**Document number 353**

**Text number 0**

Neptune is the eighth planet in the solar system and the furthest known planet from the Sun. It is the fourth largest planet in diameter and the third largest in mass. Neptune is the densest of the giant planets in the Solar System. Neptune is 17 times the mass of Earth and slightly more massive than its close twin, Uranus, which is 15 times the mass of Earth and slightly larger than Neptune.[c] Neptune orbits the Sun once every 164.8 years at an average distance of 30.1 astronomical units (4.50 × 109 km). It is named after the Roman god of the sea, and its astronomical symbol is ♆, a stylised version of Neptune's trident.

**Question 0**

Which planet is the close binary of Neptune?

**Question 1**

How much denser is Neptune compared to Earth?

**Question 2**

What is Neptune named after?

**Question 3**

What does the astronomical sign of Neptune represent?

**Question 4**

How many Earth years does Neptune orbit the Sun?

**Question 5**

What is the third largest planet in diameter

**Question 6**

What is the eighth planet from Earth?

**Question 7**

What is the least dense of the neptunes?

**Question 8**

What is 17 times smaller than a neptune?

**Question 9**

After which Greek god was Neptune named?

**Question 10**

Which planet is the opposite of Neptune?

**Question 11**

How much lighter is Neptune compared to Earth?

**Question 12**

What does the astronomical sign of Uranus represent?

**Text number 1**

Neptune is not visible to the naked eye and is the only planet in the solar system to have been discovered based on mathematical prediction rather than empirical observation. Unexpected changes in Uranus' orbit led Alexis Bouvard to conclude that its orbit was being perturbed by gravity from an unknown planet. On 23 September 1846, Johann Galle observed Neptune through a telescope at an accuracy of one degree from the position predicted by Urbain Le Verrier. Its largest moon, Triton, was discovered shortly afterwards, but none of the planet's other 14 known moons were discovered by telescope until the 1900s. The planet's distance from Earth gives it a very small apparent size, making it challenging to study with telescopes on Earth. Voyager 2 visited Neptune when it flew past the planet on 25 August 1989. The advent of the Hubble Space Telescope and large ground-based telescopes with adaptive optics has recently enabled detailed observations from afar.

**Question 0**

How was Neptune discovered?

**Question 1**

Who discovered Neptune?

**Question 2**

When was Neptune first discovered?

**Question 3**

What is Neptune's largest moon?

**Question 4**

What flew past Neptune in 1989?

**Question 5**

What is the only planet in the solar system that has been discovered by empirical observation?

**Question 6**

What led Bouvard to conclude that Neptune was the subject of a gravitational disturbance from an unknown planet?

**Question 7**

Who discovered Uranus?

**Question 8**

Who spotted Neptune with a telescope in the 1700s?

**Question 9**

When did Voyager 1 pass Neptune?

**Question 10**

How did Neptune go unnoticed before it was discovered?

**Question 11**

Who did not find Neptune?

**Question 12**

When was Neptune last observed?

**Question 13**

What is the smallest moon of Neptune?

**Question 14**

What flew past Neptune in 1988?

**Text number 2**

Neptune is similar in composition to Uranus, and both have a different composition to the big gas giants Jupiter and Saturn. Like Jupiter and Saturn, Neptune's atmosphere is composed mainly of hydrogen and helium, with residual hydrocarbons and possibly nitrogen, but it contains more 'ice', such as water, ammonia and methane. However, like Uranus, its interior is mainly composed of ice and rocks, and so Uranus and Neptune are generally considered to be 'ice giants' to emphasise this difference. Methane residues in the outer regions partly explain the planet's blue appearance.

**Question 0**

Which planet is similar in composition to Neptune?

**Question 1**

What is Neptune's atmosphere mainly made up of?

**Question 2**

What is the interior of Neptune made of?

**Question 3**

What makes Neptune blue?

**Question 4**

What are the "ices" that make up Neptune?

**Question 5**

Which two other gas giants is Neptune similar to?

**Question 6**

What gas other than oxygen makes up Neptune's atmosphere?

**Question 7**

What colour does helium make the neptune?

**Question 8**

Which planet has a different composition from Neptune?

**Question 9**

What will Neptune's atmosphere never consist of?

**Question 10**

What is the outer shell of Neptune made of?

**Question 11**

What makes Neptune red?

**Question 12**

What "rain" forms Neptune?

**Text number 3**

Unlike the fuzzy and relatively unnatural atmosphere of Uranus, Neptune's atmosphere has active and visible weather phenomena. For example, at the time of the Voyager 2 flyby in 1989, there was a large dark spot in the planet's southern hemisphere, comparable to the large red spot on Jupiter. These weather phenomena are driven by the strongest sustained winds in the solar system, reaching speeds of up to 2 100 kilometres per hour (580 m/s). Because of its great distance, Neptune's outer atmosphere is one of the coldest places in the solar system, with cloud tops reaching temperatures of almost 55 K (-218 °C). At the centre of the planet, the temperature is around 5 400 K (5 100 °C). Neptune has a faint and fragmented ring system (labelled "arcs"), first observed in the 1960s and confirmed by Voyager 2.

**Question 0**

What kind of weather did Voyager 2 observe on Neptune?

**Question 1**

Which weather feature is stronger on Neptune than on any other planet?

**Question 2**

What were the wind speeds measured on Neptune?

**Question 3**

What is the temperature of Neptune's cloud tops?

**Question 4**

What is the temperature of the planetary centre of Neptune?

**Question 5**

What detected Neptune's hazy, featureless atmosphere?

**Question 6**

When was the big red spot discovered on Jupiter?

**Question 7**

At what speed do the winds blow on Uranus?

**Question 8**

Which weather phenomenon is weakest on Neptune?

**Question 9**

What did Voyager 1 observe around Neptune in 1960?

**Question 10**

What kind of weather did Voyager 3 observe on Neptune?

**Question 11**

Which weather feature is weaker on Neptune than on any other planet?

**Question 12**

What were the rain speeds measured on Neptune?

**Question 13**

What is the temperature of Neptune's cloud bases?

**Question 14**

What is the surface temperature of the planet Neptune?

**Text number 4**

Some of the earliest telescopic observations ever made, the drawings made by Galileo on 28 December 1612 and 27 January 1613, contain plotted points corresponding to the currently known position of Neptune. On both occasions, Galileo appears to have mistaken Neptune for a fixed star when it appeared in the night sky near Jupiter, and is therefore not considered to have discovered Neptune. On the occasion of his first observation in December 1612, Neptune was almost stationary in the sky, having just that day turned retrograde. This apparent retrograde motion occurs when the Earth's orbit takes it past an outer planet. As Neptune was just starting its annual retrograde cycle, the planet's motion was far too small to be detected by Galileo's small telescope. In July 2009, University of Melbourne physicist David Jamieson reported new evidence suggesting that Galileo was at least aware that the 'star' he observed was moving relative to the fixed stars.

**Question 0**

Who drew Neptune after observing it through a telescope?

**Question 1**

Where was Neptune first thought to be?

**Question 2**

What happens when Neptune retrogrades?

**Question 3**

When was Neptune first drawn?

**Question 4**

Who has recently studied the original observation of Neptune?

**Question 5**

Who first recorded observations of Neptune in the 1500s?

**Question 6**

Who thought Neptune was Jupiter?

**Question 7**

When was Galileo believed to have discovered Neptune?

**Question 8**

Who proved that the star Galileo observed was solid?

**Question 9**

Which planet did Galileo discover at the end of his retrograde orbit?

**Question 10**

Who wrote about Neptune after observing it through a telescope?

**Question 11**

Where was Jupiter first thought to be?

**Question 12**

What doesn't happen when Neptune retrogrades?

**Question 13**

On what date was Neptune first mentioned?

**Question 14**

Who first investigated the original observation of Neptune?

**Text number 5**

In 1821, Alexis Bouvard published astronomical tables of the orbit of Neptune's neighbour Uranus. Subsequent observations revealed significant deviations from the tables, leading Bouvard to hypothesise that the orbit was perturbed by an unknown object through gravitational interaction. In 1843, John Couch Adams began calculating the orbit of Uranus on the basis of the available data. Through James Challis, Director of the Cambridge Observatory, he requested further information from the royal astronomer Sir George Airy, who supplied it in February 1844. Adams continued his work in 1845-46 and produced several different estimates of the new planet.

**Question 0**

In what year did Alexis Bouvard publish the relevant astronomical tables?

**Question 1**

What did Alexis Bouvard study?

**Question 2**

When did John Couch Adams start working on the orbit of Uranus?

**Question 3**

Who gave John Couch Adams more information?

**Question 4**

What was the result of the additional information obtained by John Couch Adams?

**Question 5**

What did Alexis Bouvard publish in the 1700s?

**Question 6**

Who published the astronomical tables of Neptune's orbit?

**Question 7**

Who gave Sir George Airy more information?

**Question 8**

What did Sir George Airy produce with the extra information?

**Question 9**

What happened in 1831?

**Question 10**

What did Alexis Bouvard teach you?

**Question 11**

When did John Couch Adams start working on the orbit of Neptune?

**Question 12**

Who stole John Couch Adams' records?

**Question 13**

What happened in February 1855?

**Text number 6**

Meanwhile, Le Verrier wrote to Johann Gottfried Galle, an astronomer at the Berlin Observatory, urging him to search with the observatory's refractor. Heinrich d'Arrest, a student at the observatory, suggested to Galle that they could compare a recently drawn celestial map of the area of Le Verrier's predicted position with the current celestial map to look for a planetary transit instead of a fixed star. On the evening of 23 September 1846, when Galle received the letter, he found Neptune within 1° of where Le Verrier had predicted it to be, about 12° from Adams' prediction. Challis later realised that he had observed the planet twice, on 4 and 12 August, but did not identify it as a planet because he did not have an up-to-date star chart and because he was distracted by his simultaneous work on comet observations.

**Question 0**

Who was Henrich d'Arrest?

**Question 1**

What was Henrich d'Arrest trying to find?

**Question 2**

When did Galle discover Neptune?

**Question 3**

How many degrees was Adams' prediction wrong?

**Question 4**

What was Challis looking for when he saw Neptune the first two times?

**Question 5**

Who told Le Verrier to search the observatory with a refractor?

**Question 6**

What did Galle propose to Heinrich d'Arrest?

**Question 7**

Who discovered Nepptune in the 1700s?

**Question 8**

What was within 10 degrees of what Le Verrier predicted?

**Question 9**

When was Le Verrier born?

**Question 10**

When did Le Verrier die?

**Question 11**

What did Henrich d'Arrest not try to find?

**Question 12**

What was 15 degrees away?

**Question 13**

What was Challis looking for when he saw Uranus the first two times?

**Text number 7**

After the discovery, there was much nationalistic rivalry between the French and the British over who deserved credit for the discovery. Eventually, there was an international consensus that both Le Verrier and Adams deserved the credit together. Since 1966, Dennis Rawlins has questioned Adams' claim of a joint discovery, and historians reassessed the issue when the Neptune Papers (historical documents) were returned to the Royal Observatory at Greenwich in 1998. After reviewing the documents, they argue that "Adams does not deserve as much credit for the discovery of Neptune as Le Verrier. That honour belongs only to the man who both predicted the planet's position and convinced astronomers to look for it."

**Question 0**

Which two countries fought over the honour of finding Neptune?

**Question 1**

Who finally deserved the credit for finding Neptune?

**Question 2**

Who questioned Adams' claim about the discovery of Neptune?

**Question 3**

Who didn't deserve the credit for finding Neptune?

**Question 4**

Who predicted the location of Neptune and got astronomers looking for it?

**Question 5**

Which two countries developed a friendship after the discovery of Neptune?

**Question 6**

Who thought Britain had discovered Neptune?

**Question 7**

Who questioned the credibility of Adam's claim in the 19th century?

**Question 8**

What documents were written in 1998?

**Question 9**

Who decided that Adam alone was responsible for finding Neptune?

**Question 10**

Which three countries disputed the honour of finding Neptune?

**Question 11**

Who finally lost the credit for finding Neptune?

**Question 12**

Who believed Adams' claim about the discovery of Neptune?

**Question 13**

Who got the credit for finding Neptune?

**Text number 8**

Le Verrier claimed the right to name his discovery, and he quickly proposed the name Neptune for the new planet, although he falsely claimed that the name had been officially approved by the French Bureau of Longitude. In October, he sought to name the planet after Le Verrier, with the staunch support of François Arago, director of the observatory. This proposal met with strong opposition outside France. French almanacs quickly reintroduced the name Herschel for Uranus, after its discoverer Sir William Herschel, and the name Leverrier for the new planet.

**Question 0**

Who claimed the right to name Neptune?

**Question 1**

What name did the discoverer want to give Neptune first?

**Question 2**

Which country adopted Neptune's first name?

**Question 3**

What first introduced the names of Neptune and Uranus?

**Question 4**

Who did not accept the first name of Neptune?

**Question 5**

What name did the French object to?

**Question 6**

What name was adopted by the French Bureau des Longitudes?

**Question 7**

What name did Le Verrier want to give Uranus?

**Question 8**

Who refused the right to name Neptune?

**Question 9**

What name did the discoverer want to give Uranus first?

**Question 10**

Which country disapproved of Neptune's first name?

**Question 11**

Which first introduced the names of Jupiter and Uranus?

**Text number 9**

In most languages, even in countries with no direct connection to Greco-Roman culture, the planet is nowadays referred to by some variant of the name "Neptune". In Chinese, Japanese and Korean, however, the name of the planet was translated as "king star of the sea" (海王星), because Neptune was the god of the sea. In Mongolian, Neptune is called Dalain Van, reflecting the role of its namesake god as ruler of the sea. In modern Greek, the planet is called Poseidon (Ποσειδώνας, Poseidonas), the Greek equivalent of Neptune. The Hebrew "Rahab" (רהב), which is derived from the biblical sea monster mentioned in the Book of Psalms, was chosen as the official name of the planet by a vote administered by the Hebrew Language Academy in 2009, although the current Latin term "Neptune" (נפטון) is commonly used. In the Māori language, the planet is called Tangaroa, named after the Māori sea god. In Nahuatl, the planet is called Tlāloccītlalli, named after the rain god Tlāloc.

**Question 0**

What is the Chinese, Japanese and Korean translation of Neptune?

**Question 1**

Which god was Neptune?

**Question 2**

What is the Mongolian name of Neptune?

**Question 3**

What did the Greeks call Neptune?

**Question 4**

What was the biblical sea monster whose name is Neptune in Hebrew?

**Question 5**

What does the Japanese name Reha mean?

**Question 6**

From which book of the Bible does the name Neptune come?

**Question 7**

Who is the Mongolian rain god?

**Question 8**

What did the ancient Greeks call Neptune?

**Question 9**

What is the French translation of Neptune?

**Question 10**

Which god was Jupiter?

**Question 11**

What is the English name of Neptune?

**Question 12**

What did the Irish call Neptune?

**Question 13**

What was the biblical land monster whose name is Neptune in Hebrew?

**Text number 10**

Neptune was the farthest known planet from the time it was discovered in 1846 until Pluto was discovered in 1930. When Pluto was discovered, it was considered a planet, and Neptune thus became the second-to-last known planet except for a 20-year period between 1979 and 1999, when Pluto's elliptical orbit brought it closer to the Sun than Neptune. The discovery of the Kuiper Belt in 1992 prompted many astronomers to debate whether Pluto should be considered a planet or part of the Kuiper Belt. In 2006, the International Astronomical Union defined the word 'planet' for the first time and reclassified Pluto as a 'dwarf planet', once again making Neptune the outermost known planet in the Solar System.

**Question 0**

What was Neptune before Pluto was discovered?

**Question 1**

At what time was Pluto closer to the Sun than Neptune?

**Question 2**

What discovery prompted astronomers to discuss Pluto's status as a planet?

**Question 3**

In what year did the International Astronomical Union define the word planet?

**Question 4**

Now that Pluto is not a planet, how is Neptune known in our solar system?

**Question 5**

What was the most distant planet known until 1846?

**Question 6**

Which planet was discovered before Neptune?

**Question 7**

Which piece was not considered a planet when it was discovered?

**Question 8**

What was Jupiter before Pluto was discovered?

**Question 9**

At what time was Jupiter closer to the Sun than Neptune?

**Question 10**

What discovery prompted astronomers to discuss Neptune's status as a planet?

**Question 11**

In what year did the International Astronomical Union define the word star?

**Question 12**

Now that Pluto is not a planet, how is Uranus known in our solar system?

**Text number 11**

Neptune's mass, 1.0243×1026 kg, is between the Earth and the larger gas giants: it is 17 times the mass of the Earth, but only 1/19 the mass of Jupiter.[d] Neptune has a gravity of 11.15 m/s2 at one bar, 1.14 times the surface gravity of the Earth, surpassed only by Jupiter. Neptune's equatorial radius of 24 764 km is almost four times that of Earth. Like Uranus, Neptune is an ice giant, a subclass of giant planets because they are smaller and contain more volatile material than Jupiter and Saturn. In the search for extra-solar planets, Neptune has been used as a metonym: discovered bodies of similar mass are often referred to as 'Neptunes', just as scientists refer to various extra-solar bodies as 'Jupiters'.

**Question 0**

What is the mass of Neptune?

**Question 1**

How much more mass does Neptune have compared to Earth?

**Question 2**

What is the gravity of Neptune at 1 bar?

**Question 3**

What is the equatorial radius of Neptune?

**Question 4**

Which Neptune is referred to because of its size and volatile content?

**Question 5**

Which planet is bigger than the gas giants?

**Question 6**

Which planet is 17 times smaller than the Earth?

**Question 7**

What is the radius of the Earth's equator?

**Question 8**

Which two planets are less volatile than Jupiter and Saturn?

**Question 9**

What is the weight of Neptune?

**Question 10**

How much less mass does Neptune have compared to Earth?

**Question 11**

What is the gravity of Neptune at 41 bars?

**Question 12**

What is the equatorial radius of Uranus?

**Question 13**

Which Neptune is referred to because of its heat and volatile content?

**Text number 12**

The mantle is equivalent to 10-15 Earths, and is rich in water, ammonia and methane. As is common in planetary science, this mixture is called icy, even though it is a hot, dense liquid. This liquid, which has a high electrical conductivity, is sometimes called a water-ammonia mixture. The mantle can consist of a layer of ionic water, where water molecules break down into a soup of hydrogen and oxygen ions, and deeper superionic water, where oxygen crystallises but hydrogen ions float freely in the oxygen lattice. At a depth of 7000 km, conditions can be such that the methane breaks down into diamond crystals, which rain down like hailstones. Experiments at very high pressure at Lawrence Livermore National Laboratory suggest that there may be an ocean of liquid carbon floating in solid 'diamonds' at the bottom of the mantle.

**Question 0**

What is abundant in Neptune's mantle?

**Question 1**

What is Neptune's hot, dense liquid?

**Question 2**

Which liquid has a high conductivity in Neptune?

**Question 3**

How deep does Neptune's water-ammonia sea go?

**Question 4**

What rains in Neptune?

**Question 5**

Whose mantle is 10-15 times bigger than Neptune's?

**Question 6**

What is the name of Neptune's cold dense liquid?

**Question 7**

What substance on Neptune blocks electricity?

**Question 8**

What kind of crystal forms 7000 km above the surface of Neoptunus?

**Question 9**

who suggested that Neptune's mantle is solid carbon?

**Question 10**

What is missing from Neptune's mantle?

**Question 11**

What is Neptune's cold, dense liquid?

**Question 12**

Which liquid on Uranus has a high conductivity?

**Question 13**

How deep does Neptune's sea of oxygen go?

**Question 14**

What rises on Neptune?

**Text number 13**

At high altitudes, Neptune's atmosphere is 80% hydrogen and 19% helium. There are also small amounts of methane. Significant methane absorption bands are found at wavelengths above 600 nm, in the red and infrared parts of the spectrum. As with Uranus, this absorption of red light by atmospheric methane is part of what gives Neptune its blue hue, although Neptune's vivid blue-green differs from Uranus' milder cyan. Since Neptune's atmosphere has a similar methane content to Uranus, some unknown atmospheric constituent is thought to contribute to Neptune's colour.

**Question 0**

What is Neptune's atmosphere made of?

**Question 1**

Where are the methane absorption lanes on Neptune?

**Question 2**

What gives Neptune its blue hue?

**Question 3**

Which planet also gets its colour from an atmospheric constituent?

**Question 4**

What colour is Uranus compared to Neptune?

**Question 5**

What will Neptune's atmosphere never consist of?

**Question 6**

Where are the oxygen absorption bands on Neptune?

**Question 7**

What gives Neptune its red hue?

**Question 8**

Which planet does not get its colour from atmospheric constituents?

**Question 9**

What colour is Jupiter compared to Neptune?

**Text number 14**

Models suggest that Neptune's troposphere contains clouds whose composition varies with altitude. The upper clouds are located at pressures below 1 bar, where the temperature is suitable for methane condensation. At pressures between one and five bar (100-500 kPa), clouds of ammonia and hydrogen sulphide are expected to form. Above 5 bar, clouds may consist of ammonia, ammonium sulphide, hydrogen sulphide and water. Deeper water ice clouds should be found at pressures of about 50 bar (5.0 MPa) at a temperature of 273 K (0 °C). Below that, clouds of ammonia and hydrogen sulphide may be present.

**Question 0**

What do the competitive variations in Neptune's clouds depend on?

**Question 1**

Which clouds on Neptune are suitable for methane condensation?

**Question 2**

What clouds form between one and five bars on Neptune?

**Question 3**

What are the clouds above the five bars of Neptune made of?

**Question 4**

What is the temperature in the clouds of Neptune at 50 bars?

**Question 5**

What do Neptune's rainfall options depend on?

**Question 6**

Which clouds on Neptune are suitable for methane expansion?

**Question 7**

What clouds form between one and six bars on Neptune?

**Question 8**

What are the clouds above the six beams of Neptune made of?

**Question 9**

What is the temperature of Neptune's clouds, which are at 500 bars?

**Text number 15**

The high clouds of Neptune have been observed to cast shadows on the opaque cloud layer below. There are also high cloud bands around the planet, which orbit the planet at a constant latitude. These orbits are 50-150 km wide and lie about 50-110 km above the cloud cover. These heights are in the layer where the weather occurs, the troposphere. Weather does not occur in the higher stratosphere or thermosphere. Unlike Uranus, Neptune has a more oceanic composition, while Uranus has a smaller mantle.

**Question 0**

Which clouds on Neptune cast shadows on the cloud cover below?

**Question 1**

What are the widths of Neptune's cloud bands?

**Question 2**

Where are the high cloud coverings of Neptune?

**Question 3**

Where on Neptune does the weather not occur?

**Question 4**

What's more about Neptune than Uranus?

**Question 5**

Which clouds on Uranus cast shadows on the cloud layer below?

**Question 6**

How long are Neptune's cloud bands?

**Question 7**

Where are the low cloud bands of Neptune?

**Question 8**

Where in Neptune does the weather always occur?

**Question 9**

What does Neptune have less of than Uranus?

**Text number 16**

The planet's thermosphere has an unusually high temperature, around 750 K. The planet is too far from the Sun for this heat to be generated by ultraviolet radiation. One candidate for a heating mechanism is the interaction of the atmosphere with ions in the planet's magnetic field. Other possible factors include gravitational waves from the interior that dissipate in the atmosphere. The thermosphere contains traces of carbon dioxide and water, which may have been deposited from external sources such as meteorites and dust.

**Question 0**

What is the temperature of Neptune in the thermosphere?

**Question 1**

What could interact with Neptune's magnetic field and cause it to heat up?

**Question 2**

What would the gravitational waves dissipate into inside Neptune?

**Question 3**

What are the traces of in Neptune's thermosphere?

**Question 4**

What is the temperature of Uranus in the thermosphere?

**Question 5**

What could interact with Neptune's magnetic field and make it cold?

**Question 6**

Where in the interior of Neptune would gravitational waves occur?

**Question 7**

What is there never a trace of in Neptune's thermosphere?

**Text number 17**

Neptune also resembles Uranus in its magnetosphere, with a magnetic field strongly tilted at an angle of 47° to its rotation axis and shifted by at least 0.55 radius, or about 13500 km from the planet's physical centre. Before Voyager 2 arrived at Neptune, it was assumed that Uranus' tilted magnetosphere was due to its lateral rotation. By comparing the magnetic fields of the two planets, scientists now believe that the extreme orientation may be typical of the currents in the planets' interiors. The field may arise from the movement of convective fluids in a thin spherical shell of electrically conductive liquids (probably a combination of ammonia, methane and water), leading to dynamo activity.

**Question 0**

What is the axis of rotation of Neptune's magnetic field?

**Question 1**

Where is Neptune's magnetic field from its physical centre?

**Question 2**

Which planet other than Neptune has a sideways orbit?

**Question 3**

What can cause Neptune to be extremely oriented?

**Question 4**

What are the liquids inside Neptune?

**Question 5**

What is the axis of rotation of Uranus' magnetic field?

**Question 6**

Where is Neptune's magnetic field externally displaced?

**Question 7**

Which planet other than Jupiter has a sideways orbit?

**Question 8**

What surely does not cause Neptune to go extreme?

**Question 9**

What liquids are not present inside Neptune?

**Text number 18**

The dipole component of the magnetic field at Neptune's magnetic equator is about 14 microtesla (0.14 G). Neptune's dipole magnetic moment is about 2.2 × 1017 T-m3 (14 μT-RN3, where RN is Neptune's radius). Neptune's magnetic field is geometrically complex, with a relatively large number of non-dipolar components, including a strong quadrupole moment that may exceed the dipole moment in strength. In contrast, Earth, Jupiter and Saturn have only relatively small quadrupole moments, and their fields are less tilted from the polar axis. Neptune's large quadrupole moment may be due to a displacement from the planet's centre and the geometric constraints of the field dynamo generator.

**Question 0**

What is the dipole magnetic moment of Neptune?

**Question 1**

What is one non-dipolar component of Neptune that can exceed the strength of the dipole moment?

**Question 2**

Which three planets have small quadrupole moments compared to Neptune?

**Question 3**

Besides the geometric limitations of the Neptune dynamo generator, what is the other result of the quadrupole moment?

**Question 4**

What is the dipole component of the magnetic field at the magnetic equator of Neptune?

**Question 5**

What is Jupiter's dipole magnetic moment?

**Question 6**

What is one non-dipolar component of Neptune that can exceed the dipole moment of weakness?

**Question 7**

What is the fourth planet with small quadrupole moments compared to Neptune?

**Question 8**

What is the dipole component of Uranus' magnetic field at the magnetic equator?

**Question 9**

Besides the geometric limitations of Neptune's dynamo generator, what is another reason for the quadrupole moment?

**Text number 19**

Neptune has a planetary ring system, although it is much smaller than Saturn. The rings may consist of ice particles coated with silicates or a carbon-based substance, which probably gives them a reddish hue. The three main rings are the narrow Adams ring, 63 000 km from the centre of Neptune, the Le Verrier ring, 53 000 km away, and the wider, fainter Galle ring, 42 000 km away. The weak outer extension of Le Verrier's ring is called the Lassell ring; its outer edge is bounded by the Aragon ring at 57 000 km.

**Question 0**

What is the Saturn-like system on Neptune?

**Question 1**

What might the rings of Neptune consist of?

**Question 2**

What might the ice particles in Neptune's rings be coated with?

**Question 3**

Where is Adams' ring from the centre of Neptune?

**Question 4**

Where is La Verrier's ring from the centre of Neptune?

**Question 5**

What system, like Jupiter, does Neptune have?

**Question 6**

What are the rings of Neptune not made of?

**Question 7**

What are the ice particles in Neptune's rings not coated with?

**Question 8**

Where is Johns' ring from the centre of Neptune?

**Question 9**

Where is Walter's ring from the centre of Neptune?

**Text number 20**

Neptune's weather is characterised by highly dynamic storm systems, with winds reaching speeds of almost 600 m/s (2 200 km/h), which is almost supersonic. More typically, by following the movement of persistent clouds, wind speeds have been shown to range from 20 m/s in an easterly direction to 325 m/s in a westerly direction. Wind speeds at the cloud tops range from 400 m/s at the equator to 250 m/s at the poles. Most of Neptune's winds move against the direction of the planet's rotation. The general pattern of winds showed a prograde rotation at high latitudes and a retrograde rotation at lower latitudes. The difference in flow direction is believed to be a "skin effect" and not due to any deeper atmospheric processes. At 70° south latitude, the high-speed jet travels at 300 m/s.

**Question 0**

What is the dynamic weather like on Neptune?

**Question 1**

What are Neptune's wind speeds?

**Question 2**

What is the high wind speed on Neptune's cloud surfaces?

**Question 3**

Which way are the winds of Neptune blowing in terms of plant rotation?

**Question 4**

What is the name given to the effect that describes the direction of the current in Neptune?

**Question 5**

What is the calm weather like on Neptune?

**Question 6**

What are the slowest wind speeds on Neptune?

**Question 7**

What is the low wind speed of Neptune's cloud tops?

**Question 8**

Which way is Neptune's rain moving in terms of plant rotation?

**Question 9**

What is the name given to the phenomenon that describes the direction of the flow on Jupiter?

**Text number 21**

In 2007, it was found that the upper troposphere at Neptune's south pole was about 10 K warmer than the rest of its atmosphere, which averages about 73 K (-200 °C). The temperature difference is sufficient to allow methane that is frozen elsewhere in the troposphere to escape into the stratosphere near the pole. The relative "hot spot" is due to the axial tilt of Neptune, which has exposed the south pole to the sun for the last quarter of Neptune's season, or about 40 Earth years. As Neptune moves slowly towards the opposite side of the Sun, the South Pole darkens and the North Pole brightens, shifting the release of methane to the North Pole.

**Question 0**

How much warmer is Neptune's south pole compared to the rest of its atmosphere?

**Question 1**

What is the average temperature at the south pole of Neptune?

**Question 2**

Where does the methane from Neptune's south pole escape to?

**Question 3**

How many Earth years is Neptune's south pole exposed to the sun?

**Question 4**

Which pole does Neptune's methane move to when it moves to the opposite side of the Sun?

**Question 5**

How much colder is Neptune's south pole than the rest of its atmosphere?

**Question 6**

What is the average temperature at the North Pole of Neptune?

**Question 7**

Where does the methane from Neptune's north pole escape to?

**Question 8**

How many Martian years is Neptune's south pole exposed to the sun?

**Question 9**

Which pole does Neptune's methane move to when it moves to the same side of the Sun?

**Text number 22**

Scooter is another storm, a group of white clouds further south than the Great Dark Cloud. This nickname first emerged in the months leading up to Voyager 2's 1989 encounter, when it was discovered that they were moving faster than the Great Dark Cloud (and later images later revealed that the clouds were moving even faster than the clouds originally detected by Voyager 2). The Little Dark Spot is a southerly cyclonic storm that was the second most powerful storm observed during the 1989 encounter. It was initially completely dark, but as Voyager 2 approached the planet it developed a bright core, which is visible in most of the highest resolution images.

**Question 0**

Which white cloud group on Neptune is further south than the dark large dot?

**Question 1**

When was Neptune's scooter discovered?

**Question 2**

What kind of storm is Neptune's scooter?

**Question 3**

What was observed in the storms on Neptune?

**Question 4**

What is the second most powerful storm on Neptune?

**Question 5**

Which dark cloud group on Neptune is farther south than the light large dot?

**Question 6**

When was Neptune's Pooter discovered?

**Question 7**

What kind of storm is Pooter on Neptune?

**Question 8**

What did not detect Neptune's storms?

**Question 9**

What is the third most powerful storm on Neptune?

**Text number 23**

Neptune's dark spots are thought to occur lower in the troposphere than the brighter cloud features, so they appear as holes in the upper cloud layers. Because they are stable features that can persist for several months, they are thought to be vortex structures. Dark spots are often associated with brighter, persistent methane clouds that form around the tropopause layer. The persistence of companion clouds suggests that some former dark clouds may continue to exist as cyclones, although they no longer appear as dark features. Dark clouds may break up when they move too close to the equator or possibly by some other unknown mechanism.

**Question 0**

Where are Neptune's dark spots thought to occur?

**Question 1**

What do the dark spots of Neptune look like in the cloud cover?

**Question 2**

Since Neptune's dark spots last for several months, what are they believed to be?

**Question 3**

What about Neptune has dark spots that are brighter?

**Question 4**

What do the dark spots on Neptune do when they move too close to the equator?

**Question 5**

Where are Neptune's points of light believed to occur?

**Question 6**

What do Neptune's points of light look like in the cloud cover?

**Question 7**

Since Neptune's luminosities last for several months, what are they believed to be?

**Question 8**

What are the bright spots in Neptune that are brighter?

**Question 9**

When Neptune's points of light move too close to the equator, what do they do?

**Text number 24**

The more variable weather compared to Neptune's Uranus is partly due to its greater internal warming. Although Neptune is more than 50% further away from the Sun than Uranus and receives only 40% of its sunlight, the surface temperatures of the two planets are roughly the same. In the upper regions of Neptune's troposphere, the temperature is 51.8 K (-221.3 °C). At a depth of 1 bar (100 kPa), the temperature is 72.00 K (-201.15 °C). Deeper inside the gas layers, the temperature rises steadily. As with Uranus, the source of this warming is unknown, but the difference is greater: Uranus radiates only 1.1 times as much energy as it receives from the Sun, while Neptune radiates about 2.61 times as much energy as it receives from the Sun. Neptune is the furthest planet from the Sun, but it still has enough internal energy to power the fastest planetary wind observed in the Solar System. Depending on the thermal properties of its interior, the heat left over from Neptune's formation may be sufficient to explain its current heat flux, although it is more difficult to simultaneously explain Uranus' lack of internal heat while maintaining the apparent similarity between the two planets.

**Question 0**

Why might Neptune have more variable weather than Uranus?

**Question 1**

How much further away is Neptune from the Sun than Uranus?

**Question 2**

How much of the Sun does Neptune get compared to Uranus?

**Question 3**

How much more energy does Neptune radiate than it receives?

**Question 4**

What explains Neptune's current heat flux?

**Question 5**

Why might Uranus have more variable weather than Jupiter?

**Question 6**

How much further away is Neptune from the Moon than Uranus?

**Question 7**

How much of the Sun does Neptune get compared to Jupiter?

**Question 8**

How much more energy does Jupiter radiate than it receives?

**Question 9**

What explains Neptune's current cold flow?

**Text number 25**

On 11 July 2011, Neptune made its first full barycentric orbit since it was discovered in 1846, although it did not appear in the sky exactly where it was discovered, because the Earth was in a different orbit for 365.26 days. Since the Sun moves relative to the barycentre of the solar system, Neptune was also not at its exact discovery position relative to the Sun on 11 July; if the more common heliocentric coordinate system is used, the discovery latitude was reached on 12 July 2011.

**Question 0**

When did Neptune complete its first barycentric orbit after its discovery?

**Question 1**

What is the Earth's orbit?

**Question 2**

When did Neptune reach discovery altitude using the heliocentric coordinate system?

**Question 3**

Why did Neptune not appear to be in the exact position it was found?

**Question 4**

When did Neptune make its last barycentric orbit after its discovery?

**Question 5**

When did Jupiter reach discovery altitude using the heliocentric coordinate system?

**Question 6**

Why did Neptune appear to be in its exact discovery position?

**Text number 26**

Neptune's orbit has a major influence on the region directly behind it, known as the Kuiper Belt. The Kuiper Belt is a ring of small icy worlds that resembles the asteroid belt but is much larger, extending from Neptune's orbit at a distance of 30 AU to about 55 AU from the Sun. In the same way that Jupiter's gravity dominates the asteroid belt and shapes its structure, Neptune's gravity dominates the Kuiper belt. As the solar system aged, Neptune's gravity destabilised certain regions of the Kuiper belt, creating gaps in the Kuiper belt's structure. An example of this is the region between 40 and 42 AU.

**Question 0**

What is the name of the area behind Neptune?

**Question 1**

What is Kuiper's belt made of?

**Question 2**

Where is Kuiper's belt in relation to Neptune?

**Question 3**

What dominates the Kuiper zone?

**Question 4**

What did Neptune's gravity do to Kuiper's zone?

**Question 5**

What is the name of the region behind Jupiter?

**Question 6**

What does Kuiper's belt not consist of?

**Question 7**

Where is Kuiper's belt in relation to Mars?

**Question 8**

What does not control the Kuiper Belt?

**Question 9**

What did Jupiter's gravity do to the Kuiper belt?

**Text number 27**

In these empty regions, orbits exist where objects can survive for the age of the Solar System. These resonances occur when the orbital period of Neptune is an exact fraction of the orbital period of the object, for example 1:2 or 3:4. For example, if an object orbits the Sun once for every two orbits of Neptune, it will only orbit half of the orbit when Neptune returns to its original position. The most densely populated resonance in the Kuiper belt, with more than 200 known objects, is a 2:3 resonance. The objects in this resonance orbit two orbits for every three orbits of Neptune, and are called plutinos because the largest known Kuiper Belt object, Pluto, is among them. Although Pluto crosses Neptune's orbit regularly, the 2:3 resonance ensures that they can never collide. Resonances of 3:4, 3:5, 4:7 and 2:5 are less common.

**Question 0**

What is the fraction of the most densely populated resonance in the Kuiper belt?

**Question 1**

How many known sites are in the most densely populated resonance of the Kuiper belt?

**Question 2**

What is the most famous and largest site in the Kuiper belt?

**Question 3**

What is Pluto's resonance in the Kuiper belt?

**Question 4**

Which resonances are less common in the Kuiper zone?

**Question 5**

What is the fraction of the most densely populated resonance in Jupiter's belt?

**Question 6**

How many unknowns are there in the most densely populated resonance of the Kuiper belt?

**Question 7**

What is the least known item on Kuiper's belt?

**Question 8**

Which resonances are more on Kuiper's belt?

**Question 9**

What is Jupiter's resonance in the Kuiper belt?

**Text number 28**

Neptune has several known Trojan points located at both the L4 and L5 points on the Sun-Neptune meridian, which are gravitationally stable regions in Neptune's orbit. Neptune's Trojans can be considered to be in 1:1 resonance with Neptune. Some of Neptune's Trojans are remarkably stable in their orbits, and are likely to have formed alongside Neptune rather than being captured. The first and so far only object identified to be associated with a Neptune trailing L5-agrangian is 2008 LC18. Neptune also has a temporary quasisatellite, (309239) 2007 RW10. The object has been a Neptune quasisatellite for about 12 500 years and will remain in this dynamic state for another 12 500 years.

**Question 0**

What is the resonance of Neptune's Trojans?

**Question 1**

Where did most of the Neptunian Trojans form?

**Question 2**

What is the only object that has been identified with the L5 Lagrange point trailing Neptune?

**Question 3**

What is the name of Neptune's temporary quasisatellite?

**Question 4**

How long has the Neptune quasisatellite been with Neptune?

**Question 5**

What is the resonance of the Jupiter Trojans?

**Question 6**

Where did most Jupiter Trojans form?

**Question 7**

What is not an object identified as a point on the L5 diagram trailing Neptune?

**Question 8**

What is the name of the real temporary satellite of Neptune?

**Question 9**

How long has the actual satellite of Neptune been on Neptune?

**Text number 29**

The formation of the ice giants Neptune and Uranus has been difficult to model accurately. Current models suggest that the density of matter in the outer regions of the Solar System was too low for such large bodies to have formed by the traditionally accepted method of nucleus accretion, and various hypotheses have been put forward to explain their formation. One is that the ice giants formed not through nucleation but as a result of instabilities in the original protoplanetary disk, and that radiation from a nearby massive OB star later blew away their atmospheres.

**Question 0**

What could have blasted Neptune and Uranus with atmospheric radiation that would have helped creation?

**Question 1**

What is too low to explain the formation of Neptune?

**Question 2**

If Neptune formed from the instabilities of the original protoplanetary disk, what did it not form from?

**Question 3**

What didn't blow up the atmosphere of Neptune and Uranus with radiation that helped creation?

**Question 4**

What is too high to explain the formation of Neptune?

**Question 5**

If Neptune did not form from the instabilities of the original protoplanetary disk, what did it form from?

**Text number 30**

An alternative view is that they formed closer to the Sun, where the density of matter was higher, and then moved to their current orbits after the gaseous protoplanetary disk left. This post-formation migration hypothesis is favoured because it better explains the occupation of the small body populations observed in the transneptunian region. The currently most widely accepted explanation of the details of this hypothesis is known as the Nice model, which studies the influence of migrating Neptune and other giant planets on the structure of the Kuiper belt.

**Question 0**

If Neptune formed closer to the Sun, what is the density of matter?

**Question 1**

If Neptune was born closer to the Sun, what caused it to move into its current orbit?

**Question 2**

What is the most widely accepted explanation for the formation of Neptune?

**Question 3**

What, according to the Nice model, contributed to the transit of Neptune?

**Question 4**

If Jupiter had formed closer to the Sun, what would the density of matter be?

**Question 5**

If Pluto was born closer to the Sun, what caused it to move into its current orbit?

**Question 6**

What is the least accepted explanation for the formation of Neptune?

**Question 7**

What, according to the Nice model, contributed to Jupiter's move?

**Text number 31**

Neptune has 14 known moons. Triton is Neptune's largest moon, accounting for more than 99.5% of the mass in Neptune's orbit[e], and is the only one massive enough to be spherical. William Lassell discovered Triton just 17 days after the discovery of Neptune itself. Unlike all the other large moons in the Solar System, Triton has a retrograde orbit, suggesting that it was captured rather than formed in place; it was probably once a dwarf planet in the Kuiper Belt. It is close enough to Neptune to be locked in synchronous orbit, and it rotates slowly inwards due to tidal acceleration. It will eventually break apart after about 3.6 billion years, when it reaches the edge of Roche. In 1989, Triton was the coldest object with an estimated temperature of 38 K (-235 °C) yet measured in the Solar System.

**Question 0**

How many moons does Neptune have?

**Question 1**

What is Neptune's largest moon?

**Question 2**

Who found Triton?

**Question 3**

What kind of orbit does Triton have around Neptune?

**Question 4**

What does the orbit of Triton tell us about its relationship to Neptune?

**Question 5**

Which planet has 13 moons?

**Question 6**

What is the smallest moon?

**Question 7**

Who failed to find Triton?

**Question 8**

What orbit does Triton take around Jupiter?

**Question 9**

What does Triton's orbit tell us about its relationship with Jupiter?

**Text number 32**

From July to September 1989, Voyager 2 discovered six of Neptune's moons. Of these, the irregularly shaped Proteus is as large as a body of its density can be without its own gravity pulling it into the shape of a sphere. Although it is the second most massive moon on Neptune, its mass is only 0.25% of that of Triton. Neptune's four inner moons - Naiad, Thalassa, Despina and Galatea - orbit close enough to Neptune's rings. Larissa, the next most distant, was originally discovered in 1981 after it had occulted the star. This occultation was thought to be caused by a ring shadow, but when Voyager 2 observed Neptune in 1989, Larissa was found to be the cause. In 2004, five new irregular moons were reported, discovered between 2002 and 2003. A new moon, and the smallest so far, S/2004 N 1, was discovered in 2013. Since Neptune was the Roman god of the sea, the moons of Neptune are named after smaller sea gods.

**Question 0**

What discovered the six moons of Neptune in 1989?

**Question 1**

What is the second most massive moon of Neptune?

**Question 2**

What is noteworthy about the Proteus moon?

**Question 3**

What are the four inner moons of Neptune?

**Question 4**

When was Neptune's moon Larissa discovered?

**Question 5**

What discovered the five moons of Neptune in 1989?

**Question 6**

What is the second least massive moon on Neptune?

**Question 7**

What is not worth noting on the moon Proteus?

**Question 8**

What are the four outer moons of Neptune?

**Question 9**

What was discovered in 1984?

**Text number 33**

Because Neptune is far from Earth, it has an angular diameter of only 2.2-2.4 arcseconds, the smallest of any planet in the Solar System. Its small apparent size makes it challenging to study visually. Most telescope data were quite limited until the Hubble Space Telescope (HST) and large ground-based telescopes with adaptive optics (AO) came on the market. The first scientifically useful observation of Neptune from ground-based telescopes using adaptive optics was made in 1997 from Hawaii. Neptune is currently entering its spring and summer seasons and has been shown to be warming up, resulting in increased atmospheric activity and brightness. With advances in technology, ground-based telescopes with adaptive optics are capturing increasingly detailed images of this outer planet. Both HST and AO telescopes on Earth have made many new discoveries of the Solar System since the mid-1990s, and the number of known satellites and moons around the outer planets, for example, has increased dramatically. In 2004 and 2005, five new small satellites of Neptune were discovered, ranging from 38 to 61 kilometres in diameter.

**Question 0**

What is the angular diameter of Neptune?

**Question 1**

Which telescope made it easier to study Neptune?

**Question 2**

When was the first useful observation of Neptune made from Earth?

**Question 3**

What seasons is Neptune currently moving into?

**Question 4**

What was discovered around Neptune in 2004 and 2005?

**Question 5**

What is the angular altitude of Neptune?

**Question 6**

Which telescope made it easier to study Jupiter?

**Question 7**

What happened in 1978?

**Question 8**

What seasons is Uranus currently moving into?

**Question 9**

What was discovered around Neptune in 2008 and 2009?

**Text number 34**

Voyager 2 is the only spacecraft to have visited Neptune. The closest approach to the planet was on 25 August 1989. As this was the last major planet that the spacecraft could visit, it was decided to make a close flyby of Triton, regardless of the consequences for the trajectory, in the same way as Voyager 1's encounter with Saturn and its moon Titan. The images sent back to Earth by Voyager 2 became the basis for the 1989 PBS all-night programme Neptune All Night.

**Question 0**

What is the only spacecraft to have visited Neptune?

**Question 1**

When did the spacecraft get closest to Neptune?

**Question 2**

Where near Neptune did the spacecraft come dangerously close?

**Question 3**

Which PBS program about Neptune was aired?

**Question 4**

What is the only spacecraft that has never visited Neptune?

**Question 5**

When did a spacecraft refuse to come close to Neptune?

**Question 6**

Where did the spacecraft land near Neptune?

**Question 7**

Which NBC programme about Neptune was aired?

**Question 8**

What was shown in 1984?

**Text number 35**

After the Voyager 2 flyby, the next step in the scientific exploration of the Neptune system will be the orbital exploration of the flagship. Such a hypothetical mission is thought to be possible in the late 2020s or early 2030s. However, the launch of Neptune missions earlier than this has been discussed on several occasions. In 2003, NASA's "Vision Missions Studies" published a proposal for a "mission to orbit Neptune with probes" to do Cassini-level science. Another, more recent proposal was for the 2019 launch of the Argo flyby, which would visit Jupiter, Saturn, Neptune and the Kuiper Belt. The main focus would be on Neptune and its largest moon Triton, which would be explored around 2029. The proposed New Horizons 2 mission (later rejected) could also have made a close flyby of the Neptune system.

**Question 0**

When is the next hypothetical mission to Neptune?

**Question 1**

What did NASA propose about Neptune in 2003 in its "Vision Missions Studies" project?

**Question 2**

When will Argo be triggered?

**Question 3**

Where does Argo visit?

**Question 4**

When can we expect Argo to visit Triton?

**Question 5**

When is the next mission to Neptune planned?

**Question 6**

What did NASA suggest about Uranus in its 2003 "Vision Missions Studies"?

**Question 7**

What will start in 2027?

**Question 8**

What is Larrgo going to see?

**Question 9**

When can we expect Argo to visit Mars?

**Document number 354**

**Text number 0**

The rail electrification system supplies electric power to trains and trams without an on-board power source or local fuel supply. Electrification has many advantages, but requires a significant capital outlay. The choice of electrification system is based on the economics of energy supply, maintenance and capital costs compared to the revenues generated by freight and passenger traffic. Different systems are used in urban and interurban areas; some electric locomotives can switch to different supply voltages, allowing flexible operation.

**Question 0**

On what factors does the capital cost of an electrification system depend?

**Question 1**

How do some locomotives work to make their use more flexible?

**Question 2**

What is the main drawback of rail electrification?

**Question 3**

Which two types of income are generated by rail transport?

**Question 4**

Which system will provide nuclear power for trains?

**Question 5**

What requires low capital expenditure?

**Question 6**

What are the same systems used for both urban and long-distance transport?

**Question 7**

Why can all electric locomotives switch to different supply voltages?

**Question 8**

The railway electrification system supplies power to trains and trams with on-board what?

**Text number 1**

Electric railways use electric locomotives to transport passengers or freight in separate carriages or in electric motor carriages with their own motors. Electricity is usually generated in large and relatively efficient power stations, transmitted to the rail network and distributed to trains. Some railways have their own substations and transmission lines, but most buy their electricity from the utility. The railways usually provide their own distribution lines, switches and transformers.

**Question 0**

What is used to transport passenger cars?

**Question 1**

How is electricity produced for electric locomotives?

**Question 2**

Who provides the distribution cables, switches and transformers?

**Question 3**

Which railways carry passengers and freight in the same wagons?

**Question 4**

What is typically produced in small power plants?

**Question 5**

All electricity circuits have their own what?

**Question 6**

Who do very few people buy electricity from?

**Question 7**

What happens at relatively inefficient stations?

**Text number 2**

Compared to the main alternative, the diesel engine, electric railways offer significantly better energy efficiency, lower emissions and lower operating costs. Electric locomotives are generally quieter, more efficient, more responsive and more reliable than diesel locomotives. They have no local emissions, which is an important advantage in tunnels and urban areas. Some electric traction systems have regenerative braking, which converts the kinetic energy of the train back into electricity and returns it to the supply network for use by other trains or the public electricity grid. Diesel locomotives burn oil, but electricity is generated from a variety of sources, including many that do not produce carbon dioxide, such as nuclear power, and from renewable energy sources such as hydropower, geothermal energy, wind power and solar energy.

**Question 0**

What is the main alternative to electric railways?

**Question 1**

Which locomotives are generally more reliable?

**Question 2**

What do some electronic betting systems offer?

**Question 3**

What kind of fuel do diesel locomotives use?

**Question 4**

What is the source of electricity?

**Question 5**

What does not offer better emission efficiency?

**Question 6**

Electricity is produced from many sources that produce carbon dioxide, what?

**Question 7**

electricity is produced from non-renewable energy sources, such as?

**Question 8**

Which locomotives have no global emissions at all?

**Question 9**

What kind of braking is provided by all electric traction systems?

**Text number 3**

The disadvantages of electric traction include high capital costs, which can be uneconomical on low-traffic routes, a relative lack of flexibility as electric trains need electrified tracks or supercapacitors and charging infrastructure at stations, and vulnerability to blackouts. Different supply voltages and frequencies may be used in different regions, which complicates through-traffic. Limited clearances on connecting trains may prevent efficient double-deck container traffic. Lethal voltages on the contact wires and third rail pose a safety risk to track workers, passengers and intruders. Overhead wires are safer than the third rail, but are often seen as an eyesore.

**Question 0**

What can make electric rail transport more difficult?

**Question 1**

What is the safety risk for railway workers?

**Question 2**

What is a safer alternative to third rails?

**Question 3**

Why are overhead lines not widely used?

**Question 4**

The benefits of e-Attractiveness include?

**Question 5**

The same supply voltages are used in all areas and?

**Question 6**

For whom are lethal voltages on overhead contact lines and third rails not a safety risk?

**Question 7**

Third rails are safer than overhead lines, but what are they?

**Text number 4**

Railways must operate at variable speeds. Until the mid-1980s, this was only possible with a brush-type DC motor, although such DC power can be supplied from an AC overhead line by means of an on-board electrical energy converter. Since such conversion was not very sophisticated in the late 19th and early 20th centuries, most early electrified railways used DC power, and many railways, especially express trams and trams, still do. Speed was controlled by connecting traction motors in various series-parallel combinations, varying the fields of the traction motors, and adding and removing starting resistors to limit motor current.

**Question 0**

What is the speed limit on railways?

**Question 1**

Why is a DC motor used more than an AC motor?

**Question 2**

Which two types of rail transport still use DC motors?

**Question 3**

Which must operate at constant speed?

**Question 4**

The speed was adjusted by disconnecting the drive motors from where?

**Question 5**

At what speeds does a brush-type BC motor work?

**Question 6**

What type of motor was used in all early electric motors?

**Question 7**

Changing the fields of the displacement motors helped to control what?

**Text number 5**

Motors have very little room for electrical insulation, so their voltage ratings are usually low. Since transformers (before the development of power electronics) cannot reduce DC voltage, trains were supplied with a relatively low DC voltage that can be used directly by motors. The most common DC voltages are listed in the previous section. Third (and fourth) rail systems almost always use voltages below 1 kV for safety reasons, while overhead lines generally use higher voltages for efficiency. ("Low" voltage is relative; even 600 V can be instantly lethal when touched.)

**Question 0**

Why is there little room for insulation in engines?

**Question 1**

What is the most common evaporation zone used by the rail system?

**Question 2**

Why do railway systems almost always use 1 kV?

**Question 3**

Which system uses higher voltages?

**Question 4**

Is the "low voltage" used by trains safe for people?

**Question 5**

How many volts can be considered non-fatal when touched?

**Question 6**

Engines have plenty of room for electronic what?

**Question 7**

What can reduce DC voltage?

**Question 8**

In the fifth (and sixth) rail system, what voltages are used for safety reasons?

**Question 9**

What has high voltage?

**Text number 6**

However, rail operators have shown interest in returning to DC trains at higher voltages. At the same voltage, DC often has lower losses than AC, which is why high-voltage DC is already used on some high-voltage transmission lines. DC avoids the electromagnetic radiation associated with AC, and on railways this also reduces interference with signalling and communication systems and mitigates the risks from electromagnetic fields. DC also avoids the power factor problems of AC. Of particular interest in rail transport is the fact that DC can supply constant power with a single ungrounded wire. Constant AC power requires a three-phase transmission with at least two ungrounded wires. Another important consideration is that the three-phase AC line frequency must be carefully designed to avoid unbalanced phase loads. System components are fed from different phases assuming that the total three-phase loads are balanced. Long isolated supply interruptions are required at the phase disconnection points between areas supplied from different phases to avoid short circuits caused by rolling stock using more than one pantograph pantograph at the same time. A few railways have experimented with a three-phase system, but its considerable complexity has made the single-phase system the standard practice, despite the fact that the electrical current is interrupted twice in each cycle. An experimental 6 kV DC line was built in the Soviet Union.

**Question 0**

What kind of electrical power guarantees lower losses?

**Question 1**

What type of electric motor supply produces electromagnetic radiation?

**Question 2**

What can electromagnetic radiation interfere with?

**Question 3**

What type of electricity requires three-phase transmission?

**Question 4**

Where was the experimental 6 kV DC line built?

**Question 5**

Rail operators have shown little interest in returning to what?

**Question 6**

What is used on all bulk power transmission lines?

**Question 7**

DC can supply variable power with a single underground what?

**Question 8**

What requires a four-phase transmission with at least two underground lines?

**Question 9**

How many railway companies have experimented with four-phase systems?

**Text number 7**

1 500 V DC is used in the Netherlands, Japan, the Republic of Indonesia, Hong Kong (partly), the Republic of Ireland, Australia (partly), India (only in the Mumbai area, which has been converted to 25 kV AC like the rest of India), France (also with 25 kV 50 Hz AC), New Zealand (Wellington) and the United States (in the Chicago area on Metra Electric and on the South Shore Line). In Slovakia, there are two narrow-gauge lines on the Upper Tatra (one rack-and-pinion). In Portugal it is used on the Cascais line and in Denmark on the suburban S-train system.

**Question 0**

What is the most common DC voltage?

**Question 1**

How many narrow-gauge lines are there in Slovakia?

**Question 2**

Which railway line is used in Portugal?

**Question 3**

Where in India has the line been converted to alternating current?

**Question 4**

Where in Romania are there two narrow-gauge railway lines?

**Question 5**

Where is the pig train located?

**Question 6**

Where is the Cascade Line located?

**Question 7**

Which Connecticut county uses 1500 V DC?

**Question 8**

What is used on the South Shore Line suburban line?

**Text number 8**

3 kV DC is used in Belgium, Italy, Spain, Poland, the northern part of the Czech Republic, Slovakia, Slovenia, South Africa, Chile and the countries of the former Soviet Union (where 25 kV 50 Hz AC is also used). It was formerly used by the Milwaukee Road from Harlowton, Montana to Seattle-Tacoma, over the Mannerheim Road and extensive branch and loop lines in Montana, the Delaware, Lackawanna & Western Railroad (now New Jersey Transit, converted to 25 kV AC) in the US and the Kolkata Suburban Railway (Bardhaman Main Line) in India, before being converted to 25 kV 50 Hz AC.

**Question 0**

What voltage is used in the South African and Chilean railway system?

**Question 1**

What other type of power plant is used in the countries of the former Soviet Union besides 3 kV DC?

**Question 2**

What was the former name of New Jersey Transit?

**Question 3**

Which US rail system uses DC or AC?

**Question 4**

What did Mississippi formally use?

**Question 5**

What are the current Soviet countries using?

**Question 6**

What is used for transit in New York in the United States?

**Question 7**

Where is the Kukuburra Suburban Railway located?

**Question 8**

Where was the Kolkata suburban railway in India transformed from?

**Text number 9**

Most electrification systems use overhead lines, but a third rail is an option for voltages up to around 1 200 V. Third rail systems use exclusively DC distribution. The use of alternating current is not possible because the dimensions of the third rail are physically very large compared to the penetration depth of alternating current (0,3 mm or 0,012 inches on a steel rail). This effect makes the resistance per unit length disproportionately high compared to DC current. The third rail is smaller than overhead lines and can be used in smaller diameter tunnels, an important factor in metro systems.

**Question 0**

Which type of overhead or overhead line is most often used?

**Question 1**

Is the trird rail system used exclusively on AC or DC power?

**Question 2**

How deep does the alternating current penetrate the steel rail?

**Question 3**

Which is physically tighter, a three-wire or an overhead line?

**Question 4**

What is preferable for metro lines?

**Question 5**

What kind of wires are used in all electrical systems?

**Question 6**

At what voltage does the third rail operate?

**Question 7**

Overhead wires are tighter than the third rail, and what can they be used for?

**Question 8**

What is considered irrelevant for the metro?

**Question 9**

Overhead wires are considered to be physically very what?

**Text number 10**

DC systems (especially third track systems) are limited to relatively low voltages, which can limit the size and speed of trains, cannot use low platforms and also limit the ventilation possibilities for trains. This may be a factor favouring overhead lines and high voltage AC even in urban applications. In practice, the top speed of trains on third-rail systems is limited to 160 km/h (100 mph), because at speeds above this limit a reliable shoe-to-rail contact cannot be maintained.

**Question 0**

Why can a DC system affect the speed of trains?

**Question 1**

Can DC systems use a low-level platform?

**Question 2**

Apart from speed and size, what else can be affected by low voltage in a DC system?

**Question 3**

What is the speed limit for trains on the third rail system?

**Question 4**

What can become unreliable if the speed exceeds the 100 mph speed limit for DC trains?

**Question 5**

DC systems are limited to relatively high what?

**Question 6**

What is the minimum speed limit for trains on third track systems?

**Question 7**

Above which speed does the contact between the shoe and the rail remain reliable?

**Question 8**

What cannot limit the size and speed of trains?

**Question 9**

What is not in favour of overhead lines and high-voltage alternating current?

**Text number 11**

Some trams used tubular conductors to collect power from the third rail. The third rail was below street level. The tram picked up power through a plow (U.S. "plow"), which was accessed through a narrow gap in the road. In the US, much (though not all) of the former Washington streetcar system (abolished in 1962) operated this way to avoid the unsightly wires and poles associated with electric traction. The same was true of the former Manhattan streetcar system. Traces of this mode of operation can still be seen in central London, UK, on the slope at the north entrance of the abandoned Kingsway Tramway subway, where the gap between the rails is clearly visible, and on P and Q streets west of Wisconsin Avenue in the Georgetown district of Washington DC, where the abandoned tracks have not yet been paved. The gap can easily be mistaken for a similar looking gap in cable cars (in some cases, the conduit gap was originally a cable gap). The disadvantages of collecting conduit were much higher initial installation costs, higher maintenance costs and problems with leaves and snow getting into the opening. For this reason, in Washington, D.C., the cars on some lines were converted to overhead wires when leaving the city center, with one worker in the "plow pit" unhooking the plow while another lifted the car's pole (which was previously hooked to the roof) into the overhead wire. In New York, for similar reasons of cost and operational efficiency, an overhead cable was used outside Manhattan. A similar system of switching from tube to overhead conductor was also used on London trams, particularly in the south; a typical interchange was at Norwood, where the tube snaked between the side rails and provided a parking space for loose shoes or ploughs.

**Question 0**

What is the second name of the street trams?

**Question 1**

Where is the third rail in the tram system?

**Question 2**

In which region of the United States did the use of overhead wires on trams stop in 1962?

**Question 3**

What external and weather conditions can affect the pipe leakage?

**Question 4**

What are the main reasons for converting pipelines to overhead systems?

**Question 5**

All streetcars use a tube what?

**Question 6**

Where can you get to through the wide gap in the road?

**Question 7**

In which New York borough have abandoned tracks not been paved?

**Question 8**

The advantage of pipe collection is much higher what?

**Question 9**

In which city have cars on all lines been converted to overhead wires?

**Text number 12**

A new approach to avoiding overhead lines is the "second generation" tram and tramway system in Bordeaux, France (the first line was put into service in December 2003; the original system was discontinued in 1958), with APS (alimentation par sol - overhead power supply). This includes a third rail, flush with the surface like the tops of the running rails. The current circuit is divided into segments, and each segment is energised in turn by the trolley sensors as the trolley passes over it, with the remainder of the third rail 'dead'. Because the long articulated trolley completely covers each energized segment and shuts down before the vehicle passes, there is no danger to pedestrians. This system has also been introduced in some parts of the new tram systems in Reims (opened in 2011) and Angers (also opened in 2011) in France. Several other new services have been proposed, including in Dubai (United Arab Emirates), Barcelona (Spain), Florence (Italy), Marseille (France), Gold Coast (Australia), Washington (USA), Brazil (Brazil) and Tours (France).

**Question 0**

What year did the "second generation" tram system start operating in France?

**Question 1**

When was the original scheme abolished?

**Question 2**

How is the third rail circuit divided?

**Question 3**

Does the live part of the third rail pose a risk to pedestrians if left bare?

**Question 4**

Which system is the old way to avoid overhead wires?

**Question 5**

Which system has been implemented in all parts of the new tram system in Reims (France)?

**Question 6**

When did the new tram system in Paris open?

**Question 7**

When was the new trans system opened in Achnor, France?

**Question 8**

In which system is the circuit not split?

**Text number 13**

The London Underground in England is one of the few networks to use a four-rail system. The additional track carries the electrical return from the running rails on the third rail and overhead networks. In the London Underground, the third rail is next to the track and has a voltage of +420 V DC, and the fourth rail is in the middle between the running rails and has a voltage of -210 V DC. Together, these rails provide a traction voltage of 630 V DC. London Underground is now upgrading its fourth rail to 750 volts DC, with the positive rail at +500 volts DC and the negative rail at -250 volts DC. However, many of the older sections of the tunnels are still at 630 volts DC. The same system was used on Milan's earliest underground line, Milan Metro Line 1, whose newer lines use catenaries or a third rail.

**Question 0**

What kind of system does the London Underground use?

**Question 1**

What is the purpose of the fourth rail?

**Question 2**

What is the direction of dissipation of the third track of the London Underground system?

**Question 3**

What is the return rail voltage?

**Question 4**

Where did they also use a system like the London Underground?

**Question 5**

Which system in England is one of the few that uses a five-track system?

**Question 6**

Where is the bottom contact rail on the London Underground?

**Question 7**

Where is the fourth rail of the ground contact located?

**Question 8**

Which system is now upgrading its fifth rail system to 750 volts DC?

**Question 9**

At what tension are many of the newer parts of the tunnels tensioned?

**Text number 14**

The main advantage of a four-rail system is that neither rail carries current. This system was introduced because the problem was that the return currents, which were supposed to be routed through the grounded (earthed) running rail, instead passed through the iron lining of the tunnel. This can cause electrolytic damage and even arcing if the tunnel sections are not electrically connected. The problem was compounded by the fact that the return current also tended to pass through iron pipes formed by nearby water and gas pipes. Some of these pipes, particularly the Victorian pre-London Underground pipes, were not designed to carry electricity and did not have adequate electrical connections between pipe segments. The four-rail system solves the problem. Although an artificially created earthing point is provided in the supply system, this connection is routed through resistors, ensuring that stray currents are kept at manageable levels. Power-only rails can be mounted on heavily insulating ceramic chairs to minimise electrical leakage, but this is not possible for contact rails, which must be mounted on stronger metal chairs to support the weight of the trains. However, elastomeric rubber pads placed between the rails and the chairs can solve part of the problem by isolating the running rails from the return of current in the event of a leakage through the running rails.

**Question 0**

What is the decisive advantage of the quad rail system?

**Question 1**

What are the potential dangers of return flows?

**Question 2**

How did the return current affect water and gas in iron pipes?

**Question 3**

How are stray ground currents kept under control?

**Question 4**

What ensures that the current leakage during the installation of the busbars is minimised?

**Question 5**

What is the key advantage of the fifth rail system?

**Question 6**

What can happen if segments of a tunnel are electronically connected?

**Question 7**

What tends to flow past nearby iron pipes that form water and gas pipelines?

**Question 8**

What is a naturally occurring land point?

**Question 9**

What's not to like about sitting on stronger metal chairs?

**Text number 15**

On the lines that London Underground shares with National Rail's third rail fleet (Bakerloo and District both have such sections), the centre rail is connected to the running rails, allowing both types of train to operate at a compromise voltage of 660 V. Metro trains run at speed from one section to the other; track-side electrical couplers and resistors separate the two types of feeders. These lines were originally electrified exclusively on the LNWR four-rail system, before National Rail trains were re-electrified on the conventional three-rail system to simplify fleet operation.

**Question 0**

What is the voltage allocated to the two types of trains on the UK rail system?

**Question 1**

Why were some parts of the Bakerloo and District lines rewired to a three-rail system?

**Question 2**

How did voltage sharing for different types of trains become possible?

**Question 3**

What links these two offers?

**Question 4**

What was reconnected to the standard four-wheel drive system?

**Question 5**

What is the maximum voltage of the two railway systems in the UK?

**Question 6**

What is the timetable for overground trains from one part to another?

**Question 7**

With whom does the London Underground not share lines?

**Text number 16**

Some lines of the Paris metro in France operate on a quadripower system, as they run on rubber tyres that run on narrow steel and in some places concrete carriageways. Since the tyres do not conduct the return current, the two guide rails, which are outside the carriageways, act as conductor rails, so that, at least electrically, it is a quad-rail system. One of the guide rails is connected to the conventional return rails inside the carriageway, so only one polarity is needed. The trains are designed so that they can operate on both poles, as some lines use reversing loops at one end, turning the train around at each end of the journey. The loop was originally designed to save the original steam locomotives, which had to turn the rest of the train around, saving a lot of time. Today, the driver does not have to change ends at terminals with such a loop, but the time saving is not very significant, as it takes almost as long to turn the loop as it does to change ends. Many of the original loops have disappeared as the lines have been extended.

**Question 0**

Why do some Paris Metro lines have to use a four-track system?

**Question 1**

What was the solution to the backflow problem on the Paris Metro?

**Question 2**

What is needed for the guide rails to work properly?

**Question 3**

How can the train turn around after each journey?

**Question 4**

Why was the reverse loop created?

**Question 5**

Which lines of the Paris metro in France are used?

**Question 6**

What runs on metal rings?

**Question 7**

Why were many of the original loops kept?

**Question 8**

What kind of tyres conduct the return flow?

**Question 9**

What runs on a pair of wide steel roadways?

**Text number 17**

The advantage of AC is that the power-wasting resistors used to control the speed in DC drives were not needed in AC drives: different voltages can be supplied by several branches of the transformer. Separate low-voltage transformer windings supply the lighting and auxiliary motors. More recently, the development of very high power semiconductors has led to the classical "generic" AC and DC motor being largely replaced by a three-phase induction motor fed by an inverter, i.e. a special frequency converter that changes both frequency and voltage to control the speed of the motor. These inverters operate equally well on DC or AC power of any frequency, and many modern electric locomotives are designed to handle different input voltages and frequencies to facilitate cross-border operation.

**Question 0**

What was the drawback of the DC system?

**Question 1**

How can different voltage ranges be supplied to AC locomotives?

**Question 2**

Which taps can provide lighting?

**Question 3**

What will replace the AC/DC motor?

**Question 4**

What is the main advantage of an induction motor?

**Question 5**

What was the early drawback of AC power?

**Question 6**

What can a single tap on a transformer feed?

**Question 7**

What caused the development of low-power semiconductors?

**Question 8**

Modern electric locomotives are not designed for what?

**Question 9**

What do the combined low-voltage transformer windings supply?

**Text number 18**

DC commutating electric motors with laminated pole pieces become universal motors because they can also run on AC current; reversing the current in both the stator and the rotor does not reverse the motor. However, the now established AC frequencies of 50 and 60 Hz caused difficulties due to inductive reactance and eddy current losses. Many railways chose low AC frequencies to overcome these problems. These frequencies have to be converted by motor generators or static inverters at substations feeding from the grid, or produced in special traction power plants.

**Question 0**

How can a DC motor be turned into a general-purpose motor?

**Question 1**

What problems did AC distribution cause?

**Question 2**

How do railways try to solve the problem of inductive reactance in AC systems?

**Question 3**

How do you get low frequencies?

**Question 4**

If the current is reversed in both the stator and the rotor, what is reversed?

**Question 5**

Why do many railways choose high AC frequencies?

**Question 6**

What are the standard DC frequencies today?

**Question 7**

What was the effect of 60 and 70 Hz distribution frequencies?

**Question 8**

Many railways opt for low direct current what?

**Text number 19**

High-voltage AC overhead line systems are not only intended for national standard line networks. With a track gauge of one metre, the Raetia Railway (RhB) and the adjacent Matterhorn Gotthard Bahn (MGB) operate at 11 kV and a frequency of 16.7 Hz. Practice has shown that both Swiss and German 15 kV trains can operate at these lower voltages. The RhB started experimenting with 11 kV in 1913 on the Engadin line (St. Moritz-Scuol/Tarasp). The MGB sections Furka-Oberalp-Bahn (FO) and Brig-Visp-Zermatt Bahn (BVZ) introduced electric services in 1941 and 1929 respectively, using the RhB's tried and tested system.

**Question 0**

How did non-standard trains start to run on high-voltage alternating current?

**Question 1**

When was the RhB system first tested?

**Question 2**

Low-voltage AC systems are not just for what?

**Question 3**

Which European trains can operate at high voltages?

**Question 4**

Who was part of the MAB?

**Question 5**

Who started the experiments on the 111 kV system?

**Question 6**

When did the RhB start testing the 11 kV system on the Raetia line?

**Text number 20**

In the United States, 25 Hz, once a common industrial electrical frequency, is used on Amtrak's 25 Hz traction system at 12 kV on the Northeast Corridor between Washington D.C. and New York City and on the Keystone Corridor between Harrisburg, Pennsylvania and Philadelphia. SEPTA's 25 Hz traction system uses the same 12 kV voltage on the Northeast Philadelphia overhead contact line. This allows trains to operate on both Amtrak and SEPTA power systems. The difference between Amtrak's and SEPTA's power distribution systems is that they have the same overhead line voltage. Amtrak's power distribution system has a 138 kV transmission grid that supplies power to substations, which then convert the voltage to 12 kV and feed it into the overhead system. SEPTA's electricity distribution system uses a 2:1 ratio autotransformer system, where the overhead line is supplied at 12 kV and the return line at 24 kV. The New York, New Haven and Hartford Railroad used an 11 kV system between New York City and New Haven, Connecticut, which was converted to a 12.5 kV 60 Hz system in 1987.

**Question 0**

What frequency was generally used on US Amtrak?

**Question 1**

What voltage does the SEPTA system use?

**Question 2**

Which specification is similar for both Amtrak and Septa?

**Question 3**

When was the 11 kV system in NY, New Haven and Hartford converted to 12.5 kV?

**Question 4**

The Northeast Corridor connects Harrisburg, Pennsylvania and which city?

**Question 5**

The Keystone Corridor connects Washington D.C. and which city?

**Question 6**

Where is a 1:2 ratio autotransformer used?

**Question 7**

When was the New York, New Haven and Hartford Railway converted to an 11 kV system?

**Question 8**

What is the overhead contact line supplied at 24 kV used for?

**Text number 21**

In the United Kingdom, the London, Brighton and South Coast Railway began electrifying its London suburban lines, and London Bridge - Victoria opened to traffic on 1 December 1909. The Victoria to Crystal Palace link via Balham and West Norwood opened in May 1911. Peckham Rye to West Norwood opened in June 1912. No further extensions were made due to the First World War. In 1925 two lines were opened under the Southern Railway, serving Coulsdon North and Sutton stations. The lines were electrified at 6.7 kV 25 Hz. In 1926, it was announced that all lines were to be converted to direct current, and the last overhead line was run in September 1929.

**Question 0**

When was the overhead system first used in the UK?

**Question 1**

Which bus used the overhead line system to Victoria Crystal Palace or Peckham Rye West Noorwood first?

**Question 2**

What was the reason for not extending the lines?

**Question 3**

What voltage was used on the two lines of the Southern Railway opened in 1925?

**Question 4**

When was overhead electrification of urban railways introduced in the UK?

**Question 5**

When did Peckham Rye Victoria open?

**Question 6**

What was left unfinished because of the Second World War?

**Question 7**

In which year were the three lines under the Southern Railway opened?

**Question 8**

In what year were all lines converted to fourth track DC?

**Text number 22**

Three-phase AC electrification was used in Italy, Switzerland and the United States in the early 1900s. Italy was the main user on the mountain lines of northern Italy from 1901 to 1976. The first lines were the Burgdorf-Thun line in Switzerland (1899) and the Ferrovia Alta Valtellina lines from Colico to Chiavenna and Tirano in Italy, which were electrified in 1901 and 1902 respectively. Other lines using the three-phase system were the Simplon Tunnel in Switzerland between 1906 and 1930 and the Great Northern Railway's Cascade Tunnel in the United States between 1909 and 1927.

**Question 0**

Which countries used a three-phase AC system in the early 1900s?

**Question 1**

Which country was a bigger user compared to these three?

**Question 2**

When did Italy start using AC power?

**Question 3**

How long did the air conditioning system last in northern Italy?

**Question 4**

How long did the three-phase system operate in the Cascade tunnel?

**Question 5**

Who was the main user of electrification of railways in the 19th century?

**Question 6**

Which tunnel in Switzerland used a four-phase system?

**Question 7**

Which tunnel in the United States used a four-phase system?

**Question 8**

Which country had the first four-way lines?

**Question 9**

In what year were the first four-way lines created?

**Text number 23**

In Hungary, the first attempt to use constant-frequency single-phase alternating current dates back to 1923, when Kálmán Kandó of Hungary used 16 kV at 50 Hz on the Budapest-Nyugati-Alagi line. The locomotives had a four-pole rotary phase converter feeding a single multiphase induction-type traction motor with a voltage of 600-1 100 V. The number of poles of the 2 500 hp motor could be varied by means of slip rings to operate at one of four synchronous speeds. The tests went well, and from 1932 until the 1960s the same system was regularly used on the Budapest-Hegyeshalom line (in the direction of Vienna). A few decades after the Second World War, the 16 kV system was replaced by a Russian and later a French 25 kV system.

**Question 0**

Which country was the first to try single-phase AC?

**Question 1**

On what frequency did the Hungarian railway system run in 1923?

**Question 2**

What type of converter was used on Hungarian locomotives of that time?

**Question 3**

How could locomotives run at four speed levels?

**Question 4**

Which system was introduced in Hungary after the Second World War?

**Question 5**

How could the number of poles on a 5 000 hp engine be changed?

**Question 6**

In which country was the first attempt to use constant-frequency two-phase AC power made?

**Question 7**

Locomotives driving a three-pole rotary phase converter could feed what?

**Question 8**

What year was the first attempt to use constant-frequency two-phase AC power?

**Question 9**

During the Second World War, 16 kV was converted to what?

**Text number 24**

The sections of wire fed from the different substations must be kept strictly separated from each other to avoid the risk of mixing the different phases. This is achieved by neutral sections (also known as phase breaks), which are usually placed at and between substations, although typically only half of them are always in use, and the rest are positioned so that the substation can be closed and feed power from adjacent substations. Neutral sections usually consist of a section of earthed conductor separated from the live wires on either side by insulating material, usually ceramic beads, designed to allow current collectors to pass smoothly from one section to the other. The grounded section prevents the arc from being drawn from one live section to the other, since the voltage difference may be greater than the normal voltage of the system if the live sections are in different phases, and the circuit breakers may not be able to safely cut off the substantial current that flows. In order to prevent an arc from being drawn from one section to the ground, the train shall be in a rolling mode when passing through the neutral section and the circuit breakers shall be open to prevent an arc from being drawn from the other section to the ground. In many cases this is done manually by the drivers. They are assisted by a warning sign just before the zero section and a pre-warning some distance before it. After the neutral section, there is another panel that tells drivers to reset the circuit breaker, but drivers are not allowed to do so until the rear pantographs have passed this panel. In the UK, the Automatic Power Control (APC) system opens and closes the circuit breaker automatically using permanent magnets along the track which are connected to a detector on board the train. All the driver has to do is switch off the power and board the train, which is why warning signs are still present on and approaching neutral sections of track.

**Question 0**

What was the main requirement for the electrical substations?

**Question 1**

What invention prevented the lines from mixing?

**Question 2**

What was the part of the wire in the phase-interruption sequences where the arc was pulled from one wire to the other?

**Question 3**

How were drivers warned to start rolling the train?

**Question 4**

What must the driver do to open and close the circuit breaker?

**Question 5**

The charged parts consist of a grounded part consisting of what?

**Question 6**

What does a system called automatic power control do in the US?

**Question 7**

Typically, which ones are in use all the time?

**Question 8**

What does the earthed part enable?

**Question 9**

What must not be rolling in order to avoid the risk of arcing?

**Text number 25**

Modern electrification systems take AC power from the grid, feed it into the locomotive and convert it to DC voltage to power the traction motors. These motors can be either DC motors, which use DC voltage directly, or three-phase AC motors, which require the DC voltage to be converted into three-phase AC (by means of power electronics). Both systems therefore have the same function: to convert and transfer high-voltage AC current from the grid to low-voltage DC current in the locomotive. Where should this conversion take place and at what voltage and current (AC or DC) should the power flow into the locomotive? What does all this have to do with energy efficiency? Both the transmission and the conversion of electrical energy involve losses: ohmic losses in wiring and power electronics, magnetic field losses in transformers and rectifiers (inductors). The power conversion in DC systems takes place mainly in the railway station, where large, heavy and more efficient equipment can be used, compared to AC systems, where the conversion takes place in the locomotive, where space is limited and losses are much higher. In addition, the energy of the blast air used to cool transformers, power electronics (including rectifiers) and other conversion equipment must be taken into account.

**Question 0**

What can be used in electrification systems today?

**Question 1**

What is the main function of AC and DC systems?

**Question 2**

What kind of losses occur during conversion and transmission in wiring and electronics?

**Question 3**

What kind of losses occur in transformers and inductors during conversion/transfer?

**Question 4**

Where do modern electrification systems draw their DC power from?

**Question 5**

What more do 4-phase AC motors require?

**Question 6**

What is not associated with losses?

**Question 7**

The power conversion in an AC system takes place mainly where?

**Question 8**

What energy must be used to blow air to heat the transformers?

**Text number 26**

In the 1970s, the Soviet Union compared systems powered by 3 kV DC and 25 kV AC (50 Hz). The results showed that the percentage losses of overhead lines (contact wires and contact wires) were more than three times higher at 3 kV DC than at 25 kV AC. When all conversion losses were taken into account and added to the overhead line losses (including energy from cooling fans), the 25 kV AC losses were slightly higher than the 3 kV DC losses. Thus, despite the much higher overhead line losses, 3 kV DC was slightly more energy efficient than AC in supplying power from the Soviet grid to the traction motor terminals (which were all DC motors at the time). Both systems used energy to convert the higher AC voltage from the Soviet grid into lower DC voltage, but in the DC system all the conversion took place (with higher efficiency) at the railway station, while in the AC system most of the conversion took place inside the locomotive (with lower efficiency). It must also be taken into account that the continuous movement of this mobile conversion equipment on the rails consumes energy, whereas the fixed equipment at the railway station does not incur such energy costs. For more information see Wiki: Soviet Union DC vs AC.

**Question 0**

What were the two systems compared in the Soviet Union in 1970?

**Question 1**

Which system had higher losses in the overhead lines?

**Question 2**

What system was used in the Soviet Union after all the calculations?

**Question 3**

Which came cheaper with cheaper mobile or fixed hardware?

**Question 4**

It takes energy to move mobile conversion software where?

**Question 5**

Which railway station equipment incurs energy costs?

**Question 6**

What was less energy efficient than AC power for energy production?

**Question 7**

Which system was converted at the railway station?

**Question 8**

Most of the DC conversion took place within what?

**Text number 27**

On newly electrified lines, there is often a "spark effect" whereby electrification of passenger rail systems leads to a significant increase in passenger numbers/revenues. Reasons for this may include the perception that electric trains are more modern and attractive, faster and smoother services, and the fact that electrification often goes hand in hand with general infrastructure and rolling stock renewal/replacement, leading to improved quality of service (in a way that could theoretically be achieved by similar renewal without electrification). Whatever the reasons for the spark effect, it has been well established on a large number of electrified routes over many decades.

**Question 0**

What exactly do you see on electrified lines?

**Question 1**

What can be achieved by electrifying modern trains?

**Question 2**

How can the quality of service be improved?

**Question 3**

Will electrification of passenger rail transport lead to insignificant leaps?

**Question 4**

What leads to a deterioration in service quality?

**Question 5**

The "spark effect" is often seen in old lines, which are what?

**Question 6**

Electric trains are often considered less modern and what?

**Question 7**

What has become established on routes that have been electrified for days?

**Text number 28**

Network effects are a big factor in electrification. When lines are electrified, connections with other lines must be taken into account. Some electrification has since been removed because of through traffic on non-electrified lines. To benefit from through services, such connections require time-consuming locomotive changes or the use of expensive dual-function locomotives. This is mainly a problem on long-distance routes, but on many lines, long-distance through freight trains (usually transporting coal, ore or containers to or from ports) dominate. In theory, these trains could make significant savings through electrification, but extending electrification to isolated areas can be too costly, and unless the whole network is electrified, companies are often forced to continue using diesel trains even if parts are electrified. The growing demand for container traffic, which is more efficient with double-deckers, also creates network interaction problems with existing electrification, as there is not enough clearance in the overhead wires for these trains, but electrification can be built or modified to provide sufficient clearance, but this creates additional costs.

**Question 0**

What is a major factor in electrification?

**Question 1**

What was the reason why some of the electrification was removed after a while?

**Question 2**

Where can we talk about the benefits of transit?

**Question 3**

What could be the drawback of electrifying long-distance freight trains?

**Question 4**

What will the growing demand for container transport lead companies to use more often?

**Question 5**

What is the small factor in electrification?

**Question 6**

What needs to be taken into account when changing lines from electricity?

**Question 7**

What has been removed for through-traffic on electrified lines?

**Question 8**

What is the most common problem when travelling short distances?

**Question 9**

Businesses often have to use what trains to reach densely populated areas?

**Text number 29**

In addition, there are problems of interconnection between different electricity systems, especially when connecting long-distance lines and lines electrified for commuter traffic, but also commuter lines built to different standards. This can mean that electrification of certain links can be very costly simply because of the impact on the lines to be connected. Many lines currently have several different electrification standards for different trains in order to avoid the replacement of existing rolling stock on these lines. This obviously requires that the economics of a particular connection be more compelling, and this has prevented the full electrification of many lines. In a few cases, diesel trains are running on fully electrified lines, which may be due to incompatibility of the electrification standards of the line.

**Question 0**

What is another issue that comes up when using electrification?

**Question 1**

Why can commuter lines built to different standards cause complexity?

**Question 2**

What solution did many lines come up with to avoid replacing the current rolling stock?

**Question 3**

Why do electrified lines still use Disel trains?

**Question 4**

What can be very affordable?

**Question 5**

What is often built to the same standards?

**Question 6**

Which trains run on partially electrified lines?

**Question 7**

What is compatible along the route?

**Question 8**

How many lines have overlapped with one electrification standard?

**Text number 30**

Electricity can often be generated at a central station with higher efficiency than with a portable motor/generator. Although the efficiency of power plants and diesel locomotives is roughly the same at rated power, diesel engines become less efficient at low power levels at non-rated power levels, whereas if an electric power plant needs less power, it will turn off its least efficient generators, thus increasing efficiency. An electric train can save energy (compared to a diesel) through regenerative braking and by not having to consume energy at idle, as diesel locomotives do when stopped or coasting. However, electric rolling stock can use cooling fans when stopped or coasting, which consumes energy.

**Question 0**

Which of the two can be electrified more efficiently?

**Question 1**

How can the energy efficiency of an electricity power plant be improved?

**Question 2**

How can an electric train be more energy efficient?

**Question 3**

What type of train still uses energy when it is rolling or stops?

**Question 4**

What makes electric trains waste energy?

**Question 5**

Where does diesel engine efficiency improve?

**Question 6**

Electric rolling stock can use fan heaters when?

**Question 7**

What can often be produced with lower efficiency?

**Question 8**

If a power plant needs to produce more electricity, what does it turn off?

**Question 9**

A diesel engine can save energy with a regenerative what?

**Text number 31**

Energy sources that are not suitable for mobile power plants, such as nuclear, renewable hydropower or wind power, can be used. According to generally accepted global energy reserve statistics, liquid fuels have much lower reserves than gas and coal (42, 167 and 416 years respectively). Most countries with large rail networks do not have significant oil reserves, and those that do, such as the US and UK, have exhausted a large proportion of reserves and oil production has been declining for decades. There is therefore also a strong economic incentive to replace oil with other fuels. Electrification of the railways is often seen as an important means of reforming consumption patterns. However, there are no reliable, peer-reviewed studies available to help inform a rational public debate on this critical issue, although there are untranslated Soviet studies from the 1980s.

**Question 0**

Can renewable energy sources be used in mobile power plants?

**Question 1**

Which types of natural resources are scarcer?

**Question 2**

What is the recent incentive to overcome the oil shortage?

**Question 3**

What research can be used in the future if it is translated?

**Question 4**

Which energy sources are suitable for mobile power plants?

**Question 5**

What are the nuclear fuel reserves?

**Question 6**

What is missing in most countries with small rail networks?

**Question 7**

What is seen as an irrelevant route towards reforming consumption patterns?

**Question 8**

Translated Soviet studies are available for which decade?

**Text number 32**

In the former Soviet Union, electric traction ended up being somewhat more energy efficient than diesel. Partly due to the inefficient electricity generation in the Soviet Union (heat efficiency was only 20.8% in 1950 and 36.2% in 1975), the diesel locomotive was about twice as energy efficient as the electric locomotive in 1950 (net tonne-kilometres of freight per kilogram of fuel). As the efficiency of electricity generation (and hence electric traction) improved, electric railways became more efficient than diesels by about 1965. After the mid-1970s, electric transport consumed about 25% less fuel per tonne-kilometre. However, diesel was mainly used on single-track lines with relatively heavy traffic, so the lower fuel consumption of electric trains may be partly due to better operating conditions on electrified lines (such as double-tracks) rather than to inherent energy efficiency. However, the cost of diesel fuel was about 1.5 times higher (per thermal energy content) than the cost of fuel used in electric power plants (which produced electricity), making electric railways even more energy cost efficient.

**Question 0**

What types of trains became more energy efficient in the former Soviet Union?

**Question 1**

Which year can be marked as the year when electric railways were more efficient than diesel railways?

**Question 2**

How much less fuel did an electric train use than a diesel in the mid-1970s in the Soviet Union?

**Question 3**

What could be the reason for the lower energy consumption of electric trains?

**Question 4**

How much more expensive was diesel per unit compared to electricity?

**Question 5**

In the US, electric traction became more energy efficient than what?

**Question 6**

When was diesel traction three times more efficient than electric traction?

**Question 7**

In which decade, electric cars used around 35% less fuel per tonne-kilometre.

**Question 8**

The price of diesel was 2.5 times higher than what?

**Question 9**

Because electricity production in the US was inefficient, the diesel locomotive was twice as energy efficient in what year?

**Text number 33**

In addition to improvements in power plant efficiency, the efficiency of electricity use by railways also increased (between 1950 and 1973), with energy intensity falling from 218 kwh to 124 kwh/10 000 gross tonne-kilometres (for both passenger and freight trains), a 43% reduction. Since energy intensity is the inverse of energy efficiency, it decreases with increasing efficiency. However, most of this 43% reduction in energy intensity also benefited diesel traction. The conversion of wheel bearings from plain bearings to roller bearings, the increase in train weight, the conversion of single-track lines to double-track (or partly double-track) and the removal of obsolete double-axle freight wagons all increased the energy efficiency of all traction modes - electric, diesel and steam. However, only electric traction (and not diesel) benefited from a 12-15% reduction in energy consumption. This was due to improvements in locomotives, the spread of regenerative braking (which in 1989 recycled 2.65% of the electrical energy used for traction), remote control of substations, better handling of the locomotive by the crew and improved automation. Thus, the overall efficiency of electric traction compared to diesel more than doubled in the Soviet Union between 1950 and the mid-1970s. After 1974 (until 1980), however, energy intensity (wh/tonnekilometre) did not improve, partly due to the increase in passenger and freight train speeds.

**Question 0**

What caused the rise in energy efficiency?

**Question 1**

What did the removal of which help the efficiency of the diesel locomotive to increase?

**Question 2**

What types of locomotives were improved in the Soviet Union between 1950 and 1973?

**Question 3**

How much energy was saved and reused thanks to regenerative braking in 1989?

**Question 4**

Has energy efficiency improved between 1974 and 1980?

**Question 5**

What types of brakes were used less?

**Question 6**

In which years did the overall efficiency of electric traction triple?

**Question 7**

In which country did the overall efficiency of electric traction triple?

**Question 8**

Energy efficiency improved enormously after what year?

**Question 9**

Energy efficiency increases as what goes up?

**Document number 355**

**Text number 0**

Spanish is the second most spoken language in the United States. There are 45 million native or second language Hispanophones and 6 million Spanish language learners in the United States. Together, this makes the US the second largest Spanish-speaking country in the world after Mexico, and the US has more Spanish speakers than Colombia and Spain (but fewer native Spanish speakers). Spanish is a Romance and Indo-European language with the highest number of native speakers in the world. About half of all Spanish speakers in the US also speak English "very well", according to a US Census self-assessment.

**Question 0**

How many people speak Spanish as a first or second language in the United States?

**Question 1**

How many Latin Americans also speak English?

**Question 2**

What other languages are often spoken in the United States?

**Question 3**

What language is Spanish?

**Question 4**

How many Spanish-speaking students are there in the United States?

**Question 5**

In which country do 45 million people speak Spanish as a first or second language?

**Question 6**

Which country is the second largest Spanish-speaking country in the world?

**Question 7**

What language is Spanish?

**Question 8**

What do half of Spanish speakers speak very well?

**Question 9**

Which branch of Spanish has the largest number of native speakers?

**Question 10**

How many Spanish-speaking students are there in Spain?

**Question 11**

What is the first American language?

**Question 12**

What is the second most spoken language in Colombia?

**Question 13**

Which country has more native Spanish speakers than Mexico?

**Question 14**

How many Spanish speakers speak Spanish in Mexico?

**Text number 1**

The Spanish language has been present in what is now the United States since the 1500s and 1600s, when Spanish colonists arrived in North America, which later became the states of Florida, Texas, Colorado, New Mexico, Arizona, Nevada, Utah and California. Spanish explorers explored the 42 future US states, leaving behind a varied Spanish heritage on the North American continent. In addition, the western territories of the Louisiana Territory were under Spanish rule from 1763-1800 after the French and Indian War, further extending Spanish influence throughout what is now the United States of America.

**Question 0**

How old is Spanish in the United States?

**Question 1**

Did the Spanish conquer land in the United States?

**Question 2**

Where in the United States did the Spaniards go on expeditions?

**Question 3**

Were there Spanish-ruled states?

**Question 4**

Do Spaniards have a heritage in America from their ancestors?

**Question 5**

When did the Spanish language start to appear in America?

**Question 6**

Florida, Texas and Colorado were part of what colonies?

**Question 7**

Besides Florida, Texas and Colorado, what other states were part of the colony?

**Question 8**

How many US states were explored by Spanish explorers?

**Question 9**

How many years was Louisiana under Spanish rule?

**Question 10**

Since when has Spanish been present in Mexico?

**Question 11**

When were the eastern territories of the Louisiana Territory under Spanish rule?

**Question 12**

How many future US states will be explored by French explorers?

**Question 13**

Which countries were inhabited by the French?

**Question 14**

What conflict caused the eastern territories of Louisiana to fall under Spanish rule?

**Text number 2**

Spanish was spoken by the first permanent European settlers in North America. The Spanish arrived in what is now the United States with Ponce de León in 1513. In 1565, through Juan Ponce de León, the Spanish founded St. Augustine, Florida, and from the early 19th century it became the oldest continuously inhabited European colony in the continental United States. In 1898, the oldest city in the whole of the United States was San Juan, the capital of Puerto Rico, where Juan Ponce de León was the first governor.

**Question 0**

When did the Spanish arrive in America?

**Question 1**

Did Europeans speak Spanish in the Americas?

**Question 2**

Where is the oldest settlement in America?

**Question 3**

What is the oldest city in the United States?

**Question 4**

How was St Augustine founded?

**Question 5**

What was the first language spoken by permanent European settlers?

**Question 6**

Who was the first Spanish settler to arrive in the US?

**Question 7**

In what year did Ponce de Leon settle in the United States?

**Question 8**

Which city did Juan Ponce de Leon discover?

**Question 9**

What is the capital of Puerto Rico?

**Question 10**

When did the Spanish arrive in Puerto Rico?

**Question 11**

Where is the oldest settlement in Puerto Rico?

**Question 12**

What is the oldest city in Florida?

**Question 13**

Where was Juan Ponce De Leio's first president?

**Question 14**

When did the Spanish discover Puerto Rico?

**Text number 3**

In 1821, after the Mexican War of Independence, Texas was part of the unified Mexican state of Coahuila y Tejas. Americans soon arrived in large numbers, initially with the approval of the Mexican president. In 1836, the now largely 'American' Texans fought a war of independence from the central government of Mexico and established the Republic of Texas. In 1846, the republic was dissolved when Texas joined the United States of America as a state. According to the 1850 US Census, fewer than 16 000 Texans were of Mexican descent, and almost all were Spanish-speaking (both Mexicans and non-Spanish European settlers, including German Texans), English-speaking settlers (both American and other European settlers) outnumbered (six to one) English-speaking settlers (both American and other European settlers)[citation needed].

**Question 0**

Was Texas part of Mexico?

**Question 1**

When did Americans come to Texas?

**Question 2**

Was there a war between Mexicans and Texans?

**Question 3**

When did Texas become a state?

**Question 4**

Was Texas primarily a Spanish-speaking state?

**Question 5**

What was the name of the region to which Coahuila y Tejas belonged?

**Question 6**

How many Texans were of Mexican descent in 1850?

**Question 7**

How many Mexicans in Texas were Spanish-speaking?

**Question 8**

What is another nationality with a strong presence in Texas?

**Question 9**

When did the Republic break up and Texas joined the United States?

**Question 10**

When did the Americans come to Spain?

**Question 11**

When did Spain become a country?

**Question 12**

How many Texans were of English descent?

**Question 13**

Who did Spain fight to gain independence?

**Question 14**

According to which census, fewer than 16,000 Texans were of English ancestry?

**Text number 4**

After the Mexican War of Independence, California, Nevada, Arizona, Utah, western Colorado and southwestern Wyoming became part of the Mexican territory of Alta California, and most of New Mexico, western Texas, southern Colorado, southwestern Kansas and the Oklahoma panhandle were part of the Santa Fe de Nuevo México. The geographic isolation of the region and its unique political history meant that New Mexican Spanish was very different from the Spanish spoken in other parts of the United States of America and from the Spanish spoken in what is now the United Mexican States.

**Question 0**

When did the other states become part of Mexico?

**Question 1**

What states does Alta California consist of

**Question 2**

Which states were part of Santa Fe de Nuevo?

**Question 3**

Why are bilingual languages still spoken in these states?

**Question 4**

When did other states become part of Colorado?

**Question 5**

Why is Mexico still bilingual?

**Question 6**

What made Spanish different in Spain?

**Question 7**

What was North Dakota part of?

**Question 8**

Where did Nebraska belong?

**Text number 5**

The English-speaking American settlers who arrived in the Southwest established their language, culture and legislation as dominant by sheer force of numbers, to the extent that it displaced Spanish from public life altogether; hence the United States never developed bilingualism in the way Canada did. For example, eight Californians attended the California Constitutional Convention in 1849; the resulting state constitution was drafted in English and Spanish, and included a clause requiring all published laws and regulations to be published in both languages. There were no Spanish-speaking participants in the 1872 constitutional convention; the English-speaking participants felt that the state's remaining Spanish-speaking minority should simply learn English; and the convention eventually voted 46-39 to amend the earlier clause so that all official proceedings would henceforth be published only in English.

**Question 0**

Why is Spanish not spoken in the south-west?

**Question 1**

Is Canada bilingual?

**Question 2**

Was California a bilingual state?

**Question 3**

Why did California not officially become bilingual?

**Question 4**

Was there a court decision?

**Question 5**

Why is the south-west not in English?

**Question 6**

Why did California not officially become monolingual?

**Question 7**

Where were there no English-speaking participants?

**Question 8**

What were the nine Californian participants?

**Question 9**

Who developed monolingualism?

**Text number 6**

For decades, the US federal government made strenuous efforts to force Puerto Ricans to adopt English, even to the point of forcing them to use English as the primary language of instruction in high schools. It failed completely and abandoned this policy in 1948. Puerto Rico was able to preserve its Spanish language, culture and identity because the relatively small and densely populated island was already home to nearly a million people, all of whom spoke Spanish, at the time of the US coup, and the vast territory acquired from Mexico 50 years earlier was never invaded by the vast millions of English-speaking people who arrived.

**Question 0**

Is America trying to make Puerto Rico an English-speaking territory?

**Question 1**

How did America try to get Puerto Rico's language into English?

**Question 2**

Was English successful in Puerto Rico?

**Question 3**

How did Puerto Rico remain a Spanish-speaking territory?

**Question 4**

Are there many English-speaking residents in Puerto Rico?

**Question 5**

How did Mexico try to change the language of Puerto Rico into English?

**Question 6**

Was French successful in Peurto Rico?

**Question 7**

How did Puerto Rico remain an English-speaking territory?

**Question 8**

How long has the US federal government been trying to force Puerto Ricans to adopt Spanish?

**Question 9**

When did the US government withdraw the policy that Puerto Ricans had to use Spanish?

**Text number 7**

With more than 5 million inhabitants, Puerto Ricans are easily the second largest group of Latin Americans. Of all the major Latin American groups, Puerto Ricans are the least likely to speak Spanish, yet millions of Puerto Rican Americans living in the continental United States are fluent in Spanish. Puerto Ricans are native-born US citizens, and many Puerto Ricans have moved to New York, Orlando, Philadelphia and other areas in the eastern US, which has increased the Spanish-speaking population, and in some areas, particularly in Central Florida, they make up the majority of the Spanish-speaking population. In Hawaii, where Puerto Rican farm workers and Mexican ranchers have settled since the late 19th century, 7.0% of the islands' population is either Spanish-speaking or Hispanic or both.

**Question 0**

How many Puerto Ricans are there?

**Question 1**

Are they fluent in Spanish?

**Question 2**

Where are the most Puerto Ricans on the continent?

**Question 3**

Are there many Hispanics in Florida?

**Question 4**

Are Latin Americans in Hawaii?

**Question 5**

What is the second largest Spanish group?

**Question 6**

How many Puerto Ricans are there?

**Question 7**

Which country are Puerto Ricans citizens of?

**Question 8**

Where in the United States have many Puerto Ricans moved to?

**Question 9**

Where did Puerto Rican farm workers go in the 19th century?

**Question 10**

How many US citizens are there?

**Question 11**

Which group is least likely to be proficient in English?

**Question 12**

What percentage of Puerto Rico's population is either English-speaking or Spanish-speaking or both?

**Question 13**

How many Hawaiians live in the continental United States?

**Question 14**

Where have farmers and English livestock farmers settled?

**Text number 8**

The immigration of Spanish-speaking Cubans to the United States began because Cuba was politically unstable after gaining independence. The fall of the dictatorship of Fulgencio Batista and the rise of Fidel Castro's government in 1959 increased Cuban immigration to the United States, so that there are about one million Cubans in the United States, most of whom settled in south-central Florida, while other Cubans live in the northeastern United States; most are fluent in Spanish. In Miami, Spanish is now the native language, mainly due to Cuban immigration.

**Question 0**

Why did Cubans come to the United States?

**Question 1**

In what year did most Cubans start coming to America?

**Question 2**

Where do most Cuban Americans live?

**Question 3**

Do Cubans speak Spanish in America?

**Question 4**

Is there a specific place in the United States where Cubans live and speak Spanish?

**Question 5**

What caused the political instability in Cuba?

**Question 6**

In what year did Fulgencio Batista's dictatorship end?

**Question 7**

Who came to power in Cuba in 1959?

**Question 8**

In which southern state did most Cubans settle?

**Question 9**

Which city has Spanish as its first language, due to immigration from Cuba?

**Question 10**

Why did Baptists come to the United States?

**Question 11**

In what year did most Spaniards start coming to America?

**Question 12**

Where do most Spaniards live?

**Question 13**

Do Floridians speak Spanish in America?

**Question 14**

Is there a specific place in Cuba where Cubans live and speak Spanish?

**Text number 9**

Spanish-speaking Nicaraguans also began to migrate in the wake of political instability in the late 1970s and 1980s. The Sandinista revolution, which overthrew the Somoza dictatorship in 1979, led to the migration of many Nicaraguans, especially from among those who opposed the Sandinistas. As the Contra (or Contra-revolutionary) war, which was supported by the United States throughout the 1980s, continued until 1988 and the country's economic collapse led to many Nicaraguans emigrating to the United States, as well as to other countries. The US states to which most Nicaraguans migrated include Florida, California and Texas.

**Question 0**

What other Spanish-speaking people come to America?

**Question 1**

Why did Nicaraguans come to America?

**Question 2**

When did the Nicaraguans arrive?

**Question 3**

Where did Nicaraguans settle in the Americas?

**Question 4**

Did many Nicaraguans have a particular reason for fleeing to the United States?

**Question 5**

Why did Spanish-speaking Nicaraguans also migrate to the country?

**Question 6**

In what years did Nicaraguans migrate?

**Question 7**

Which revolution brought down the Somoza dictatorship?

**Question 8**

What was another term for the Contra war?

**Question 9**

When did the Contra war end?

**Question 10**

What other Spanish-speaking people come to Florida?

**Question 11**

Why did Nicaraguans come to Florida?

**Question 12**

When did the Floridians arrive?

**Question 13**

Did many Floridians have a particular reason for fleeing to the United States?

**Question 14**

When did Florida support the Contra war?

**Text number 10**

The emigration of Salvadorans was due to both economic and political problems. The largest wave of migration occurred in the 1980s following the Salvadoran civil war, when 20-30% of El Salvador's population left the country. Around 50 %, or up to 500 000, of those fleeing headed for the United States, where more than 10 000 Salvadorans were already living, making Salvadoran-Americans the fourth largest Latin American group after the Mexican-American majority, Puerto Ricans and Cubans.

**Question 0**

Why did the Salvadorans come to America?

**Question 1**

When did the Salvadorans come to America?

**Question 2**

How many Salvadorans moved to the country?

**Question 3**

How many Salvadorans live in America?

**Question 4**

Where do Hispanics rank on the scale of Hispanics living in the Americas?

**Question 5**

Why did Salvadorans start emigrating?

**Question 6**

What caused the largest immigration of Salvadorans?

**Question 7**

How many Salvadorans came to the United States?

**Question 8**

What year did the Salvadorans come to the United States?

**Question 9**

What is the fourth largest Latin American group?

**Question 10**

Why did the Slavs come to Mexico?

**Question 11**

When did the Salvadorans come to Mexico?

**Question 12**

How many Salvadorans live in Mexico?

**Question 13**

Who are the fifth largest Latin American group?

**Question 14**

How many of El Salvador's population fled to Mexico?

**Text number 11**

As civil wars raged in several Central American countries in the 1980s, hundreds of thousands of Salvadorans fled their country and came to the United States. Between 1980 and 1990, the number of Salvadoran immigrants in the United States almost quintupled, from 94 000 to 465 000. The number of Salvadoran immigrants in the United States continued to increase in the 1990s and 2000s, due to family reunification and natural disasters such as earthquakes and hurricanes that affected El Salvador. In 2008, there were around 1.1 million Salvadoran immigrants in the United States.

**Question 0**

Why did Central Americans flee to the United States?

**Question 1**

When did the Salvadorans flee

**Question 2**

Are Salvadorans a large population in the United States?

**Question 3**

Is the Salvadoran population still growing?

**Question 4**

How many Salvadorans are now in America?

**Question 5**

Why did Central Americans flee to El Salvador?

**Question 6**

How many Salvadorans are now in Mexico?

**Question 7**

What was the population of El Salvador in 1980?

**Question 8**

What was the population of El Salvador in 1990?

**Question 9**

What natural disasters occur in the US?

**Text number 12**

There was no clear information on the number of Venezuelans who migrated to the United States before the 1900s. Between the 1700s and early 1800s, a large number of European immigrants left Venezuela and later immigrated to the United States with their children and grandchildren who were born and/or raised in Venezuela as Spanish speakers. Between 1910 and 1930, it is estimated that more than 4,000 South Americans immigrated to the United States each year; however, few accurate statistics are available. Many Venezuelans settled in the United States in search of a better education and remained after graduation. They are often accompanied by relatives. However, the reasons for Venezuelan emigration have changed since the early 1980s in the hope of higher wages and the volatility of the Venezuelan economy, which has also contributed to a significant migration of Venezuelan professionals to the United States.

**Question 0**

When did Venezuelans migrate to the United States?

**Question 1**

Are there immigrants from other countries in Venezuela?

**Question 2**

Why did Venezuelans come to America?

**Question 3**

Are Venezuelans still coming to America for the same reasons as before?

**Question 4**

When did Venezuelans move to Mexico?

**Question 5**

Why did Europeans come to America?

**Question 6**

Since when did European immigration include the desire for higher wages?

**Question 7**

How many South Americans immigrated to Mexico between 1910 and 1930?

**Question 8**

When did European migrants leave for Venezuela and later Mexico?

**Text number 13**

In the 2000s, an increasing number of Venezuelans opposed to President Hugo Chávez's economic and political policies moved to the United States (mostly to Florida, but New York City and Houston are other destinations). The largest concentration of Venezuelans in the US is in South Florida, particularly in the suburbs of Doral and Weston. Other major states with a Venezuelan-American population, according to the 1990 census, are New York, California, Texas (adding existing Hispanic populations), New Jersey, Massachusetts and Maryland. Urban areas with high concentrations of Venezuelans include Miami, New York City, Los Angeles and Washington, D.C..

**Question 0**

How did Chavez affect Venezuelans?

**Question 1**

In which regions of the Americas did Venezuelans settle?

**Question 2**

Are there other areas in the Americas where Venezuelans have settled?

**Question 3**

Where are the most populous cities in Venezuela?

**Question 4**

Which regions of the Americas did the Chavezes settle?

**Question 5**

Where are the most populous cities in Florida?

**Question 6**

In which census was Florida's population recorded?

**Question 7**

When did Floridians oppose Hugo Chavez?

**Question 8**

Where is the largest concentration of Floridians?

**Text number 14**

Although there is no legally official language in the United States, English is the dominant language of business, education, government, religion, media, culture, civil society and public life. Almost all state and federal agencies and large corporations use English as their internal working language, especially at management level. Some states, such as New Mexico, have bilingual legal notices and official documents in Spanish and English, as well as other commonly used languages. By 2015, there was a trend towards a majority of Americans and Americans of Hispanic descent speaking only English at home.

**Question 0**

What language is spoken in the United States?

**Question 1**

Is there a bilingual state?

**Question 2**

Do American Hispanics speak English at home?

**Question 3**

Is there an official language in the United States?

**Question 4**

What language is spoken in Mexico?

**Question 5**

What is the official language of the United States?

**Question 6**

When did the majority of Americans and Americans of Hispanic descent speak only Spanish at home?

**Question 7**

Who uses Spanish as their internal working language?

**Question 8**

What is the state that provides monolingual statutory declarations?

**Text number 15**

The state (like its south-western neighbours) has had close linguistic and cultural ties with Mexico. The state, outside the 1853 Gadsden Purchase, was part of New Mexico until 1863, when the western half of the state became Arizona. The former Gadsden Purchase area was majority Spanish-speaking until the 1940s, although the Tucson area had more English speakers (including Mexican Americans fluent in English); the continued influx of Mexican immigrants increased the number of Spanish speakers.

**Question 0**

Have some states, such as Arizona, embraced their Mexican history?

**Question 1**

What is the history of states?

**Question 2**

Whether New Mexico had a majority of Spanish-speaking natives.

**Question 3**

Do people in Arizona and New Mexico speak Spanish or English?

**Question 4**

With whom does the state have regional links?

**Question 5**

What was part of the territory of Mexico until 1863?

**Question 6**

In which region is the proportion of English speakers the same?

**Question 7**

Where was the eastern half of the New Mexico Territory formed?

**Text number 16**

Spanish is generally considered to be the official language of New Mexico, alongside English, because it is widely used and legally promoted in the state; however, there is no official language in the state. New Mexico's laws are published bilingually in Spanish and English. Although English is the official working language of the state government, administrative matters are often conducted in Spanish, especially at the local level. Spanish has been spoken along the New Mexico-Colorado border and the present-day US-Mexico border since the 1500s [referred to ].

**Question 0**

Is there an official language in New Mexico?

**Question 1**

What language is New Mexico written in?

**Question 2**

How long has Spanish been spoken in New Mexico?

**Question 3**

Is New Mexico known for its Spanish language?

**Question 4**

Is Colorado an official language?

**Question 5**

What language are Colorado's laws written in?

**Question 6**

How long has Spanish been spoken in Spain?

**Question 7**

In which language is government business often conducted in Spain?

**Question 8**

What is the Colorado government's paperwork?

**Text number 17**

Having been relatively isolated from other Spanish-speaking regions for most of its 400-year existence, New Mexican Spanish, and particularly the Spanish of northern New Mexico and Colorado, has retained many elements of the Spanish language of the 16th and 17th centuries and developed its own vocabulary. It also contains many words from Nahuatl, the language spoken by the ancient Aztecs of Mexico. New Mexican Spanish also contains loanwords from the Pueblo languages of the upper Rio Grande Valley, Mexican-English words (mexicanismos) and loans from English. Grammatical changes include the disappearance of the second person verb form, changes in verb endings, especially the preterite, and the partial fusion of the second and third conjugations.

**Question 0**

Why is New Mexico always an afterthought in American Spanish-speaking society?

**Question 1**

Is the New Mexican language different from other Spanish dialects?

**Question 2**

How does the Spanish dialect of New Mexico differ?

**Question 3**

Does the New Mexico language include other dialects?

**Question 4**

In New Mexico, do they also use the American language when speaking Spanish?

**Question 5**

Why is Colorado always an afterthought in American Spanish-speaking society?

**Question 6**

How is the Spanish dialect different in Coloradp?

**Question 7**

Does Colorado also use the American language when speaking Spanish?

**Question 8**

What has been relatively isolated from other English-speaking areas for most of its 400 years of existence?

**Question 9**

What is another name for English words in Spanish?

**Text number 18**

In Texas, English is effectively the official language of the state (although it has no legal status) and is used in state government. However, the continuing influx of Spanish-speaking immigrants increased the importance of Spanish in Texas. The counties of Texas bordering Mexico are mostly Hispanic, so Spanish is widely spoken in the region. The Texas government mandates under Government Code Section 2054.116 that state agencies must provide information on their websites in Spanish to assist residents with limited English proficiency.

**Question 0**

What is the official language of Texas?

**Question 1**

Are there any exceptions to the official language of Texas?

**Question 2**

How does Texas deal with people who don't speak English but live in Mexico?

**Question 3**

How will this mandate help Spanish-speaking residents?

**Question 4**

What is the official language of Mexico?

**Question 5**

Are there any exceptions to the official language of Mexico?

**Question 6**

How does Texas deal with people who don't speak Spanish?

**Question 7**

What are most counties in Mexico that border Texas?

**Question 8**

What has increased the import of English in Texas?

**Text number 19**

Spanish is currently the language most taught in non-English schools and colleges in the US. With over 1.4 million university students enrolled in language courses in autumn 2002, Spanish is the most taught language in American colleges and universities with 53%, followed by French (14.4%), German (7.1%), Italian (4.5%), American Sign Language (4.3%), Japanese (3.7%) and Chinese (2.4%), although these languages remain relatively small in relation to the total US population.

**Question 0**

What language other than English is spoken in the United States?

**Question 1**

Do they teach Spanish in American schools?

**Question 2**

How popular are Spanish language courses in the USA?

**Question 3**

What other languages are popular among American students?

**Question 4**

Are these other languages studied in the United States as popular as Spanish?

**Question 5**

What language other than American is spoken in the United States?

**Question 6**

How popular are English language courses in the US?

**Question 7**

What other languages are popular among Mexican students?

**Question 8**

Do you learn languages other than English in the United States?

**Question 9**

How many university students were enrolled in autumn 2002?

**Text number 20**

State of the Union speeches and other presidential addresses will be translated into Spanish, following the precedent set by the Bill Clinton administration. Official Spanish translations are available at WhiteHouse.gov. In addition, non-Hispanic American politicians fluent in Spanish will speak Spanish to Hispanic majority constituencies. There are 500 Spanish-language newspapers, 152 magazines and 205 publishers in the United States; advertising expenditures for magazines and local television aimed at the Spanish-speaking market have increased substantially from 1999 to 2003, by 58% and 43% respectively.

**Question 0**

What political speeches are made in English and Spanish?

**Question 1**

Has this always been the case in American political addresses?

**Question 2**

Does Washington (the government) work in both languages (bilingual - Spanish?)?

**Question 3**

If someone is not bilingual and only speaks Spanish, how can they find out about current events?

**Question 4**

Is the Hispanic population relevant to the American media?

**Question 5**

What speech is given in English only?

**Question 6**

How many newspapers are there in Spain?

**Question 7**

When did advertising to the UK market increase?

**Question 8**

How much did advertising in the UK market grow between 1999 and 2000.

**Question 9**

What language is used in the state of the Union?

**Text number 21**

Calvin Veltman conducted the most comprehensive study of how Spanish-speaking immigrants adopt English for the National Center for Education Statistics and the Hispanic Policy Development Project. Veltman's research on language shift shows that young and native-born immigrants in particular are highly bilingual and have adopted English as their primary language among Spanish speakers. The overall population projections in these studies assume that a given Spanish-speaking immigrant cohort will assimilate almost completely within two generations. Although his study was based on a large sample from the 1976 Census Bureau (which has not been replicated), data from the 1990 Census generally confirm the high degree of Anglicization of the US population of Hispanic origin.

**Question 0**

Are there any studies on the Latin American language?

**Question 1**

What is Calvin Veltman's research all about?

**Question 2**

What were Calvin Veltman's findings?

**Question 3**

Is "Calvin Veltman" relevant for today's Latin Americans?

**Question 4**

Are there other observations similar to Calvin Veltman's in modern times?

**Question 5**

Who did the most comprehensive study on Hispanic language acquisition?

**Question 6**

What population groups did Veltman exclude from the study?

**Question 7**

Which census data confirm the high level of Anglicisation of the population of Billings?

**Question 8**

What is the preferred language of Spanish-speaking immigrants?

**Question 9**

How many generations does it take for a Native American to assimilate?

**Text number 22**

When these states were annexed to the United States in the first half of the 19th century, Spanish was later established in the country with the acquisition of Puerto Rico in 1898. Later, waves of migration from Mexico, Cuba, El Salvador and other Latin American Latin American countries to the United States in the second half of the 19th century strengthened the position of Spanish in the country. Today, Hispanics are one of the fastest-growing demographic groups in the United States, increasing the use and importance of American Spanish in the United States.

**Question 0**

In which century did the United States adopt Spanish?

**Question 1**

Which acquisition strengthened the Spanish language?

**Question 2**

In what year did Puerto Rico become a state?

**Question 3**

From which countries did large migrations come to the United States?

**Question 4**

What is growing in the US as the Hispanic population increases?

**Question 5**

What was associated with the United States in the first half of the 1700s?

**Question 6**

When was Spain conquered?

**Question 7**

What is one of the fastest growing population groups in Spain?

**Question 8**

What strengthened the position of English in the country?

**Question 9**

Who will increase the use and importance of American English in the United States?

**Document number 356**

**Text number 0**

Charleston is the oldest and second largest city in the US state of South Carolina, the capital of Charleston County and the capital of the Charleston-North Charleston-Summerville metropolitan area. The city is located south of the geographic center of the South Carolina coast and Charleston Harbor, the mouth of the Atlantic Ocean at the confluence of the Ashley and Cooper Rivers, or as it is locally referred to, "where the Cooper and Ashley Rivers meet the Atlantic Ocean".

**Question 0**

What is the oldest city in South Carolina?

**Question 1**

What county is Charleston, South Carolina located in?

**Question 2**

Which port is Charleston in?

**Question 3**

The port of Charleston is in which ocean bay?

**Question 4**

Which river merges with the Cooper River in Charleston Harbour?

**Question 5**

What county is Charleston in?

**Question 6**

On which ocean is the Port of Charleston located?

**Question 7**

Which river joins the Ashley River at Charleston Harbour?

**Question 8**

What is the newest city in South Carolina?

**Question 9**

What county is Charleston, North Carolina located in?

**Question 10**

Which port is Charleston not in?

**Question 11**

The port of Charleston is the mouth of which ocean?

**Question 12**

Which river merges with the Cooper River to form Charleston Bay?

**Text number 1**

Charleston was founded in 1670 as Charles Town in honour of King Charles II of England, and received its current name in 1783. It moved to its present site at Oyster Point in 1680 from Albemarle Point on the west bank of the Ashley River. By 1690, Charles Town was the fifth largest town in North America and remained one of the 10 largest cities in the United States until the 1840 census. With a population of 120,083 according to the 2010 census (and 130,113 according to 2014 estimates), Charleston is the fastest growing municipality in South Carolina. The population of the Charleston metropolitan area, which includes Berkeley, Charleston and Dorchester counties, was estimated at 727,689 in 2014, making it the third largest metropolitan area in the state and the 78th largest in the United States.

**Question 0**

What year was Charleston founded?

**Question 1**

What was Charleston's original name?

**Question 2**

Charles Town was named after which king?

**Question 3**

Where was the city originally located?

**Question 4**

What was the population of Charleston in 2010?

**Question 5**

What year was Charleston originally founded?

**Question 6**

What was Charleston's original name?

**Question 7**

Who was Charles Town named after?

**Question 8**

How many people lived in Charleston in 2010?

**Question 9**

Where was Charleston's first office?

**Question 10**

What year was Charleston not founded?

**Question 11**

What was Charleston's unoriginal name?

**Question 12**

Charles Town was named after which queen?

**Question 13**

Where was the city not originally located?

**Question 14**

What was the population of Charleston in 2012?

**Text number 2**

According to the US Census Bureau, the city has a total area of 127.5 square miles (330.2 km2), of which 109.0 square miles (282.2 km2) is land and 18.5 square miles (47.9 km2) is covered by water. The Old City is located on the peninsula at the point where, as Charlestonites say, "the Ashley and Cooper Rivers meet to form the Atlantic Ocean". The whole peninsula is very shallow, part of it is landfill material, and as a result is often flooded during heavy rains, storm surges and unusually high tides. The city limits have extended across the Ashley River from the peninsula to include most of West Ashley, as well as James Island and part of Johns Island. The city limits have also extended across the Cooper River to include Daniel Island and the Cainhoy area. North Charleston blocks any expansion on the peninsula, and Mount Pleasant is located directly east of the Cooper River.

**Question 0**

How big is Charleston, South Carolina?

**Question 1**

Which city is preventing Charleston from expanding onto the peninsula?

**Question 2**

How much of Charleston is covered by water?

**Question 3**

What percentage of Charleston's total land area is dry land?

**Question 4**

Which city is located directly east of the Cooper River?

**Question 5**

How small is Charleston, South Carolina?

**Question 6**

What city is preventing Charleston from expanding into the Cape?

**Question 7**

How much of Charleston is not covered by water?

**Question 8**

How much of Charleston's total land area is not dry land?

**Question 9**

Which city lies directly west of the Cooper River?

**Text number 3**

Charleston has a humid subtropical climate (Köppen climate classification Cfa), with mild winters, hot and humid summers and significant rainfall all year round. Summer is the wettest season, with almost half of the annual rainfall occurring in thunderstorms from June to September. Autumn remains relatively warm until November. Winter is short and mild, with occasional rainfall. Measurable snowfall (≥ 0.25 cm) occurs at most a few times per decade, most recently on 26 December 2010. However, 15 centimeters (6.0 inches) of snow fell at the airport on December 23, 1989, the largest single-day snowfall, and contributed to the single storm and seasonal record of 20 centimeters (8.0 inches) of snow.

**Question 0**

What is the wettest season in Charleston?

**Question 1**

In what form does half of Charleston's annual rainfall occur?

**Question 2**

Which season is short in Charleston?

**Question 3**

What is Charleston's seasonal snow record?

**Question 4**

What season is considered short in Charleston?

**Question 5**

What is the wettest season in Charleston?

**Question 6**

In what form does half of Charleston's annual rainfall occur?

**Question 7**

How much snow did Charleston Airport receive on 23 December 1989?

**Question 8**

What is the driest season in Charleston?

**Question 9**

What is the annual rainfall in Charleston?

**Question 10**

Which season is long in Charleston?

**Question 11**

What is Charleston's seasonal record for wind speed?

**Question 12**

How much snow did Charleston Airport receive on 23 December 1998?

**Text number 4**

The highest temperature recorded within the city limits was 104°F (40°C) on June 2, 1985 and June 24, 1944, and the lowest temperature was -14°F (-14°C) on February 14, 1899, although at the airport where official records are kept, historical temperatures range from -41°F (41°C) on August 1, 1999 to -14°F (-14°C) on January 21, 1985. Hurricanes are a major threat to the region during the summer and early autumn, and the region has been hit by several powerful hurricanes, the most notable being Hurricane Hugo (a category 4 storm) on 21 September 1989. The dew point in summer ranges between 20 and 22 °C (67,8 and 71,4 °F).

**Question 0**

What is the hottest temperature recorded in the city of Charleston?

**Question 1**

What kind of storm is a big threat to Charleston in the summer and early autumn?

**Question 2**

Which hurricane hit Charleston in 1989?

**Question 3**

What was the lowest temperature ever recorded at the Charleston city limits?

**Question 4**

On what day was it a record cold day at Charleston airport?

**Question 5**

What is the coldest temperature ever recorded in the city of Charleston?

**Question 6**

What kind of storm poses a small threat to Charleston in the summer and early fall?

**Question 7**

Which hurricane hit Charleston in 1998?

**Question 8**

What was the highest temperature ever recorded at the Charleston city limits?

**Question 9**

On what day was it a record warm day at Charleston airport?

**Text number 5**

Charleston-North Charleston-Summerville Metropolitan Statistical Area consists of three counties: Charleston, Berkeley and Dorchester. According to the 2013 US Census, the total population of the metropolitan area was 712,239. North Charleston is the second largest city in the Charleston-North Charleston-Summerville metropolitan area and the third largest city in the state; Mount Pleasant and Summerville are the next largest cities. These cities, along with other cities and the City of Charleston, make up the Charleston-North Charleston metropolitan area, which had a population of 548,404 in 2010. The metropolitan statistical area also includes a separate and much smaller urban area in Berkeley County, Moncks Corner (population 9,123 in 2000).

**Question 0**

How many people lived in the Charleston=North Charleston metropolitan area in 2010?

**Question 1**

What is the third largest city in South Carolina?

**Question 2**

How many people lived in Moncks Corner in 2000?

**Question 3**

Charleston and Berkeley will be combined with which other county to form a metropolitan area?

**Question 4**

What county is Moncks Corner in?

**Question 5**

How many people lived in the Charleston=North Charleston metropolitan area in 2012?

**Question 6**

What is the third largest city in North Carolina?

**Question 7**

How many people lived in Moncks Corner in 2010?

**Question 8**

Charleston and Berkeley are not combined with any other county into a statistical metropolitan area?

**Question 9**

In which county is Moncks Corner not located?

**Text number 6**

The traditional parish system survived until the Reconstruction era, when the counties were introduced.However, traditional parishes still exist in various forms, mainly as public service areas. When the town of Charleston was formed, it was defined by the boundaries of the parishes of St. Philip and St. Michael, and now includes parts of St. James Parish, St. George Parish, St. Andrew Parish and St. John Parish, although the last two are mostly still incorporated rural parishes.

**Question 0**

What era brought counties to South Carolina?

**Question 1**

What system in South Carolina was replaced by counties?

**Question 2**

What is the main purpose of the church system today?

**Question 3**

The city of Charleston is defined by the boundaries of St Michael's parish and which other parish?

**Question 4**

What other parish besides St John's is a mostly united rural parish?

**Question 5**

What era brought counties to North Carolina?

**Question 6**

What system in North Carolina was replaced by counties?

**Question 7**

What is not the main purpose of the church system today?

**Question 8**

The city of Charleston is not defined by the boundaries of St Michael's parish and what other parish?

**Question 9**

Which church other than St John's is a mostly urban church?

**Text number 7**

When Charles II of England (1630-1685) was restored to the English throne in 1660 after Oliver Cromwell's Protectorate, he granted the province of Caroline on 24 March 1663 to eight of his loyal friends, known as the Lords Proprietors. It took seven years for the group to organise colonial expeditions. The first of these established Charles Town in 1670. Its administration, settlement and development were to follow the visionary plan drawn up by John Locke for the Lords Proprietors, known as the Grand Model.

**Question 0**

In what year was Charles Town founded?

**Question 1**

How long did it take to establish settlements in the Carolina Province?

**Question 2**

What was the plan for the settlement and development of the province of Carolina?

**Question 3**

Who drew up the plan known as the "grand design"?

**Question 4**

When was Charles II of England restored to the throne?

**Question 5**

What year was Charles Town abandoned?

**Question 6**

How long did it take to set up the settler colonies in the province of South Carolina?

**Question 7**

Who rejected the plan known as the "grand design"?

**Question 8**

What was the plan for the settlement and development of the State of Carolina?

**Question 9**

When was Charles I of England restored to the throne?

**Text number 8**

The colony was founded by several shiploads of settlers from Bermuda (located east of South Carolina, although it is 1030 miles from the nearest Cape Hatteras, North Carolina) under Governor William Sayle on the west bank of the Ashley River, a few miles northwest of the present town centre. The Earl of Shaftesbury, one of the lords' proprietors, soon predicted that it would become a "great port city," a destiny the town quickly fulfilled. In 1680 the settlement was moved to the east side of the Ashley River on the peninsula between the Ashley and Cooper Rivers. This location was more defensible, and also provided access to a fine natural harbour.

**Question 0**

Where did Charleston's original settlers come from?

**Question 1**

Which North Carolina city is near Bermuda?

**Question 2**

Who was Charleston's first governor?

**Question 3**

Who predicted that Charleston would become a "great port city"?

**Question 4**

Settlement was moved east along which river?

**Question 5**

Where did Charleston's original settlers not come from?

**Question 6**

Which South Carolina city is near Bermuda?

**Question 7**

Who was the last governor of Charleston?

**Question 8**

Who predicted that Charleston would become a "weak port city"?

**Question 9**

Settlement was moved west along which river?

**Text number 9**

The first settlers came mainly from England, its Caribbean colony Barbados and its Atlantic colony Bermuda. Among them were free people of colour born in the West Indies from alliances and marriages between Africans and Englishmen, when colour lines were looser among the working class in the early colonial years, and some wealthy whites took black spouses or concubines. Charles Town attracted a mix of ethnic and religious groups. French, Scottish, Irish and German immigrants, representing numerous Protestant denominations, moved to the emerging seaside town. Because of the struggles between the English "royals" and the Roman Catholic Church, practising Catholics were not allowed to settle in South Carolina until after the American Revolution. Jews were allowed to move into the city, and Sephardic Jews moved in in such numbers that by the early 1800s the city was home to the largest and wealthiest Jewish community in North America, a status it maintained until about 1830.

**Question 0**

Which religious group was not allowed to settle in South Carolina?

**Question 1**

Around what year did the wealthiest Jewish community in America cease to exist in Charleston?

**Question 2**

From which European country did many of Charleston's first settlers come?

**Question 3**

After which war did the state ban on Catholics end?

**Question 4**

From which other English colony besides Bermuda did many settlers come?

**Question 5**

Which religious group was allowed to settle in South Carolina?

**Question 6**

Around what year did Charleston begin to have the wealthiest Jewish community in America?

**Question 7**

From which European country did the few first settlers in Charleston come?

**Question 8**

After which war did the banning of state Catholics begin?

**Question 9**

Which other English colony besides Bermuda received few settlers?

**Text number 10**

The early colony came under frequent attack from sea and land, including from Spain and France (both of which disputed British claims to the area), as well as from time to time from pirates. These were compounded by attacks by Native Americans seeking to protect themselves from so-called European 'settlers', who in turn sought to expand the settlement. The heart of the city was fortified according to a plan drawn up by Governor Johnson in 1704. With the exception of the walls on the Cooper River, most of the walls were removed in the 1720s.

**Question 0**

Which country, together with France, contested England's claim to the Charleston area?

**Question 1**

Which group raided the settlement to protect themselves from settlers?

**Question 2**

Whose 1704 plan was used to fortify the city?

**Question 3**

In which decade were most of the walls of the fortress removed?

**Question 4**

Who else attacked Charleston besides the European nations and the Indians?

**Question 5**

Which country, together with France, accepted England's claim to the Charleston area?

**Question 6**

Which group raided a settlement to protect themselves from the police?

**Question 7**

Whose 1740 plan was used to fortify the city?

**Question 8**

In which decade was the minority of the fortress walls removed?

**Question 9**

Who else protected the Charleston settlement apart from the European nations and the Indians?

**Text number 11**

Africans were brought to Charles Town in the Middle Harbour, first as "servants" and then as slaves. The ethnic groups transported here included in particular the Wolof, Yoruba, Fulani, Igbo, Malinke and others from the Windward Coast. It is estimated that 40% of the 400,000 Africans transported and sold as slaves to North America landed on Sullivan's Island, off Charles Town Harbour. It has been described as "a kind of hellish Ellis Island" .... Today, that ugly fact is no more than a simple bench set up by author Toni Morrison with private funds. "

**Question 0**

Which author paid for a simple bench at Sullivan's Island?

**Question 1**

What percentage of those sold into slavery in North America landed on Sullivan's Island?

**Question 2**

At what point did the slave trade supply slaves to Charles Town?

**Question 3**

What peoples were brought to Charles Town as slaves?

**Question 4**

Where on the African coast did many of the slaves sold in Charles Town come from?

**Question 5**

Which author stole the simple bench at Sullivan's Island?

**Question 6**

What percentage of people sold as slaves in South America landed on Sullivan's Island?

**Question 7**

At what point in the slave trade were slaves stolen from Charles Town?

**Question 8**

Which peoples were not brought to Charles Town as slaves?

**Question 9**

Where on the African coast did no slaves come from that were sold in Charles Town?

**Text number 12**

Colonial Lowcountry landowners experimented with cash crops from tea to silkworms. African slaves brought with them knowledge of rice farming, which plantation owners cultivated and developed into a successful cash crop by the 1700s. With the forced help of African slaves from the Caribbean, plantation owner George Lucas' daughter Eliza Lucas learned in 1747 how to grow and use indigo in the Lowcountry. With British support, indigo became a leading export by 1750. They and naval stores were exported to the highly profitable shipping industry.

**Question 0**

African slaves had a great knowledge of growing what product?

**Question 1**

Which nation supported indigo plantations in the Lowcountry?

**Question 2**

What year was indigo the Lowcountry's leading export?

**Question 3**

By when was rice a successful base crop for the Lowcountry?

**Question 4**

Besides indigo, what products were exported from Lowcountry?

**Question 5**

Which product was not known to have been grown by African slaves?

**Question 6**

Which nation supported indigo plantations in the Highcountry?

**Question 7**

By what year was indigo a minor export to the Lowcountry?

**Question 8**

By what year was rice not a successful base crop for the Lowcountry?

**Question 9**

What products were imported together with indigo from Lowcountry?

**Text number 13**

By the mid-1700s, Charles Town had become a bustling commercial centre, the hub of Atlantic trade for the southern colonies. Charles Towne was also the wealthiest and largest town south of Philadelphia, due in part to the lucrative slave trade. By 1770, it was the fourth largest port in the colonies after Boston, New York and Philadelphia, with a population of 11,000, just over half of whom were slaves. By 1708, the majority of the colony's population was slaves, and the future state had a majority of African descent until the great migration of the early 20th century.

**Question 0**

Which lucrative trade contributed greatly to the growth of Charles Town?

**Question 1**

When did Charles Town become the fourth largest colonial port?

**Question 2**

Who made up the majority of the population of Charles Town in 1708?

**Question 3**

People of African descent were the majority in Charleston until what mass movement?

**Question 4**

When did the great migration take place?

**Question 5**

Which unprofitable industry contributed greatly to the growth of Charles Town?

**Question 6**

When did Charles Town become the fifth largest colonial port?

**Question 7**

Who made up the majority of the population of Charles Town in 1780?

**Question 8**

People of African descent were a minority in Charleston until what mass movement?

**Question 9**

When did the great migration not happen?

**Text number 14**

Charles Town was the centre of the deerskin trade, which was the basis of its early economy. Trading alliances with the Cherokee and Creek tribes ensured a steady supply of moose hides. Between 1699 and 1715, settlers shipped an average of 54,000 deer hides a year through Charles Town to Europe. Between 1739 and 1761, the peak of the deer hide trade, an estimated 500,000 to 1,250,000 deer were slaughtered. During the same period, Charles Town's records show that £5 239 350 worth of deer skins were exported. Deerskins were used to make men's fashionable and practical oak-leather trousers, gloves and bookbindings.

**Question 0**

What other Indian people than the Cherokee supplied Charles Town with deer skins?

**Question 1**

How many deer were slaughtered in Charles Town between 1739 and 1761?

**Question 2**

How many kilos of moose skins were exported from Charles Town during the peak of the moose skin trade?

**Question 3**

What trade was the basis of Charles Town's original economy?

**Question 4**

How many moose skins did the town of Kaarlela export to Europe on average between 1699 and 1715?

**Question 5**

What other North American people than the Cherokee supplied Charles Town with deer skins?

**Question 6**

How many deer were slaughtered in Charles Town between 1739 and 1861?

**Question 7**

How many kilos of moose skins were imported from Charles Town during the peak of its moose skin trade?

**Question 8**

What trade was not the basis of Charles Town's original economy?

**Question 9**

How many moose skins did the town of Kaarlela export to Europe on average between 1699 and 1815?

**Text number 15**

As Charles Town grew, so did the cultural and social opportunities of the community, especially for the merchant and farming elite. America's first theatre building was built in 1736 on the site of the present Dock Street Theatre. Charitable societies were formed by various ethnic groups, from French Huguenots to free Coloureds, Germans and Jews. The Charles Towne Library Society was founded in 1748 by well-to-do young men who wanted to share the financial costs of keeping up to date with scientific and philosophical issues. This group also helped found Charles Towne College in 1770, the oldest college in South Carolina. Until it was taken over by the state in 1970, it was the oldest community-supported college in the United States.

**Question 0**

What is the oldest university in South Carolina?

**Question 1**

Until what year did Charleston support Charles Towne College?

**Question 2**

In what year was the Charles Towne Library Society founded?

**Question 3**

When was the College of Charles Towe founded?

**Question 4**

What is the site of the first theatre building in Charles Town?

**Question 5**

What is South Carolina's newest university?

**Question 6**

Charleston never supported Charles Towne College until what year?

**Question 7**

In what year was the Charles Towne Library Society founded?

**Question 8**

When was Charles Tove's college unfounded?

**Question 9**

What is the site of the last theatre building in Charles Town?

**Text number 16**

On June 28, 1776, General Sir Henry Clinton, with 2,000 men and a navy, attempted to capture Charles Towne, hoping for a simultaneous Loyalist rebellion in South Carolina. When the navy fired cannonballs, they failed to penetrate the unfinished but thick palmetto wood walls of Sullivan's fort. The local Loyalists did not attack the town from the mainland, as the British had hoped. Colonel Moultrie's men returned fire and caused heavy damage to several British ships. The British were forced to withdraw their troops, and the Americans renamed the defensive fortifications Fort Moultrie in honour of their commander.

**Question 0**

Which general tried to take over Charles Town during the American Revolution?

**Question 1**

When did General Clinton invade South Carolina?

**Question 2**

Who was the commander of the American forces defending South Carolina?

**Question 3**

What did the British hope to achieve with their attack on Charles Town?

**Question 4**

What was the name of Fort Sullivan after the battle?

**Question 5**

Which general tried to take over Charles Town before the American Revolution?

**Question 6**

When did General Clinton invade North Carolina?

**Question 7**

Who was the commander of the American forces defending North Carolina?

**Question 8**

What did the British hope to inspire by defending Charles Town?

**Text number 17**

Clinton returned in 1780 with 14 000 soldiers. The American general Benjamin Lincoln fell into a trap and surrendered his entire force of 5 400 men after a long battle, and the siege of Charles Towne was the biggest American defeat of the war. Many Americans who escaped the massacre joined other militias, including Francis Marion, the 'sucker', and Andrew Pickens. The British held the city until December 1782. After the British left, the city was officially renamed Charleston in 1783.

**Question 0**

What was the greatest American defeat of the American Revolution?

**Question 1**

How many soldiers did General Clinton return with?

**Question 2**

What year did General Clinton return to Charles Towne?

**Question 3**

Who was the leader of the American forces defending Charles Towne?

**Question 4**

How many soldiers did General Lincoln lead?

**Question 5**

What was the worst American defeat of the American Revolution?

**Question 6**

How many soldiers did General Clinton return with?

**Question 7**

What year did General Clinton not return to Charles Towne?

**Question 8**

Who was the leader of the American troops who attacked Charles Towne?

**Question 9**

How many soldiers did General Lincoln not lead?

**Text number 18**

Although the city lost its status as state capital to Columbia in 1786, Charleston continued to prosper in the post-revolutionary plantation economy. The invention of the cotton gin in 1793 revolutionised the handling of this crop and made short-term cotton profitable. Cotton was easier to grow in mountainous areas and quickly became South Carolina's most important export. The Piedmont region developed cotton plantations, to which the Sea Islands and the Lowcountry were already devoted. Slaves were also the town's primary labor force, working as domestic servants, artisans, market laborers, and laborers.

**Question 0**

Which city became the state capital of South Carolina?

**Question 1**

Charleston was the state capital of South Carolina until what year?

**Question 2**

What year was the cotton star invented?

**Question 3**

What became South Carolina's most important export after 1793?

**Question 4**

Who made up the majority of the primary labour force on cotton plantations?

**Question 5**

Which city became the state capital of North Carolina?

**Question 6**

Charleston was the capital of the state of North Carolina until what year?

**Question 7**

What year was the cotton star rejected?

**Question 8**

What became South Carolina's most important export after 1739?

**Question 9**

Who made up a small proportion of the primary labour force on cotton plantations?

**Text number 19**

There were also a large number of free people of colour in the city. By 1860, there were 3,785 free people of colour in Charleston, representing nearly 18% of the city's black population and 8% of the total population. Free people of color were much more likely to be mixed race than slaves. Many were educated, skilled craftsmen, and some even owned substantial property, including slaves. In 1790, they formed the Brown Fellowship Society for mutual aid, initially as a burial society. It continued until 1945.

**Question 0**

How many free people of colour lived in Charleston in 1860?

**Question 1**

What percentage of Charleston's population were free people of colour?

**Question 2**

What percentage of Charleston's black population were free people of colour?

**Question 3**

In what year was the Brown Fellowship Society founded?

**Question 4**

What year did the Brown Fellowship Society end?

**Question 5**

How many free people of color lived in Charleston in 1680?

**Question 6**

What percentage of Charleston's population were coloured slaves?

**Question 7**

How much of Charleston's black population were not free people of colour?

**Question 8**

What year was the Brown Fellowship Society closed?

**Question 9**

In what year was the Brown Fellowship Society founded?

**Text number 20**

By 1820, Charleston's population had grown to 23 000, and the black (and mostly slave) majority remained. When the massive slave rebellion planned by the free black Danish Vesey was exposed in May 1822, whites reacted with intense fear, well aware of the violent reprisals against whites by slaves during the Haitian Revolution. Soon afterwards, Vesey was tried and executed, and hanged in early July along with five slaves. A further 28 slaves were later hanged. Subsequently, the state legislature passed laws requiring the approval of the individual legislature for manumission (the freeing of a slave) and regulating the activities of free blacks and slaves.

**Question 0**

What was Denmark Vesey planning?

**Question 1**

When was Vesey's plan for a slave rebellion revealed?

**Question 2**

How was Vesey executed in 1822?

**Question 3**

How many slaves were executed with Vesey?

**Question 4**

What revolution made whites fear the revenge of slaves?

**Question 5**

What did Denmark Vesey not plan?

**Question 6**

When did Vesey's plan for a slave rebellion not come to light?

**Question 7**

How was Vesey executed in 1820?

**Question 8**

How many slaves were spared with Vesey?

**Question 9**

What revolution made blacks fear the revenge of slaves?

**Text number 21**

Charleston's African-American population grew as freedmen moved from the countryside to the big city: from 17,000 in 1860 to more than 27,000 in 1880. Historian Eric Foner noted that blacks were happy to be free from the many regulations of slavery and to operate outside white control. Among other changes, most blacks quickly left the Southern Baptist Church and established their own black Baptist churches or joined the New African Methodist Churches and AME Zion Churches, both of which were independent black denominations first established in the North. The freed men 'acquired dogs, guns and liquor (all of which had been denied them during slavery) and refused to give up their sidewalks to the whites'.

**Question 0**

How many African Americans lived in Charleston in 1860?

**Question 1**

How many African Americans lived in Charleston in 1880?

**Question 2**

Black left which religious denomination has a large number of slavery followers?

**Question 3**

In which part of America were AME churches first established?

**Question 4**

What forbidden product , apart from dogs and guns , did the freethinkers want when slavery ended?

**Question 5**

How many African Americans lived in Charleston in 1870?

**Question 6**

How many African Americans lived in Charleston in 1890?

**Question 7**

Black left which denomination has a low rate after slavery?

**Question 8**

In which part of America were AME churches last established?

**Question 9**

Besides dogs and guns, what was the forbidden product that the freethinkers wanted when slavery began?

**Text number 22**

Industry slowly brought new vitality to the city and its inhabitants, and jobs attracted new residents. As the city's commerce improved, residents sought to renovate or create community institutions. In 1865, the American Missionary Association founded the Avery Normal Institute, Charleston's first free high school for African Americans. General William T. Sherman supported the transformation of the U.S. Arsenal into Porter Military Academy, an educational institution for ex-soldiers and boys orphaned or destitute by war. The Porter Military Academy later merged with the Gaud School and is now a university preparatory school, the Porter-Gaud School.

**Question 0**

Which association founded the Avery Normal Institute?

**Question 1**

What type of school was Avery Normal Institute?

**Question 2**

Who went to Avery's Normal Institute?

**Question 3**

Which general advocated the transformation of the US Arsenal into the Porter Military Academy?

**Question 4**

What influenced the soldiers and boys helped by the Porter Military Academy?

**Question 5**

Which association never founded the Avery Normal Institute?

**Question 6**

What kind of school was not Avery Normal Institute?

**Question 7**

Who never attended Avery Normal Institute?

**Question 8**

Which general advocated turning the UN arsenal into the Porter Military Academy?

**Question 9**

Didn't the Vantaa men and boys helped by the Porter Military Academy contribute anything?

**Text number 23**

In 1875, blacks made up 57% of the city's population and 73% of Charleston County's population. Historian Melinda Meeks Hennessy described the community as "unique" because it was able to defend itself without causing "massive white reprisals", as happened in many other areas during Reconstruction. The 1876 election season saw two major riots in the city between black Republicans and white Democrats in September and the day after the election in November, and a violent incident at a joint debate in Cainhoy in October.

**Question 0**

What percentage of Charleston's population was black in 1875?

**Question 1**

What percentage of Charleston County was black in 1875?

**Question 2**

In 1876, Charleston's black Republicans fought against whom?

**Question 3**

When did the second riot of 1876 take place?

**Question 4**

How many major riots between blacks and whites took place in Charleston in 1876?

**Question 5**

What percentage of Charleston's population was black in 1857?

**Question 6**

What percentage of Charleston County was black in 1857?

**Question 7**

Who were the black Republicans in Charleston fighting in 1867?

**Question 8**

When did the second riot of 1867 take place?

**Question 9**

How many major riots between blacks and whites took place in Charleston in 1867?

**Text number 24**

Violent incidents occurred throughout the state of Piedmont as white rebels struggled to maintain white supremacy in the face of post-war social changes and the civil rights granted to freed men by federal constitutional amendments. After former Confederates were allowed to vote again, white Democratic paramilitary groups known as the Red Shirts violently intimidated blacks and Republicans in election campaigns from 1872 onwards. Violent incidents occurred in Charleston on King Street on 6 September and in nearby Cainhoy on 15 October, both during pre-election political rallies in 1876. The Cainhoy incident was the only statewide incident in which more whites than blacks were killed. The Red Shirts contributed to the suppression of the black Republican vote in some areas in 1876, the narrow election of Wade Hampton as governor and the retaking of control of the state legislature. Another riot occurred in Charleston the day after the election, when a prominent Republican leader was mistakenly reported killed.

**Question 0**

What was the name of the white Democratic paramilitary groups in Charleston?

**Question 1**

What granted Freeman American citizenship?

**Question 2**

On what day did the Kainhoy incident happen?

**Question 3**

What was the date of the violent incident in King's Street in 1876?

**Question 4**

Who won the 1876 election as a result of voter intimidation?

**Question 5**

What was the name by which white Democratic paramilitary groups were not known in Charleston?

**Question 6**

What admitted Freeman was not an American citizen?

**Question 7**

On what day did the Cainboy incident happen?

**Question 8**

What was the violent incident in King's Street in 1867 that happened on that day?

**Question 9**

Who won the 1867 election as a result of voter intimidation?

**Text number 25**

On August 31, 1886, Charleston was nearly destroyed by an earthquake. The instantaneous magnitude of the quake was estimated at 7.0 and the maximum magnitude of the Mercalli earthquake was X (extreme). The quake was felt in Boston to the north, Chicago and Milwaukee to the north-west, New Orleans to the west, Cuba to the south and Bermuda to the east. It damaged 2 000 buildings in Charleston and caused $6 million ($133 million in 2006 dollars) in damage, compared with a total value of about $24 million ($531 million in 2006 dollars) for all buildings in the city.

**Question 0**

What almost destroyed Charleston in 1886?

**Question 1**

What was the date of the Charleston earthquake in 1886?

**Question 2**

How many buildings were damaged in the Charleston earthquake of 1886?

**Question 3**

How much did the damage caused by the 1886 earthquake cost the city of Charleston?

**Question 4**

What was the total value of all buildings in the city of Charleston before the earthquake?

**Question 5**

What almost destroyed Charleston in 1868?

**Question 6**

What was the date of the Charleston earthquake in 1868?

**Question 7**

How many buildings were damaged in the Charleston earthquake of 1868?

**Question 8**

How much did the damage caused by the 1868 earthquake cost the city of Charleston?

**Question 9**

What was the total value of some buildings in the city of Charleston before the earthquake?

**Text number 26**

Investment in the city continued. In 1889, the William Enston Home was built, a community designed for the city's elderly and sick. In 1896, the federal government completed a sophisticated public building in the heart of the city, the U.S. Post Office and Courthouse. The Democrat-controlled state legislature passed a new constitution in 1895 that disenfranchised blacks and effectively excluded them from the political process altogether. This second-class status persisted for more than six decades in a state with a black majority until about 1930.

**Question 0**

Which party controlled the South Carolina state legislature?

**Question 1**

What year was the new constitution passed that discriminated against blacks?

**Question 2**

William Enston's home was built in what year?

**Question 3**

Until what year were blacks the majority in South Carolina?

**Question 4**

What year was the large post office and courthouse built?

**Question 5**

Which party controlled the North Carolina state legislature?

**Question 6**

What year was the new constitution passed that discriminated against whites?

**Question 7**

What year was William Enston's home destroyed?

**Question 8**

Until what year were blacks a minority in South Carolina?

**Question 9**

In which year was a small post office and courthouse built?

**Text number 27**

On 17 June 2015, 21-year-old Dylann Roof invaded the historic Emanuel African Methodist Episcopal Church during Bible study and killed nine people. Senior pastor Clementa Pinckney, who also served as a state senator, was among those killed in the attack. Also among the dead were church members Susie Jackson, 87, Pastor Daniel Simmons Sr., 74, Ethel Lance, 70, Myra Thompson, 59, Cynthia Hurd, 54, Pastor Depayne Middleton-Doctor, 49, Pastor Sharonda Coleman-Singleton, 45, and Tywanza Sanders, 26. The attack drew national attention and discussion about historical racism, Southern Confederate symbolism and gun violence. On July 10, 2015, the Confederate battle flag was removed from the South Carolina State House. The memorial service on the College of Charleston campus was attended by President Barack Obama, Michelle Obama, Vice President Joe Biden, Jill Biden and Speaker of the House John Boehner.

**Question 0**

On what day were nine people killed at Emanuel African Methodist Episcopal Church?

**Question 1**

What was the name of the 21-year-old who killed nine church members in Charleston, South Carolina?

**Question 2**

What public office did Clementa Pinckney hold in the State of South Carolina?

**Question 3**

On what day was the Confederate flag removed from the South Carolina state house?

**Question 4**

Which university campus hosted the memorial service for the nine victims?

**Question 5**

On what day were six people killed at the Emanuel African Methodist Episcopal Church?

**Question 6**

What was the name of the 22-year-old who killed nine church members in Charleston, South Carolina?

**Question 7**

Which North Carolina state public office did Clementa Pinckney hold?

**Question 8**

On what day was the Confederate flag added to the South Carolina state house?

**Question 9**

The memorial service for the six victims was held on which university campus?

**Text number 28**

Charleston is known for its unique culture, which combines traditional southern American, English, French and West African elements. The downtown district is renowned for its art, music, local cuisine and fashion. The Spoleto Festival USA, held annually in late spring, has become one of the largest performing arts festivals in the world. It was founded in 1977 by Pulitzer Prize-winning composer Gian Carlo Menotti, who wanted to create a counterpart to the Festival dei Due Mondi in Spoleto, Italy.

**Question 0**

What time of year is the Spoleto Festival USA held?

**Question 1**

In what year was the Spoleto Festival USA founded?

**Question 2**

What is Gian Carlo Menotti's occupation?

**Question 3**

What is the Italian equivalent of the Spoleto Festival USA?

**Question 4**

Which major prize did Gian Carlo Menotti win?

**Question 5**

What time of year is the Spoleto Festival USA not held?

**Question 6**

In what year was Spoleto Festival UK founded?

**Question 7**

Spoleto Festival Uk is the equivalent of which Italian festival?

**Question 8**

Which small prize did Gian Carlo Menotti win?

**Text number 29**

Charleston's oldest community theatre group, the Footlight Players, has been offering theatre performances since 1931. There are several performing arts venues, including the historic Dock Street Theatre. Charleston Fashion Week, held each spring in Marion Square, brings designers, journalists and clients from across the country. Charleston is known for its local seafood, which plays a key role in the city's renowned cuisine, which includes traditional dishes such as gumbo, crab soup, fried oysters, Lowcountry boil, crab cakes, red rice and shrimp and grits. Rice is a staple food in many dishes, reflecting the Low Country rice culture. Charleston's food culture also has strong British and French influences.

**Question 0**

What is Charleston's oldest community theatre company?

**Question 1**

In what year did Footlight Players start doing theatre productions?

**Question 2**

Where is the annual Charleston Fashion Week?

**Question 3**

Charleston is known for what kind of food?

**Question 4**

Which two cultures have influenced Charleston's cuisine?

**Question 5**

What is Charleston's newest community theatre group?

**Question 6**

In what year did Footlight Players stop doing theatre shows?

**Question 7**

Where is Charleston's annual fashion month?

**Question 8**

Charleston is unknown what type of food?

**Question 9**

Which two cultures are influenced by Charleston cuisine?

**Text number 30**

The traditional Charleston accent has long been known in the state and throughout the South. It is typically heard in wealthy white families whose families have lived in the city for generations. It has sliding or monophthongal long middle vowels, ay and aw sounds are stressed in certain environments, and is not rhotic. Sylvester Primer of the College of Charleston wrote about the local dialect in his late 19th century works, Charleston Provincialisms (1887) and The Huguenot Element in Charleston's Provincialisms, published in a German journal. He believed that the accent was based on the English spoken by the first settlers, which was thus derived from Elizabethan England and preserved with modifications by Charleston speakers. The rapidly disappearing 'Charleston accent' is still evident in the local pronunciation of the town's name. Some elderly (and usually upper-class) Charleston residents ignore the r and stretch the first vowel, pronouncing the name 'Chah-l-ston'. Some observers attribute these unique features of Charleston speech to the early settlement of French Huguenots and Sephardic Jews (who were mainly English-speaking Jews from London), both of whom played an influential role in Charleston's early development and history[citation needed].

**Question 0**

"Charleston's Provincialisms" was published what year?

**Question 1**

Who is the author of "The Huguenot element in Charleston provincialism"?

**Question 2**

Which college did Sylvester Primer belong to?

**Question 3**

To which two early cultures are the unique features of the Charleston accent related?

**Question 4**

In which journal was Primer's work on Charleston's accent published?

**Question 5**

"Charleston Provincials" was not published in what year?

**Question 6**

Who was not the author of "The Huguenot Element in Charleston Provincialism"?

**Question 7**

Which university did Sylvester Primer not belong to?

**Question 8**

To which three early cultures are the unique features of the Charleston accent related?

**Question 9**

In which journal was Primer's work on Charleston's accent not published?

**Text number 31**

The Spoleto Festival USA, founded by Gian Carlo Menotti, is an annual 17-day arts festival in Charleston, featuring more than 100 performances by artists from all disciplines. The Spoleto Festival is internationally recognised as America's leading performing arts festival. The annual Piccolo Spoleto Festival, held at the same time, features local performers and artists, with hundreds of performances across the city. Other festivals and events include the Historic Charleston Foundation's Festival of Homes and Gardens and the Charleston Antiques Show, Taste of Charleston, The Lowcountry Oyster Festival, Cooper River Bridge Run, Charleston Marathon, Southeastern Wildlife Exposition (SEWE), Charleston Food and Wine Festival, Charleston Fashion Week, MOJA Arts Festival and Holiday Festival of Lights (at James Island County Park), and the Charleston International Film Festival.

**Question 0**

How many days does the Spoleto Festival USA last each year?

**Question 1**

What is the Spoleto Festival USA like?

**Question 2**

The Holiday Festival of Lights takes place where?

**Question 3**

How many shows are there at the Spoleto Festival USA?

**Question 4**

Who founded the Spoleto Festival USA?

**Question 5**

How many days does Spoleto Festival UK last each year?

**Question 6**

What is Spoleto Festival UK like?

**Question 7**

The Holiday Festival of Lights will not take place where?

**Question 8**

How many shows are there at Spoleto Festival UK?

**Question 9**

Who founded Spoleto Festival UK?

**Text number 32**

As with all aspects of Charleston culture, the gullah community has had a huge influence on Charleston music, particularly in the early development of jazz music. In turn, Charleston music has influenced music throughout the country. The geechee dances that accompanied the music of Charleston's longshoremen followed the rhythm that inspired Eubie Blake's "Charleston Rag" and later James P. Johnson's "The Charleston" and the dance style that defined the nation in the 1920s. "Ballin' the Jack," a popular dance in the years before "The Charleston," was written by native Charleston resident Chris Smith.

**Question 0**

Who wrote "Charleston"?

**Question 1**

In which decade was the Charleston dance nationally popular?

**Question 2**

Who created the song "Charleston Rag"?

**Question 3**

Which Charleston community had a major influence on jazz music?

**Question 4**

Geechee dances are associated with which type of working class music?

**Question 5**

Who never wrote "Charleston"?

**Question 6**

In which decade was the Charleston not nationally popular?

**Question 7**

Who hated the song "Charleston Rag"?

**Question 8**

Which Charleston community had a small influence on jazz music?

**Question 9**

Geechee dances have nothing to do with the music of what type of worker?

**Text number 33**

Reverend Daniel J. Jenkins founded the Jenkins Orphanage in Charleston in 1891. The orphanage accepted donations of musical instruments, and Reverend Jenkins hired local Charleston musicians and graduates of the Avery Institute to teach music to the boys. As a result, the Charleston musicians mastered a wide range of instruments and became proficient in reading music. These qualities set Jenkins' musicians apart and helped some of them get into the big band ensembles of Duke Ellington and Count Basie. William "Cat" Anderson, Jabbo Smith and Freddie Green are just a few of the former members of the Jenkins Orphanage who went on to become professional musicians in some of today's best bands. Orchestras across the country began developing brass bands with the success of the Jenkins Orphanage Band. For example, in the Colored Waif's Home Brass Band in New Orleans, young trumpeter Louis Armstrong first began to attract attention.

**Question 0**

In what year was the Jenkins Orphanage founded?

**Question 1**

Which Charleston pastor founded the Jenkins orphanage?

**Question 2**

What kind of donations did Jerkins Orphanage accept?

**Question 3**

Whose graduates taught many of the boys at the Jenkins orphanage?

**Question 4**

What city was Louis Armstrong from?

**Question 5**

What year was the Jenkins orphanage closed?

**Question 6**

Which Charleston pastor closed the Jenkins orphanage?

**Question 7**

What kind of donations did the Jerkins Orphanage turn down?

**Question 8**

Whose graduate students taught many of the girls at the Jenkins orphanage?

**Question 9**

Which city was Louis Armstrong not from?

**Text number 34**

As many as five bands were on tour in the 1920s. The Jenkins Orphanage Band played at the inaugural parades of Presidents Theodore Roosevelt and William Taft and toured the US and Europe. The band also played on Broadway in DuBose and Dorothy Heyward's play "Porgy", a stage version of their novel of the same name. The story was set in Charleston and featured a gullah community. The Heywards insisted that they hire the real Jenkins Orphanage Band to perform on stage. Just a few years later, DuBose Heyward collaborated with George and Ira Gershwin to turn his novel into the famous opera Porgy and Bess (so named to distinguish it from the play). George Gershwin and Heyward spent the summer of 1934 at Folly Beach outside Charleston writing this "folk opera," as Gershwin called it. Porgy and Bess is considered a great American opera[citation needed] and is widely performed.

**Question 0**

Which president other than Taft was Jenkins' orphanage calling for?

**Question 1**

In which play did the Jenkins orphanage band play on Broadway ?

**Question 2**

What was the name of the "folk opera" based on "Porgy"?

**Question 3**

Where did Gershwin and Heyward write their folk operas?

**Question 4**

When did Gershwin and Heyward write their folk opera?

**Question 5**

Who else did the Jenkins orphanage not call but President Taft?

**Question 6**

In which play did the Jenkins Orphanage not play on Broadway?

**Question 7**

What was not the name of the "folk opera" based on "Porgy"?

**Question 8**

Where did Gershwin and Heyward read their folk operas?

**Question 9**

When did Gershwin and Heyward read their folk opera?

**Text number 35**

The City of Charleston Fire Department consists of more than 300 full-time firefighters. These firefighters operate in 19 units located throughout the city: 16 engine companies, two tower companies and one ladder company. The department's divisions are Training, Fire Chief, Operations and Administration. The department has a 24/48-hour schedule and had an ISO classification of Class 1 until the end of 2008, when ISO officially downgraded it to Class 3. Russell (Rusty) Thomas served as Fire Chief until June 2008, and was succeeded by Fire Chief Thomas Carr in November 2008.

**Question 0**

How many companies are there in the City of Charleston Fire Department?

**Question 1**

How many full-time firefighters are there in Charleston?

**Question 2**

Who was the fire chief until June 2008?

**Question 3**

Who became a fire chief in November 2008?

**Question 4**

How many tower companies does the fire brigade have?

**Question 5**

How many companies are not in the City of Charleston Fire Department?

**Question 6**

How many part-time firefighters are there in Charleston?

**Question 7**

Who was the fire chief until June 2009?

**Question 8**

Who became a fire chief in November 2009?

**Question 9**

How many tower companies does the fire brigade not have?

**Text number 36**

The Charleston City Police Department is the largest police department in South Carolina, with a total of 452 sworn police officers, 137 civilian police officers and 27 reserve police officers. Their policies to eradicate drug use and gang violence in the city are being used as a model for other cities to follow. According to 2005 FBI final crime reports, Charleston's crime rate is worse than the national average in nearly every major category. The current Chief of the Charleston Police Department is Greg Mullen, former Deputy Chief of the Virginia Beach (Virginia) Police Department. The former Charleston Police Chief was Reuben Greenberg, who resigned on August 12, 2005. Greenberg is credited with creating a courteous police force that kept police violence well in check while developing a visible presence in community policing and significantly reducing crime.

**Question 0**

What is the largest police department in South Carolina?

**Question 1**

How many reserve police officers does the Charleston Police Department have?

**Question 2**

How many civilian staff work for the Charleston Police Department?

**Question 3**

Who is the current head of the Charleston Police Department?

**Question 4**

In what year did Reuben Greenberg retire as chief of the Charleston Police Department?

**Question 5**

What is the smallest police department in South Carolina?

**Question 6**

How many reserve police officers does the Charleston Police Department not have?

**Question 7**

How many civilians do not serve in the Charleston Police Department?

**Question 8**

Who is the former head of the Charleston Police Department?

**Question 9**

In what year did Reuben Greenberg retire as chief of the Charleston Police Department?

**Text number 37**

Charleston is the primary medical centre for the eastern part of the state. The city has several major hospitals located in the downtown area, including MUSC (Medical University of South Carolina Medical Center), Ralph H. Johnson VA Medical Center and Roper Hospital. MUSC is the first medical school in the state, the largest medical university in the state and the sixth oldest continuously operating medical school in the United States. In the downtown medical district, the biotechnology and medical research industry is growing rapidly, and all major hospitals have expanded significantly. In addition, another major hospital in West Ashley has new expansions planned or underway: Bon Secours-St Francis Xavier Hospital. Trident Regional Medical Center in North Charleston and East Cooper Regional Medical Center in Mount Pleasant also serve the needs of Charleston residents.

**Question 0**

What is the state's first medical school?

**Question 1**

Where is East Cooper Regional Medical Center?

**Question 2**

Where is Trident Regional Medical Center located?

**Question 3**

Bon Secours-St Francis Xavier Hospital is located in which part of the city?

**Question 4**

In which hospital districts is the biotech and medical research sector growing?

**Question 5**

What is the last medical school in the state?

**Question 6**

Where is the West Cooper Regional Health Centre?

**Question 7**

Where is Trident Regional Medical Center not located?

**Question 8**

Bon Secours-St Francis Xavier Hospital is not located in which part of the city?

**Question 9**

In which hospital districts is the biotech and medical research sector in decline?

**Text number 38**

The city of Charleston is served by Charleston International Airport. It is located in the town of North Charleston and is approximately 20 kilometers northwest of downtown Charleston. It is the busiest passenger airport in South Carolina (IATA: CHS, ICAO: KCHS) and shares runways with the adjacent Charleston Air Force Base. Charleston Executive Airport is a smaller airport located in the John's Island neighborhood of the City of Charleston and is used by non-commercial aircraft. Both airports are owned and operated by the Charleston County Aviation Authority.

**Question 0**

Which airport has service to Charleston?

**Question 1**

In which city is Charleston International Airport located?

**Question 2**

How far is the airport from Charleston city centre?

**Question 3**

Where is Charleston Executive Airport located?

**Question 4**

Which military base is located near the airport?

**Question 5**

Which airport does not provide service to Charleston?

**Question 6**

Charleston International Airport is not located in which city?

**Question 7**

How far is the airport from Charleston city centre?

**Question 8**

Where is Charleston Executive Airport not located?

**Question 9**

Which military base is nowhere near an airport?

**Text number 39**

Highway 26 begins in downtown Charleston, with access to the Septima Clark Expressway, Arthur Ravenel, Jr. Bridge and Meeting Street. Facing northwest, it connects the city to North Charleston, Charleston International Airport, Interstate 95 and Columbia. Arthur Ravenel, Jr. Bridge and the Septima Clark Expressway are part of U.S. Highway 17, which runs east-west through the cities of Charleston and Mount Pleasant. The Mark Clark Expressway, or Interstate 526, is the city's bypass that begins and ends at U.S. Highway 17. U.S. Highway 52 is Meeting Street and its branch East Bay Street, which becomes Morrison Drive as it leaves the east side. This highway joins King Street in the Town Neck area (industrial area). U.S. Highway 78 is King Street in the downtown area, eventually joining Meeting Street.

**Question 0**

What is the Charleston area considered an industrial area?

**Question 1**

Which highway is King Street in downtown Charleston?

**Question 2**

Which street does U.S. Highway 78 join?

**Question 3**

Highway 526 starts and ends on which highway?

**Question 4**

Which part of Charleston is the start of Interstate 26?

**Question 5**

Which Charleston area is not considered an industrial area?

**Question 6**

Which highway is King Street in downtown Charleston?

**Question 7**

Which street does U.S. Highway 87 join?

**Question 8**

Highway 562 starts and ends on which highway?

**Question 9**

Which part of Charleston is the beginning of Interstate 62?

**Text number 40**

The Arthur Ravenel Jr. Bridge over the Cooper River opened on July 16, 2005, and was the second longest cable-stayed bridge in America at the time of its construction.The bridge connects Mount Pleasant and downtown Charleston, and features eight lanes and a 12-foot shared lane for pedestrians and bicycles. It replaced the Grace Memorial Bridge built in 1929 and the Silas N. Pearman Bridge built in 1966. They were considered two of the most dangerous bridges in America and were demolished after the opening of the Ravenel Bridge.

**Question 0**

What year was the Arthur Ravenel Jr. bridge opened?

**Question 1**

What does the bridge connect to downtown Charleston?

**Question 2**

What year was the Grace Memorial Bridge built?

**Question 3**

What year was the Silas N. Pearman Bridge built?

**Question 4**

Which river does the Arthur Ravenel Jr. Bridge cross?

**Question 5**

What year was the Arthur Ravenel Jr. bridge closed?

**Question 6**

What does the bridge connect to downtown Charleston?

**Question 7**

What year was the Grace Memorial Bridge closed?

**Question 8**

What year was the Silas N. Pearman Bridge destroyed?

**Question 9**

Arthur Ravenel Jr. bridge never crosses what river?

**Text number 41**

The Roman Catholic Diocese of Charleston's Office of Education also operates in the city and oversees several K-8 parochial schools, including Blessed Sacrament School, Christ Our King School, Charleston Catholic School, Nativity School and Divine Redeemer School, all of which are "feeder schools" for Bishop England High School, the diocesan high school in the city. Bishop England, Porter-Gaud School and Ashley Hall are among the oldest and best-known private schools in the city, and are a significant part of Charleston's history, dating back some 150 years.

**Question 0**

How long have the oldest private schools in Charleston been in existence?

**Question 1**

Which schools are supervised by the Roman Catholic Diocese of Charleston?

**Question 2**

How old are some of Charleston's private schools?

**Question 3**

Which school is Charleston Diocesan High School?

**Question 4**

Which organisation oversees several parochial schools for grades K-8?

**Question 5**

Bishop England High school , Porter-Gaud School and which other school is one of Charleston's most prominent private schools?

**Question 6**

How long have the oldest public schools in Charleston been in existence?

**Question 7**

Which hospitals are supervised by the Roman Catholic Diocese of Charleston?

**Question 8**

How old are some of Charleston's public schools?

**Question 9**

Which school is not a Charleston Diocesan High School?

**Question 10**

Which organization oversees several K-9 parochial schools?

**Text number 42**

Charleston's public institutions of higher education include the College of Charleston (the 13th oldest university in the country), The Citadel, The Military College of South Carolina and the Medical University of South Carolina. Charleston is also home to the Roper Hospital School of Practical Nursing, and has a satellite campus of the region's technical school, Trident Technical College, in downtown Charleston. Charleston is also home to the only college in the country offering bachelor's degrees in building arts, The American College of the Building Arts. The Art Institute of Charleston, located downtown on North Market Street, opened in 2007.

**Question 0**

What is the 13th oldest university in the country?

**Question 1**

Where is the Charleston Institute of Art located?

**Question 2**

What year was the Charleston Institute of Art opened?

**Question 3**

Which Charleston College offers a civil engineering degree?

**Question 4**

Which technical college has a campus in downtown Charleston?

**Question 5**

What is the 12th oldest university in the country?

**Question 6**

Where is the Charleston Institute of Art not located?

**Question 7**

What year was the Charleston Institute of Art closed?

**Question 8**

Which Charleston college does not offer a degree in civil engineering?

**Question 9**

Which technical college has a campus in downtown Charleston?

**Text number 43**

Charleston has one official twin town, Spoleto, in Umbria, Italy. The relationship between the two cities began when Pulitzer Prize-winning Italian composer Gian Carlo Menotti chose Charleston as the city to host the American version of Spoleto's annual Two Worlds Festival. "When looking for a city that would offer the charm of Spoleto and the abundance of theatres, churches and other performance venues, they chose Charleston, South Carolina as the ideal location. The historic town was a perfect fit: intimate enough to capture the entire town, but cosmopolitan enough to provide an enthusiastic audience and a robust infrastructure."

**Question 0**

What is the name of the sister city of Charleston?

**Question 1**

In which country is Spoleto located?

**Question 2**

Who chose Charleston to host the American version of the festival?

**Question 3**

What is the name of the festival in Spoleto?

**Question 4**

What is Gian Carlo Menotti's occupation?

**Question 5**

What is the name of the brother city of Charleston?

**Question 6**

In which country is Spoleto not located?

**Question 7**

Who chose Charleston not to host the American version of the festival?

**Question 8**

What is not the name of the festival in Spoleto?

**Question 9**

What is not the profession of Gian Carlo Menotti?

**Text number 44**

During this time, the weapons station was the loading station for all the nuclear ballistic missile submarines in the Atlantic Fleet. Two SSBN "Boomer" squadrons and one submarine tug were homeported at Weapons Station, while one SSN attack squadron, Submarine Squadron 4, and one submarine tug were homeported at Naval Base. When the station's Polaris Missile Facility Atlantic (POMFLANT) was closed in 1996, it housed and maintained more than 2,500 nuclear warheads and their UGM-27 Polaris, UGM-73 Poseidon, and UGM-96 Trident I launchers (SLBMs), guarded by a company of US Marine Security Forces.

**Question 0**

What year was the Polaris Missile Facility Atlantic station closed?

**Question 1**

How many nuclear warheads were stored at the Polaris missile facility at Atlantic Station?

**Question 2**

How many squadrons of SSBN "Boomers" were stationed at the weapons station?

**Question 3**

What type of military base is the home port of Submarine Squadron 4?

**Question 4**

What kind of security forces guard the 2500 nuclear warheads?

**Question 5**

What year was the Polaris Missile Facility Atlantic station opened?

**Question 6**

How many nuclear warheads are not stored at the Polaris missile facility at Atlantic Station?

**Question 7**

How many SSNB "Boomer" flotillas were in the home port at the weapon station?

**Question 8**

What type of military base is the home port of Submarine Squadron 3?

**Question 9**

What kind of security forces guard the 2600 nuclear warheads?

**Text number 45**

In 1832, South Carolina passed a nullification ordinance, which allowed the state to effectively repeal federal law; it was aimed against the most recent tariff laws. Soon federal soldiers were sent to Charleston's forts, and five U.S. Coast Guard cutters were sent to Charleston Harbor "to take possession of all vessels arriving from foreign ports, and to defend against all attempts to deprive the customs authorities of their control until all the requirements of the law have been complied with." This federal action became known as the Charleston case. State politicians in Washington worked on a compromise law to phase out tariffs.

**Question 0**

In what year did South Carolina pass a law that allows them to repeal federal law?

**Question 1**

When South Carolina passed the repeal ordinance, who was sent to the Charleston forts?

**Question 2**

When South Carolina passed the repeal ordinance, who was sent to the Port of Charleston?

**Question 3**

What is called a federal action to send soldiers to Charleston in 1832?

**Question 4**

What was achieved by the compromise laws of state politicians?

**Question 5**

What year did North Carolina pass a law that allows them to repeal federal law?

**Question 6**

When North Carolina passed the repeal ordinance, who was sent to the Charleston forts?

**Question 7**

When North Carolina passed the repeal ordinance, who was sent to the Port of Charleston?

**Question 8**

What is called a federal action to send soldiers to Charleston in 1823?

**Question 9**

Compromise by state politicians never achieved what?

**Text number 46**

By 1840, the market hall and sheds, where fresh meat and produce were brought in daily, became the centre of commercial activity. The slave trade also depended on the Charleston harbour, where ships could be unloaded and slaves bought and sold. The legal importation of African slaves had ended in 1808, although smuggling was significant. However, the domestic trade flourished. More than a million slaves were transported from the upper South to the Deep South during the antebellum years, when cotton plantations were developed extensively in the so-called Black Belt. Many slaves were transported in the coastal slave trade, with slave ships stopping in ports like Charleston.

**Question 0**

Which industry was dependent on the Port of Charleston?

**Question 1**

Where was fresh food sold daily in Charleston in 1840?

**Question 2**

In what year did the legal import of slaves end?

**Question 3**

What was the name of the area where the cotton plantations were developed?

**Question 4**

In what era were a million slaves traded throughout the South?

**Question 5**

What industry has never depended on the Port of Charleston?

**Question 6**

Where was fresh food sold daily in Charleston in 1804?

**Question 7**

In what year did the legal import of slaves begin?

**Question 8**

What is called an area where there were no cotton plantations?

**Question 9**

In what era were two million slaves traded throughout the South?

**Text number 47**

After the Confederate defeat, federal troops remained in Charleston to rebuild the city. The war had shattered the prosperity of the former city. Freed slaves faced poverty and discrimination, but a large number of free people of colour had established themselves in the city before the war and became leaders of the post-war Republican Party and its legislature. In South Carolina, 26% of those elected to state and federal office between 1868 and 1876 were free men of colour before the war.

**Question 0**

What percentage of those elected between 1868 and 1876 were liberal?

**Question 1**

Which party did Freeman become leader of in Charleston?

**Question 2**

What else did freed slaves face in post-war Charleston besides discrimination?

**Question 3**

Why did the federal troops stay in Charleston?

**Question 4**

Which side lost the war before reconstruction?

**Question 5**

What percentage of those elected between 1868 and 1886 were liberal?

**Question 6**

Which party did Freeman never get to lead in Charleston?

**Question 7**

What else did freed slaves face in pre-war Charleston besides discrimination?

**Question 8**

Why did federal troops leave Charleston?

**Question 9**

Which side lost the war after reconstruction?

**Document number 357**

**Text number 0**

Between 7 September 1940 and 21 May 1941, 16 British cities were hit by air raids using at least 100 tonnes of explosives. In 267 days, 71 attacks were made on London, eight on Birmingham, Liverpool and Plymouth, six on Bristol, five on Glasgow, four on Southampton, three on Portsmouth and three on Hull and at least one major attack on eight other cities. This was the result of a rapid escalation beginning on 24 August 1940, when RAF night bombers targeting airfields drifted off course and accidentally destroyed several London homes, killing civilians, combined with the retaliatory bombing of Berlin the following night by British Prime Minister Winston Churchill [clarification needed].

**Question 0**

What was the start time of the air raids on the UK?

**Question 1**

How many days did the British air raids last?

**Question 2**

How many times was London attacked?

**Question 3**

Who was the UK Prime Minister at the time of the air raids?

**Question 4**

What city did Winston Churchill bomb in retaliation for killing civilians?

**Text number 1**

From 7 September 1940, a year after the war began, the Luftwaffe bombed London for 57 consecutive nights. Over a million London houses were destroyed or damaged and over 40,000 civilians were killed, almost half of them in London. Ports and industrial centres outside London were also attacked. The main Atlantic seaport of Liverpool was bombed, causing nearly 4 000 deaths in the Merseyside area during the war. The North Sea port of Hull, a convenient and easily located target or secondary target for bombers unable to locate their primary targets, was the target of 86 attacks during the war in the Hull Blitz, which killed a conservative estimate of 1 200 civilians and destroyed or damaged 95% of its housing stock. Other ports such as Bristol, Cardiff, Portsmouth, Plymouth, Southampton and Swansea were also bombed, as were the industrial towns of Birmingham, Belfast, Coventry, Glasgow, Manchester and Sheffield. Birmingham and Coventry were chosen because Birmingham had Spitfire and tank factories and Coventry had several munitions factories. Coventry city centre was almost completely destroyed, as was Coventry Cathedral.

**Question 0**

How many nights did the Luftwaffe bomb London?

**Question 1**

Which North Sea port was the secondary target for the bombers that could not find their primary target?

**Question 2**

How many homes in London were destroyed in London?

**Question 3**

How many people died in Liverpool?

**Question 4**

Which city centre was destroyed?

**Text number 2**

The bombing failed to discourage the British from surrendering or significantly damage the war economy. The eight months of bombing never seriously affected British production, and the war industry continued to operate and expand. The Blitz bombing was only authorised after the Luftwaffe had failed to meet the preconditions for the launch of Operation Sea Lion in 1940, Germany's tentatively planned invasion of Britain. By May 1941, the threat of a British invasion was over, and Hitler's attention had turned to his Operation Barbarossa in the east. Compared to the subsequent Allied bombing of Germany, the Blitz caused relatively few casualties; the British bombing of Hamburg in July 1943 caused some 42,000 civilian casualties, roughly the same number as during the entire Blitz.

**Question 0**

What was the name of the Luftwaffe's plan to attack Britain?

**Question 1**

How many people died in the Hamburg bombing?

**Question 2**

When did the Hamburg bombing take place?

**Question 3**

Who was the leader of the Luftwaffe?

**Text number 3**

In the 1920s and 1930s, air power theorists Giulio Douhet and Billy Mitchell advocated the idea that air power could win wars on its own without land and sea battles. It was felt that there was no defence against air attacks, especially at night. Enemy industry, government installations, factories and communications could be destroyed, thus depriving the enemy of the means of resistance. The bombing of population centres was also thought to cause a collapse of civilian civilian opinion, which could have led to the collapse of production and civilian life. Particularly vulnerable were democracies where the people could openly express their disapproval of the government in power. This mindset prevailed in both the RAF and the US Army Air Corps (USAAC) between the two world wars. In particular, the RAF Bomber Command sought to achieve victory by destroying the will of the civilian population, communications and industry.

**Question 0**

In the 1920s and 30s, theorists thought that wars could be won with air power, what were their names?

**Question 1**

What was the bombing of civilians believed to cause?

**Question 2**

Which populations were thought to be most vulnerable?

**Question 3**

What is USAAC?

**Question 4**

What kind of bomb attacks were most popular?

**Text number 4**

Within the Luftwaffe, strategic bombing was treated with more restraint. The OKL was not opposed to strategic bombing of enemy industry and/or cities and believed that it could significantly affect the balance of power on the battlefield in Germany's favour by disrupting production and damaging civilian morale, but it did not believe that air power alone could be decisive. Contrary to popular belief, the Luftwaffe did not pursue a systematic policy known as 'terror bombing'. Evidence suggests that the Luftwaffe did not adopt a formal bombing policy in which civilians became the primary target until 1942.

**Question 0**

Who believes that air power alone is not decisive?

**Question 1**

What was the name of the Luftwaffe bombing raids?

**Question 2**

In what year did the terrorist bombing policy become official?

**Text number 5**

Wever argued that the Luftwaffe General Staff should not be trained only in tactical and operational matters. He said it should be trained in grand strategy, military economics, armament and the mentality of potential adversaries (also known as mirror imaging). Wever's vision was not realised; general staff studies in these subjects took a back seat, and air academies focused on tactics, technology and operational planning rather than on independent strategic air attacks.

**Question 0**

Who said that the Luftwaffe General Staff should be taught grand strategy?

**Question 1**

What is the mentality of potential opponents?

**Question 2**

What did the Aviation Academies not focus on?

**Question 3**

To which army does the General Staff belong?

**Text number 6**

In 1936, Wever died in a plane crash. His vision of a new Luftwaffe failed largely because of his immediate successors. Former army staff Albert Kesselring and Hans-Jürgen Stumpff are generally blamed for the shift away from strategic planning to focus on close air support. However, it would seem that the two most prominent enthusiastic supporters who focused on (direct or indirect) ground support activities were Hugo Sperrle and Hans Jeschonnek. These men were professional pilots of long standing, involved in the German Air Force from the early stages of their careers. The Luftwaffe did not have to start ground support operations because of pressure from the army or because it was led by former members of the army. Instead, the mission fitted in with the Luftwaffe's current warfare style, which was based on joint inter-force operations rather than independent strategic air campaigns.

**Question 0**

How did Wever die?

**Question 1**

What year did Wever die?

**Question 2**

Who replaced Wever after his death?

**Question 3**

Which two men were the most important in the ground forces?

**Question 4**

What kind of long-term careers were Sperrle and Jeschonnek involved in?

**Text number 7**

Adolf Hitler did not pay as much attention to bombing the enemy as to protecting against enemy bombing, although he had promoted the development of bombers in the 1930s and understood that bombers could be used for important strategic purposes. He told the OKL in 1939 that the ruthless use of the Luftwaffe against the heart of the British resistance could and would happen when the moment was right; however, he quickly developed a lively scepticism about strategic bombing, which was confirmed by the results of the lightning strike. He often lamented the Luftwaffe's inability to damage industry sufficiently and said: "Air raids cannot effectively tackle the munitions industry ... generally designated targets are not hit".

**Question 0**

In what year did Hitler start bombing the enemy?

**Question 1**

Who was sceptical about strategic bombing?

**Question 2**

Why did Hitler think the bombing didn't work?

**Question 3**

In 1939, Hitler said that the bombing of Britain would start when?

**Question 4**

Why did Hitler think the Luftwaffe was not successful in bombing?

**Text number 8**

Ultimately, Hitler was trapped by his own view of bombing as a weapon of terror, which emerged in the 1930s when he threatened smaller nations to accept German rule rather than submit to aerial bombardment. This had important consequences. It showed the extent to which Hitler personally mistook the Allied strategy for breaking morale rather than economic warfare, and the collapse of morale was an added bonus. Hitler was far more interested in the political aspects of the bombing. Since the mere threat of bombing had produced diplomatic results in the 1930s, he expected that the threat of German retaliation would induce the Allies to adopt a policy of moderation rather than an unrestricted bombing policy. His hope - because of Germany's internal political prestige - was that the German population would be protected from Allied bombing. When this proved impossible, he began to fear that popular sentiment would turn against his administration, and he redoubled his efforts to launch a similar 'terror attack' against Britain in order to create a stalemate in which both sides would hesitate to use bombing at all.

**Question 0**

How did Hitler threaten small nations to accept German rule?

**Question 1**

What kind of policy did Hitler hope the Allied bombing would produce?

**Question 2**

What kind of authority did Hitler want?

**Question 3**

Why did Hitler use terrorist bombing against Britain?

**Text number 9**

The big problem with the Luftwaffe was Hermann Göring. Hitler believed that the Luftwaffe was 'the most effective strategic weapon', and in response to repeated requests from the Kriegsmarine for control of aircraft, he insisted: 'We would never have been able to hold our own in this war if we had not had an undivided Luftwaffe'. Such principles made it much more difficult to integrate the air force into the overall strategy and led Goering to jealously and perniciously defend his 'empire' while Hitler voluntarily abolished systematic command of the air force at either the strategic or operational level. Later in the war, when Hitler attempted to intervene more in the management of the air force, he found himself in a self-inflicted political conflict between Goering and himself, which was not fully resolved until the end of the war. In 1940 and 1941, Goering's refusal to cooperate with the Kriegsmarine prevented the Wehrmacht's forces throughout the Reich from suppressing British sea links that could have had a strategic or decisive impact in the war against the British Empire.

**Question 0**

With whom did Hitler have a conflict over the command of the air force?

**Question 1**

What strategy could have worked against the British Empire?

**Question 2**

With whom did Goring refuse to cooperate in 1940 and 1941?

**Question 3**

What was the Kriegsmarine trying to take control of?

**Text number 10**

The deliberate separation of the Luftwaffe from the rest of the military structure contributed to a major "communication gap" between Hitler and the Luftwaffe, which was further exacerbated by other factors. Firstly, Goering's fear of Hitler led him to falsify or distort available information, which led to an uncritical and over-optimistic interpretation of the strength of the air force. When Göring decided in 1937 not to pursue Wever's original heavy bomber programme, the Reichsmarschall himself explained it by saying that Hitler only wanted to know the number of bombers, not how many engines each had. In July 1939, Göring organised a demonstration of the Luftwaffe's most advanced equipment at Rechlin to give the impression that the air force was better prepared for strategic air warfare than it actually was.

**Question 0**

What was the main reason for separating the Luftwaffe from the rest of the military?

**Question 1**

What did Goring do out of fear of Hitler?

**Question 2**

What year did Goring present the Luftwaffe's advanced equipment?

**Question 3**

In which city did Goring present the advance equipment?

**Question 4**

Whose bombing programme was rejected by Goring in 1939?

**Text number 11**

A few hours after the UK and France declared war on Germany on 3 September 1939, the RAF bombed German warships off the German coast at Wilhelmshaven. The bombing was then directed at ports and shipping and the dropping of propaganda leaflets. The operations were designed to minimise civilian casualties. From 15 May 1940, the day after the Luftwaffe destroyed the centre of Rotterdam, the RAF also carried out operations east of the Rhine, attacking industrial and transport sites. Thereafter, operations were carried out every night.

**Question 0**

Which two countries declared war on Germany on 3 September 1939?

**Question 1**

What coast of Germany was bombed by the RAF?

**Question 2**

What kind of leaflets were dropped?

**Question 3**

What did the RAF operations aim to reduce?

**Question 4**

What year did the Luftwaffe destroy the centre of Rotterdam?

**Text number 12**

Although the Luftwaffe was not specifically prepared for independent strategic air operations against the enemy, it was expected to do so over Britain. From July to September 1940, the Luftwaffe attacked RAF fighter forces to gain air superiority as a pre-attack measure. This involved the bombing of English Channel convoys, harbours and RAF airfields and supporting industry. The destruction of the RAF fighter force would allow the Germans to gain control of the airspace in the area of attack. It was assumed that Bomber Command, RAF Coastal Command and the Royal Navy could not operate under German air superiority.

**Question 0**

What tactics was the Luftwaffe not allowed to use against Britain?

**Question 1**

Why did the Luftwaffe bomb RAF fighter squadrons?

**Question 2**

What was the name of the canal that the Luftwaffe bombed to gain air supremacy?

**Question 3**

Which fleet was supposed to be unable to operate under German air superiority?

**Text number 13**

Due to the Luftwaffe's weak intelligence capabilities, its aircraft were not always able to locate their targets, and therefore attacks on factories and airfields did not produce the desired results. British production of fighter aircraft continued to outstrip German production by 2:1. The British produced 10 000 aircraft in 1940, while Germany produced 8 000. Replacing pilots and flight crews was more difficult. Both the RAF and the Luftwaffe had difficulty replacing lost crews, although the Germans had larger reserves of trained aircrew. Circumstances affected the Germans more than the British. British pilots operating over their home country could fly again if they survived a shoot-down. German crews were threatened with imprisonment even if they survived. In addition, the bombers had between four and five crew members, which meant a greater loss of manpower. On 7 September, the Germans moved away from the destruction of RAF support structures. German intelligence indicated that Fighter Command was weakening, and an attack on London would force it into a last stand of destruction, while forcing the British government to surrender.

**Question 0**

Why did the Luftwaffe fail to locate its targets?

**Question 1**

By what margin did Britain's fighter aircraft production beat Germany's?

**Question 2**

How many aircraft did Britain produce in 1940?

**Question 3**

What would German crew members have to go through if they were shot down over Britain?

**Question 4**

How big was the crew of the bomber?

**Text number 14**

The Oberkommando der Luftwaffe (OKL) sometimes claims that the decision to change strategy was a big mistake. It is argued that by continuing attacks against RAF airfields, the Luftwaffe might have won air supremacy. Others argue that the Luftwaffe made little impact on fighter pilot command in the last week of August and the first week of September and that the change in strategy was not decisive. It has also been argued that the Luftwaffe could hardly have achieved air superiority before the "weather window" began to deteriorate in October. If the RAF's losses had become severe, it was also possible that it could have withdrawn north, waited for the German invasion and then moved south again. Other historians argue that the outcome of the air battle did not matter; the massive numerical superiority of the British navy and the inherent weakness of the Kriegsmarine would have made the planned German invasion, Unternehmen Seelöwe (Operation Sea Lion), a disaster, whether or not Germany had air superiority.

**Question 0**

What does OKL mean?

**Question 1**

In which month does the weather window start to get smaller?

**Question 2**

If the RAF had suffered serious losses, where could they have withdrawn from?

**Question 3**

What is the German name for Operation Sea Lion?

**Question 4**

Who had an exponentially larger naval force?

**Text number 15**

Despite the Luftwaffe's ability to win air supremacy, Adolf Hitler was frustrated that it was not happening fast enough. With no sign of the RAF weakening and the Luftwaffe air fleets (Luftflotten) suffering punishing losses, the OKL wanted to change strategy. To further reduce losses, a change in strategy was also recommended for night time to give bombers better cover under cover of darkness. On 4 September 1940, in a long speech at the Sportspalast, Hitler declared: 'And if the Royal Air Force drops two or three thousand [kilos ...], we now drop [...] 300,000, 400,000, even a million kilos in one night. And if they announce that they are going to increase their attacks on our cities substantially, then we will wipe out their cities."

**Question 0**

What kind of losses did the Luftwaffe air fleets suffer?

**Question 1**

What did the Luftwaffe do about the punitive losses of the air fleet?

**Question 2**

What strategy did the Luftwaffe use to give its bombers better protection?

**Question 3**

In which city did Hitler give a speech in which he said he would destroy British cities?

**Question 4**

What year did Hitler give a speech at Sportspalast?

**Text number 16**

Initially, it was decided to concentrate on bombing British industrial cities in daylight. The main focus of the bombing was on the city of London. The first major attack in this respect was carried out on 7 September. On 15 September, the day known as Battle of Britain Day, a large-scale daylight attack was carried out, but suffered significant casualties with no lasting gains. Although a few major daylight air battles were fought later in the month and in October, the Luftwaffe shifted its main effort to night raids to reduce losses. This became official policy on 7 October. An air campaign against London and other British cities was soon launched. However, the Luftwaffe had its limitations. Its aircraft - Dornier Do 17, Junkers Ju 88 and Heinkel He 111 - were capable of carrying out strategic missions, but bomb load restrictions prevented them from doing much damage. The Luftwaffe's decision to concentrate on medium bombers during the interwar period was due to several reasons: Hitler neither intended nor anticipated war with Britain in 1939; OKL believed that medium bombers could perform strategic missions as well as heavy bombers; and Germany did not have the resources or technical capability to produce four-engine bombers before the war.

**Question 0**

Which British city did the Luftwaffe concentrate its bombing on?

**Question 1**

What was the name of the great air raid that took place in Britain during the day?

**Question 2**

What was the main reason why the Luftwaffe was unable to cause major damage with its flights?

**Question 3**

What kind of bombers could Germany not build?

**Text number 17**

Although the Luftwaffe's equipment was capable of inflicting serious damage, its problem was its unclear strategy and weak intelligence. The OKL had been informed that Britain was not to be considered a potential adversary until early 1938. It did not have time to gather reliable intelligence on British industry. Nor was the OKL in a position to decide on an appropriate strategy. German planners had to decide whether Luftwaffe attacks should target a particular sector of British industry, such as aircraft factories, or a system of interrelated industries, such as the British import and distribution network, or even an attack designed to break the morale of the British population. During the winter of 1940-1941, the Luftwaffe's strategy became increasingly aimless. Arguments within the OKL staff were more about tactics than strategy. This approach doomed the invasion of Britain to failure even before it began.

**Question 0**

Poor intelligence and what other problem hampered the Luftwaffe's ability to carry out extreme destruction?

**Question 1**

In what year did the OKL find out that the UK was a potential destination?

**Question 2**

What were the disagreements around which the Luftwaffe headquarters were centred?

**Question 3**

What did the staff disputes do to the anti-British strategy?

**Text number 18**

Operationally, the limitations of weapons technology and the rapid British response made it difficult to achieve strategic effects. Attacks on ports, shipping and imports, and disruption of rail transport in the surrounding areas, especially disruption of the distribution of coal, an important fuel in all the industrial economies of the pre-World War II period, would have produced positive results. The use of delayed action bombs was initially very effective, but gradually their impact diminished, partly because they did not explode.[c] In addition, the British had anticipated the change in strategy and decentralised their production facilities, making them less vulnerable to concentrated attacks. Regional commissars were given the power to re-establish communications and organise the distribution of supplies to keep the war economy going.

**Question 0**

Combined with the UK's rapid response, what is causing the lack of capacity to act?

**Question 1**

What was an important fuel in the Second World War?

**Question 2**

What kind of bombs were effective at the beginning, but lost their effectiveness over time?

**Question 3**

What did Britain do that helped make the new strategy less effective?

**Question 4**

Who was authorised to restore electricity and move supplies to keep the war going?

**Text number 19**

Based on the experience of German strategic bombing of the UK during the First World War, the UK government estimated after the war that each tonne of bombs dropped on London would cause 50 casualties, of which around a third would die. The estimate of how many tons of bombs the enemy could drop in a day increased as aircraft technology developed: 75 tons in 1922, 150 tons in 1934 and 644 tons in 1937. In that year, the Imperial Defence Committee estimated that a 60-day offensive would cause 600,000 deaths and 1,200,000 wounded. News reports of the Spanish Civil War, including the bombing of Barcelona, supported the estimate of 50 deaths per tonne. By 1938, experts generally expected Germany to try to drop up to 3 500 tons in the first 24 hours of the war and an average of 700 tons a day for several weeks. In addition to explosive and incendiary bombs, the enemy would possibly use poison gas and even bacteriological warfare, all with great precision. In 1939, war theorist Basil Liddell-Hart predicted that 250 000 people in Britain could be killed and injured in the first week of war.

**Question 0**

How many deaths does the British government estimate for every tonne of bombs dropped?

**Question 1**

How many bombs could be dropped in a day in 1937 as technology advanced?

**Question 2**

Which committee estimates that 60 days of attacks would result in 600 000 deaths?

**Question 3**

How many tons did the experts expect Germany to drop in the first 24 hours of the war?

**Question 4**

Who was the war theorist in 1939 who said that 250 000 people would be killed and injured in the first week of the war in Britain?

**Text number 20**

In addition to the dead and wounded, government leaders feared the massive psychological trauma of the air strike and the resulting collapse of civil society. The Committee of Psychiatrists reported to the government in 1938 that there would be three times as many psychological as physical casualties from aerial bombing, which meant three to four million psychiatric patients. Winston Churchill told Parliament in 1934: 'We must expect that under the pressure of the constant attacks on London at least three or four million people would be driven into the open country around the metropolis'. Panic reactions during the Munich crisis, such as the migration of 150 000 people to Wales, contributed to fears of social chaos.

**Question 0**

What was the biggest fear of air strikes, apart from death and wounded?

**Question 1**

Psychiatrists believed in 1938 that there could be how many millions of people with mental trauma?

**Question 2**

Where did 150 000 people move to during the Munich crisis?

**Question 3**

Who told Parliament that after long attacks people would leave the cities for the countryside?

**Text number 21**

The government planned to voluntarily evacuate four million people - mainly women and children - from urban areas, including 1.4 million from London. It expected around 90% of those evacuated to live in private housing, and carried out an extensive survey to determine available accommodation. Detailed preparations were developed for their transport. A trial blackout was held on 10 August 1939, and when Germany invaded Poland on 1 September, the blackout began at sunset. No lights would be allowed after dark for nearly six years, and blackout became by far the least popular aspect of the war among civilians, more so than rationing.51,106 Relocation of the government and civil service was also planned, but would only be carried out if necessary to avoid damaging civilian morale.

**Question 0**

The government planned to evacuate 1.4 million people from which city?

**Question 1**

Which trial was held on 10 August 1939?

**Question 2**

How long were the lights not allowed to be switched on after dark?

**Question 3**

What was the most unpopular impact of the war among civilians ?

**Question 4**

Why did the government and civil service not want to move elsewhere during the war?

**Text number 22**

Much of the civil protection capacity in the form of shelters remained the responsibility of local authorities, and many areas, such as Birmingham, Coventry, Belfast and the East End of London, did not have sufficient shelters. However, the phoney war and unexpected delays in civilian bombing enabled the civil defence programme to be completed in June 1940.35 The programme recommended Anderson backyard shelters and small brick surface shelters; many of the latter were soon abandoned in 1940 as unsafe. In addition, the authorities expected attacks to be brief and to take place during the day. Few predicted that night attacks would force Londoners to sleep in shelters.

**Question 0**

Which civil protection measures were left to the local authorities?

**Question 1**

What year did the shelter programme end?

**Question 2**

Why were the protections soon abandoned in 1940?

**Question 3**

Why did Londoners have to sleep in shelters?

**Text number 23**

Very deeply buried shelters offered the best protection against a direct hit. The government did not build them for large populations before the war because they were expensive, took time to build and because it was feared that their safety would cause residents to refuse to go to work or that anti-war sentiment would arise among large groups. The government saw the Communist Party's leading role in defending the construction of deep shelters as an attempt to damage civilian morale, especially after the Molotov-Ribbentrop Pact of August 1939.34

**Question 0**

What kind of mood did the government fear would arise in large group shelters?

**Question 1**

Who did the government consider to be the leading advocate of deep shelter construction?

**Question 2**

What was the name of the August 1939 agreement?

**Text number 24**

The main existing common shelters were London Underground stations. Although many civilians had used them during the First World War, in 1939 the government refused to allow the stations to be used as shelters so as not to disrupt commuter and public transport and because it was feared that residents would refuse to leave. Metro officials were ordered to lock the station entrances during the attacks, but in the second week, after heavy bombing, the government relented and ordered the stations to be opened. People queued in order every day until 16:00, when they were allowed to enter the stations. In mid-September 1940, some 150 000 people were sleeping rough in the underground, but by winter and spring the number had fallen to 100 000 or less. The sounds of the fighting were muted and sleep was easier in the deepest positions, but many were killed in the full-scale bombardments at several stations.

**Question 0**

Why did the government refuse to allow London Underground stations to be used as shelters?

**Question 1**

Metro stations were ordered to be locked during the raids, but how long did it take to open them after the orders were given?

**Question 2**

How many people slept in metro stations in 1940?

**Question 3**

What did it help to facilitate at metro stations when the noise was silenced?

**Question 4**

Why did many die in underground stations?

**Text number 25**

However, more than seven per cent of Greater Londoners never lived in shared shelters. At best, 177,000 people were using the Underground as shelter on 27 September 1940, and the November 1940 census found that around 4% of Londoners were using the Underground and other large shelters, 9% using public surface shelters and 27% using private housing, suggesting that the remaining 60% of the city's residents were likely to remain at home. The government distributed Anderson shelters until 1941, the same year it began distributing Morrison shelters for use in homes.190

**Question 0**

What was the largest number of people using underground shelters on 27 September 1940?

**Question 1**

What percentage used the metro as a sleeping shelter in 1940?

**Question 2**

Where did 60% of the population go?

**Question 3**

In what year did the government start distributing Morrison's shelters?

**Question 4**

Where could Morrison's shelters be used?

**Text number 26**

Public demand prompted the government in October 1940 to build new deep shelters:189-190 inside the underground with a capacity of 80,000 people, but they were only completed after the heaviest bombing. By the end of 1940, the underground and many other large shelters had undergone major improvements. The authorities provided cookers and bathrooms, and food trains provided food. Tickets were issued for sleeping places in the large shelters to reduce the time spent queuing. Shelter committees were quickly formed into informal governments, and organisations such as the British Red Cross and Salvation Army worked to improve conditions. Entertainment included concerts, films, plays and books from local libraries.

**Question 0**

In what year did the government start building new deepwater dams?

**Question 1**

How many people were the new shelters supposed to accommodate?

**Question 2**

What helped to reduce the waiting time in shelters?

**Question 3**

Which two groups are helping to improve life in shelters?

**Question 4**

What kind of trains offered food in shelters?

**Text number 27**

Although the intensity of the bombing was not as high as expected before the war, making comparison impossible, the Blitz did not cause a psychiatric crisis even during the largest bombing in September 1940. One American eyewitness wrote: "By all the tests and yardsticks I can apply, these people are firm to the bone and will not give up ... the British are stronger and in a better position than they were at the beginning". People referred to the attacks as if they were weather, noting that the day was "very lightning fast".75,261 However, another American visiting Britain, publisher Ralph Ingersoll, wrote soon after the lightning subsided on 15 September that:

**Question 0**

What with the intensive bombing did not happen as much as the pre-war predictions expected?

**Question 1**

Which witness wrote that these people are tough to the bone and don't give up?

**Question 2**

People called the raids very stupid as if they were talking about what?

**Text number 28**

Ingersoll added that, according to Anna Freud and Edward Glover, London civilians were unsurprisingly not affected by widespread shell shock, unlike the soldiers in the Dunkirk evacuation.114,117-118 The psychoanalysts were right, and the specialised network of psychiatric clinics opened to receive mental victims of the attacks was closed down as unnecessary. Although the stress of the war led to many anxiety attacks, eating disorders, fatigue, crying, miscarriages and other physical and mental ailments, society did not collapse. Suicides and drunkenness declined, and London recorded only about two 'bombing incidents' a week during the first three months of bombing. Many civilians found that the best way to maintain mental stability was to be with their families, and after the first weeks of bombing, evacuation programmes were increasingly avoided. 80-81 Glover speculated that the knowledge that the whole country was under attack and that there was no escape from the bombs forced people to accept the situation and cope. 118:118

**Question 0**

According to Anne Freud and Edward Glover, London civilians did not suffer from what?

**Question 1**

Why were psychiatric clinics closed?

**Question 2**

Which two things were reduced during the attacks on the UK?

**Question 3**

The whole country was attacked and Glover believed it would help people to do what?

**Text number 29**

The joyous crowds at the bombing sites were so large that they disrupted rescue efforts, pub visits increased (beer was never rationed), and 13,000 people attended a cricket match at Lord's. People left the shelters when ordered and refused to leave, although many housewives reportedly enjoyed the break from housework. Some people even told government investigators that they enjoyed the air raids if they happened occasionally, perhaps once a week. Despite the attacks, the defeats in Norway and France and the threat of invasion, public morale remained high; a Gallup poll found that only 3% of Britons expected to lose the war in May 1940, another poll found Churchill's support at 88% in July and a third poll found it at 89% in October. Support for peace talks fell from 29% in February. With each setback, more civilians volunteered as unpaid local defence volunteers, workers worked longer shifts and weekends, contributions rose to £5,000 'Spitfire funds' to build fighters, and the number of working days lost to strikes in 1940 was the lowest in history:60-63,67-68,75,78-79,215-216

**Question 0**

What drink was never rationed?

**Question 1**

How many people went to watch cricket at Lord's?

**Question 2**

What percentage of Britons expected to lose the war?

**Question 3**

What was Churchill's highest rating?

**Question 4**

What were the Spitfire funds used for?

**Text number 30**

London's civilians played a huge role in protecting their city. Many civilians who were unwilling or unable to join the army joined the Home Guard, the Air Raid Precautions Service (ARP), the Fire Brigade Auxiliary and many other organisations. By July 1939, the AFS had 138,000 employees. Only a year earlier, there had been only 6,600 full-time and 13,800 part-time firefighters in the whole country. During the Blitz, the Scout Association directed fire engines to where they were most needed, and they were known as 'Blitz Scouts'. Many of the unemployed were recruited into the Royal Army's mercenary corps. They and other members of the Engineers were given rescue and clean-up duties.

**Question 0**

What is ARP?

**Question 1**

How many members did the fire brigade auxiliary have in July 1939?

**Question 2**

Who was given the name Blitz Scouts?

**Question 3**

The Royal Army Pay Corps and what other group was responsible for the rescue and clean-up work?

**Text number 31**

The WVS (Women's Voluntary Services for Civil Defence) was set up in 1938 under the leadership of Home Secretary Samuel Hoare, specifically to deal with air raids. Hoare saw it as the female branch of the ARP. They organised the evacuation of children, set up centres for people displaced by bombing, ran canteens and rescue and recycling schemes. By the end of 1941, the WVS had one million members. Before the outbreak of war, 50 million respirators (gas masks) were distributed to civilians. These were issued in case of gas bombing before evacuation.

**Question 0**

Which group was founded by Samuel Hoare in 1938?

**Question 1**

Who was the Home Secretary in 1938?

**Question 2**

How many members did the WVS have at the end of 1941?

**Question 3**

How many gas masks were issued before the war?

**Text number 32**

Between the wars and after 1940, fighter pilot commander Hugh Dowding has been credited with defending British airspace and the Luftwaffe's failure to achieve air supremacy. However, Dowding had put so much effort into preparing a daylight fighter defence that there was little to stop the Germans from implementing an alternative strategy by bombing at night. When the Luftwaffe first struck British cities on 7 September 1940, many civil and political leaders were concerned about Dowding's apparent unresponsiveness to the new crisis.

**Question 0**

Who was the commander of the fighter force after 1940?

**Question 1**

What kind of credit did Dowding get?

**Question 2**

What strategy could the Germans have used instead of daylight attacks?

**Question 3**

Why were civic and political leaders concerned about Dowdings?

**Text number 33**

Dowding accepted that as commander in chief he was responsible for the defence of Britain day and night, and if he failed, the blame would fall on him. When urgent changes and improvements had to be made, Dowding seemed reluctant to act quickly. The Air Staff felt that this was due to his stubborn nature and unwillingness to co-operate. Dowding's opponents in the Air Ministry, who had already criticised Dowding's performance in the day-to-day battle (see Battle of Britain Day and the Big Wing controversy), were prepared to use these shortcomings as a stick against him and his abilities.

**Question 0**

Who was unwilling to act quickly when urgent changes had to be made?

**Question 1**

Who thought Dowding was stubborn and didn't want to cooperate?

**Question 2**

After which battle did the Air Ministry criticise Dowding?

**Question 3**

What was the Air Ministry going to do about his failures?

**Text number 34**

On 17 October 1940, Dowding was summoned to a meeting of the Air Ministry to explain the poor state of the night defences and the supposed (but ultimately successful) "failure" of his day strategy. Criticism of his leadership extended far beyond the Aircraft Council, and the Minister for Aircraft Production, Lord Beaverbrook, and Churchill himself indicated that their support was waning. Although the failure of the night defence preparations was undeniable, it was not the responsibility of the Air Operations Centre to raise the resources. The general neglect of the RAF until the final push in 1938 had left scarce resources for defence construction. While it was permissible to disagree with Dowding on the operational and tactical deployment of troops, the failure of the government and the Air Ministry to allocate resources was ultimately the responsibility of civil and military institutions. Before the war, the Chamberlain government stated that night fighting against air raids should not take up a large part of the national effort and, together with the Air Ministry, did not give it priority.

**Question 0**

Who was invited to the Air Ministry meeting on 17 October 1940?

**Question 1**

Lord Beaverbrook and Churchill's support for Dowding was what?

**Question 2**

The neglect of the RAF until 1938 caused what?

**Question 3**

The Air Ministry and which other group decided not to make night defence a priority?

**Text number 35**

The attitude of the Air Ministry was at odds with the experience of the First World War, when a few German bombers caused physical and psychological damage disproportionate to their numbers. Some 280 short tons (250 t) (9 000 bombs) had been dropped, killing 1 413 people and wounding 3 500 others. Most people over 35 years of age remembered the threat and reacted to the bombings with great fear. Between 1916 and 1918, German attacks had decreased in the face of counter-attacks, which showed that defending against night-time air raids was possible.

**Question 0**

How do people over 35 react to bomb attacks?

**Question 1**

Why had the German attacks decreased between 1916 and 1918?

**Question 2**

How many people died in bombings during the First World War?

**Question 3**

How many bombs were dropped?

**Text number 36**

Although night anti-aircraft fire was a major concern before the war, it was not at the forefront of RAF planning. Most resources were devoted to planning for daytime fighter defence. The RAF bombers' difficulty in navigating in the dark led the British to believe that German bombers would suffer the same problems and would not be able to reach and identify their targets. There was also a mentality in all the air forces that if they could carry out effective operations during the day, night flights and their disadvantages could be avoided.

**Question 0**

What did the RAF spend most of its resources on?

**Question 1**

The RAF bombers had trouble flying at night, so the British thought the Germans would do what?

**Question 2**

Britain believes that German bombers would not be able to reach and identify what?

**Question 3**

What did the Air Force believe it could avoid if it carried out effective day-to-day operations?

**Text number 37**

British Air Force doctrine since the days of Air Chief of Staff Hugh Trenchard in the early 1920s had stressed that attack was the best means of defence. British defence strategy was based on offensive action, known as the offensive cult. To prevent German formations from striking targets in Britain, the RAF Bomber Command destroyed Luftwaffe aircraft at their own bases, aircraft at their factories and fuel depots by attacking oil mills. This philosophy was impractical because Bomber Command lacked the technology and equipment and took several years to develop. This strategy slowed down the development of fighter defence in the 1930s. Dowding agreed that air defence would require some offensive action and that fighters alone could not defend Britain. Until September 1940, the RAF had no aircraft specialising in night fighters and relied on anti-aircraft units that were poorly equipped and too few in number.

**Question 0**

What did the British crime become known as?

**Question 1**

Why was bombing German air bases, factories and fuel depots an impractical tactic?

**Question 2**

What types of aircraft did the RAF lack until 1940?

**Question 3**

What was wrong with the anti-aircraft units?

**Text number 38**

Bomber crews already had some experience with this type of system, as the Lorenz bar was a commercial blind landing aid that allowed aircraft to land at night or in bad weather. The Germans developed the short-range Lorenz system into the Knickebein system, which used two Lorenz beams with a much stronger signal transmission. The concept was the same as for the Lorenz system. The two antennas were rotated for two congruent beams, which were directed to cross directly over the target. German bombers would lock on to one beam and fly along it until they began to receive the signal from the other beam. When the second beam made a steady sound, the crew knew they were over the target and began dropping their bombs.

**Question 0**

What did the Lorenz radius allow aircraft to do?

**Question 1**

Which system did the Germans develop from Lorenz?

**Question 2**

Knickebein was the same as Lorenz, but used how many beams?

**Question 3**

The Germans flew along one beam until they detected a voice in another beam telling them when to start doing what?

**Text number 39**

German crews used the Knickebein en masse, while the use of the X-Gerät was limited to specially trained tracker crews. He 111 aircraft were fitted with special receivers, and a radio compartment was installed in the fuselage of the bomber. The system operated on a higher frequency (66-77 MHz, compared with 30-33 MHz for the Knickebein). Transmitters on the ground transmitted pulses at a rate of 180 per minute. The X-unit received and analysed the pulses and provided the pilot with both visual and audible indications of course. Three beams crossed along the He 111's flight path. The first crossbeam served as a warning to the bomb launcher, who set off the bomb timer and activated it only when the second crossbeam was reached. When the third crossbar was reached, the bombardier activated the third trigger, which stopped the first pointer on the device's clock, and the second pointer continued. The bombs were triggered when the second pointer was again in line with the first. The clock's timing mechanism was matched to the distances of the intersecting beams to the target, so the target was directly below when the bomb was fired.

**Question 0**

While Knickebein was used by most of my German crews who used the X-Gerat system?

**Question 1**

What frequency did the X-Gerat system use?

**Question 2**

How much per minute did the terrestrial transmitters transmit?

**Question 3**

When the bomber crossed the first beam, what did the bomber timer do?

**Question 4**

What mechanism causes bombs to go off?

**Text number 40**

Y-devices were the most complex of the three systems. It was effectively an automatic beam tracking system, operated via the bomber's automatic control system. The ground controller controlled a single approach beam along which the bomber followed. The bomber's equipment relayed the signals from the station. This allowed the bomber's path along the beam to be accurately checked. The directional checks also enabled the controller to keep the crew on an accurate course. The crew was ordered to drop the bombs either by a code word from the ground controller or when the signal transmissions stopped. Although the bomb's maximum usable range was similar to previous systems, it was not unknown for certain buildings to be hit.

**Question 0**

Which of the three systems was the most complex?

**Question 1**

Who used the automatic beam system?

**Question 2**

What kind of checks help keep the machine on course?

**Question 3**

What could tell the crew to drop a bomb?

**Question 4**

Who gave the bombers the code word?

**Text number 41**

In June 1940, a German prisoner of war was overheard boasting that the British would never find Knickebein, even though it was under their noses. The details of the conversation were passed on to Dr R. V. Jones, technical adviser to the RAF Air Staff, who began a thorough investigation which revealed that the Luftwaffe's Lorenz receivers were more than just blind landing devices. Jones therefore began a search for German beams. BATDU (Beam Approach Training Development Unit) Avro Ansons were flown over the upper and lower reaches of Britain and equipped with a 30 MHz receiver to detect them. A beam was soon traced to Derby (mentioned in Luftwaffe transmissions). The first jamming operations were carried out using confiscated hospital telegraphs. A subtle form of distortion was introduced. Up to nine special transmitters directed their signals in the direction of the beam in such a way that the beam path was widened, thus losing its ability to locate targets accurately. Confidence in the device was undermined when the Luftwaffe decided to launch large-scale attacks. The interception operations were carried out by British Electronic Countermeasures (ECM) units led by Edward Addison, Wing Commander of the RAF 80th Wing. Generating false radio navigation signals by retransmitting the original signals was a technique known as masking beacons (meacons).

**Question 0**

In 1940, a German prisoner was overheard boasting that the British would never find what system?

**Question 1**

Who was the RAF technical adviser to whom the conversation was passed on?

**Question 2**

The Bean Approach training development unit was equipped with what kind of transmitter to search for Knickebein?

**Question 3**

The beam was traced to which city?

**Question 4**

On which machines was the first jamming operation carried out?

**Text number 42**

The German beacons operated in the medium frequency band, and the signals contained a two-letter Morse code followed by a long period of time that allowed Luftwaffe crews to determine the direction of the signal. The Meacon system included separate locations for a receiver and a transmitter with a directional antenna. When a German signal was received by the receiver, it was properly transmitted to the transmitter and the signal was repeated. This did not guarantee automatic success. If a German bomber flew closer to its own beam than the Meacon, the previous signal came through more strongly in the direction finder. The reverse would only be true if the Meacon was closer.

**Question 0**

What frequency range did the German lighthouses use?

**Question 1**

What was the two-letter code for the signal?

**Question 2**

Which system used separate locations for the receiver and directional antenna?

**Question 3**

When a German bomber flew too close to its own beam, what happened to the signal?

**Text number 43**

In general, German bombers probably reached their targets without too much difficulty. It would still take months to build an effective night-fighter force, and the air defence only became adequate after the lightning had passed, so tricks were devised to lure German bombers away from their targets. Throughout 1940, artificial airfields were prepared that were good enough to withstand professional observation. Many bombs were dropped on these decoy targets ("Starfish").

**Question 0**

After which the air defence became better?

**Question 1**

What did they use to lure German bombers away from their targets?

**Question 2**

What kind of airports were ready to handle professional observers?

**Question 3**

What was the name of these artificial airfields?

**Text number 44**

Diversionary techniques, such as fires, had to be used carefully. False fires could only be started once the bombardment had begun over an adjacent target and its effects had been controlled. Too early, in which case the chances of success would be reduced; too late, in which case the actual fire on the target would overwhelm the diversionary fires. Another innovation was the boiler fire. These units were fed from two adjacent tanks containing oil and water. Water was then injected into the oil-fed fires from time to time; the resulting flashes were similar to those of the German C-250 and C-500 flash bombs. The hope was that if it could distract the German bombers, it would draw more bombers away from the right target.

**Question 0**

What was the technique used to make the fake fires?

**Question 1**

Two oil tanks, one containing oil and the other water, fed what kind of fire?

**Question 2**

What was injected into the fires from time to time to create a flash?

**Question 3**

What do these flashes simulate?

**Question 4**

What was the purpose of these fires?

**Text number 45**

The change in strategy took the RAF by surprise at first, causing extensive damage and civilian casualties. Some 107 400 long tons (109 100 t) of shipping were damaged in the Thames Estuary, and 1 600 civilians were killed. Of these, around 400 were killed. The fighting in the air was fiercer in daylight. In all, Loge had paid the Luftwaffe for 41 aircraft: 14 bombers, 16 Messerschmitt Bf 109s, seven Messerschmitt Bf 110s and four reconnaissance aircraft. The Fighter Command lost 23 fighters, six pilots were killed and seven wounded. 247 bombers of Sperrle's Luftflotte 3 (Luftflotte 3) attacked the same night. On 8 September, the Luftwaffe returned. This time 412 people were killed and 747 seriously wounded.

**Question 0**

How many civilian casualties were caused by the bombing of the Thames Estuary?

**Question 1**

How many people died in the Thames Estuary bombing?

**Question 2**

How many aircraft did the Luftwaffe lose?

**Question 3**

How many German pilots died?

**Question 4**

How many Air Fleet 3s were attacked that night?

**Text number 46**

On 9 September, the OKL appeared to support two strategies. Its round-the-clock bombing of London was an immediate attempt to force the British government to surrender, but it also struck at Britain's vital sea links to achieve victory through siege. Despite the bad weather, heavy attacks were made in the afternoon on the London suburbs and Farnborough Airport. The day's fighting cost Kesselring and Luftflotte 2 (Air Fleet 2) 24 aircraft, including 13 Bf 109s. Fighter Command lost 17 fighters and six pilots. Over the next few days the weather was bad, and the next main battle did not begin until 15 September 1940.

**Question 0**

What was the name of the airport where the heavy attacks took place?

**Question 1**

How many Bf 109s were lost?

**Question 2**

FighterCommand lost how many fighters?

**Question 3**

How many pilots did the fighters lose?

**Question 4**

What caused the delay?

**Text number 47**

On 15 September, the Luftwaffe made two major daylight raids on London along the Thames Estuary, targeting the city's ports and railway lines. Its hope was to destroy its targets and attract the RAF to defend them, allowing the Luftwaffe to destroy their fighters in large numbers and thus gain air superiority. Large air battles ensued, lasting most of the day. The first attack only damaged the railway network for three days, and the second attack failed completely. The air battle was later commemorated as the Battle of Britain. The Luftwaffe lost 18% of the bombers sent on operations that day and did not gain air superiority.

**Question 0**

Where in London did the Luftwaffe carry out daylight raids on 15 September?

**Question 1**

Which two targets did the Luftwaffe try to destroy?

**Question 2**

What was the reason for trying to draw the RAF into the fight?

**Question 3**

What was the name of this air battle?

**Question 4**

What percentage of the bombers sent by the Luftwaffe that day were lost?

**Text number 48**

Goering was optimistic about the Luftwaffe's victory, but Hitler was not. On 17 September, he postponed Operation Sea Lion (indefinitely, as it turned out) rather than risk Germany's newfound military prestige with a risky cross-Channel operation, especially as the Soviet Joseph Stalin was sceptical. In the final days of the battle, the bombers became a decoy to try to lure the RAF into a fight against German fighters. However, their operations were of no use; deteriorating weather and unbearable daylight wear gave the OKL an excuse to switch to night raids on 7 October.

**Question 0**

Who believed the Luftwaffe could win?

**Question 1**

On what day did Hitler postpone Operation Sea Lion?

**Question 2**

What was the name of the Soviet man who suspected the Sea Lion operation?

**Question 3**

Who did the Luftwaffe try to lure into battle with its bombers?

**Question 4**

When did OKL switch to night attacks?

**Text number 49**

On 14 October, 380 Luftflotte 3 German bombers struck London in the heaviest night raid to date. Around 200 people were killed and 2 000 injured. The British air force (General Frederick Alfred Pile) fired 8,326 shots and shot down only two bombers. On 15 October, the bombers returned, and some 900 fires were started from a mixture of 415 short tons (376 t) of explosives and 11 short tons (10.0 t) of propellant. In London, five main railway lines were cut and rolling stock damaged.

**Question 0**

How many German bombers attacked on 14 October?

**Question 1**

How many people died?

**Question 2**

Who fired the defensive shots?

**Question 3**

How many shots were fired against the defence?

**Question 4**

How many German bombers were shot down?

**Text number 50**

The loge continued during October. According to German sources, 9 000 short tons (8 200 t) of bombs were dropped that month, of which about 10% were dropped in daylight. More than 6 000 short tons (5 400 t) were aimed at London at night. Birmingham and Coventry were targeted by a total of 500 short tons (450 t) during the last ten days of October. Liverpool received 200 short tons (180 t) of bombs. Hull and Glasgow were attacked, but 800 short tons (730 t) of bombs were spread across Britain. Manchester's Metropolitan-Vickers factory was targeted, with 12 short tons (11 t) of bombs dropped. Fighter Command airfields received few bombs; instead, Bomber Command airfields were hit.

**Question 0**

What proportion of short bombs were dropped during the day?

**Question 1**

In which two cities were 500 short tons of bombs dropped at the end of October?

**Question 2**

How many short tons were dropped in Liverpool?

**Question 3**

Where were the 12 short tons of bombs targeted?

**Question 4**

Which was the more powerful target, the bombers or the fighter command posts?

**Text number 51**

The Luftwaffe policy at this stage was primarily to continue gradual attacks on London, mainly by night raids, secondly to disrupt the production of the huge industrial weapons factories in the West Midlands, again mainly by night raids, and thirdly to disrupt the factories and plants by day with fighter-bombers. Commander Kesselring of Luftflotte 2 was ordered to send 50 flights at night against London and to attack the eastern ports in daylight. Luftflotte 3 commander Sperrle was ordered to send 250 flights overnight, including 100 against the West Midlands. Fliegerkorps X (10th Air Force) would be responsible for Seeschlange, concentrating on mine action against shipping. It was also involved in the bombing of Britain. By 19-20 April 1941, it had dropped 3,984 mines, ⅓ of all mines dropped. The mines' ability to destroy entire streets earned them respect in Britain, but many of them fell unexploded into British hands, allowing the development of countermeasures that damaged the German anti-ship campaign.

**Question 0**

What was the Luftwaffe's second priority?

**Question 1**

Who was the commander of Luftflotte 2?

**Question 2**

How many flights did Luftflotte 3 make overnight?

**Question 3**

What was the focus of Fliegerkorps X?

**Question 4**

How many mines had been dropped by April 1941?

**Text number 52**

By mid-November 1940, when the Germans accepted the revised plan, over 13 000 short tons (12 000 t) of explosives and nearly 1 000 000 firebombs had fallen on London. Outside the capital there had been widespread disruption by individual aircraft and fairly heavy diversionary attacks on Birmingham, Coventry and Liverpool, but no major raids. London's ports and railway lines had been hit hard, and the railway system had suffered much damage outside London. In September, Britain's railways had been hit by as many as 667 attacks, and at one point between 5,000 and 6,000 carriages were standing idle due to delayed bombs. But most services continued, and although Londoners looked anxiously each morning at their local station's list of closed lines or made odd detours on backstreet buses, they still got to work. Despite all the destruction of life and property, observers sent by the Department of Homeland Security found not the slightest sign of a breakdown in morale. In September and October alone, more than 13 000 civilians had been killed and almost 20 000 wounded, but the death toll was much lower than expected. At the end of 1940, Churchill thanked his protectors:

**Question 0**

How many firebombs were dropped in London by mid-November 1940?

**Question 1**

Which places suffer from strong diversionary tactics?

**Question 2**

How many rail tickets were there in the UK in September?

**Question 3**

What did the Department of Homeland Security not find out?

**Question 4**

How many civilians were injured in September and October?

**Text number 53**

The American observer Ingersoll reported at the time that "I have no reservations about the accuracy of the bombing of military targets. The target is surprisingly, astonishingly, astonishingly inaccurate ... The physical damage to the civilian population of London was, in summary, more widespread and extensive than I had imagined. The damage to military targets was much less," and he said he had seen numerous examples of intact targets surrounded by buildings destroyed by stray bombs. For example, Battersea Power Station, perhaps the largest single target in London, had received only one minor hit ('scratch') in two months of bombing. None of the Thames bridges had been hit, and the ports were still in operation despite extensive damage. One airfield was hit 56 times, but the runways were never damaged and the airfield was never out of use, even though German pilots knew it from pre-war commercial flights. Ingersoll wrote that the difference between the failure of the German campaign against military targets and its success in continental Europe was that the RAF maintained air superiority: 79-80,174.

**Question 0**

What was the name of the American observer?

**Question 1**

The American observer asked, what about the damage in London?

**Question 2**

How many hits did the Battersea power station take in two months?

**Question 3**

How many Thames bridges were hit?

**Question 4**

What did German pilots use to get information about the airport?

**Text number 54**

Britain's night-time air defences were in poor shape. Few anti-aircraft guns had a fire control system, and low-powered searchlights were generally ineffective against aircraft above 3 700 metres (12 000 feet). In July 1940, only 1 200 heavy and 549 light guns were in use in Britain as a whole. Of the heavy guns, about 200 were obsolete 76 mm (3 inch) guns; the remainder were powerful 110 mm (4.5 inch) and 94 mm (3.7 inch) guns with a theoretical 'upper limit' of over 9 100 m (30 000 ft), but a practical limit of 7 600 m (25 000 ft) because the predictive equipment in use could not accept higher altitudes. The light guns, about half of which were the excellent Bofors 40 mm guns, could only deal with aircraft up to 1 800 m (6 000 ft). Although the use of guns boosted civilian morale, knowing that German bomber crews were subject to barrage, it is now believed that anti-aircraft guns achieved little, and in fact falling shrapnel caused more British casualties on the ground.

**Question 0**

British night-time air defence was effective up to what height?

**Question 1**

How many guns were in use in Britain by July 1940?

**Question 2**

What was the practical maximum number of powerful heavy guns?

**Question 3**

What kind of light cannon could handle aircraft up to 6000 feet?

**Question 4**

What is believed to have caused many civilian casualties because of anti-aircraft guns?

**Text number 55**

General Pile, Commander-in-Chief of the Air Defence Command, quickly reorganised London's defences. It is questionable what effect this had on the effectiveness of air defence. In May 1941, the British were still a third behind in establishing the AAA (or ack-ack) heavy anti-aircraft artillery, with only 2 631 guns available. Dowding had to resort to night fighters. From 1940 to 1941, the most successful night fighter was the Boulton Paul Defiant; its four squadrons shot down more enemy aircraft than any other type. Anti-aircraft defences were improved by better use of radar and searchlights. The 20 000 shells used per fighter shot down over several months in September 1940 fell to 4 087 shells in January 1941 and 2 963 in February 1941.

**Question 0**

Who will reorganise London's defences?

**Question 1**

How far were the British from establishing heavy anti-aircraft artillery?

**Question 2**

Who resorted to night fighters?

**Question 3**

Whose four squadrons shot down more enemy aircraft than any other type?

**Question 4**

How was AA's defence improved?

**Text number 56**

The airborne air surveillance (AI) radar was unreliable. The heavy fighting of the Battle of Britain had eaten up most of the fighter pilots' resources, so little effort was put into night fighting. Bombers were flown in desperation with airborne searchlights[citation needed] but to no avail. The greater potential was the GL (Gunlaying) radar and searchlights, which were controlled from the RAF fighter control rooms to initiate a GCI (Ground Control-led Interception) system under group control (No. 10 Group RAF, No. 11 Group RAF and No. 12 Group RAF).

**Question 0**

What was considered unreliable?

**Question 1**

What were the main uses of the Fighter Command's resources?

**Question 2**

What did the bombers use out of desperation?

**Question 3**

What system was created to combine Gunlaying radar and RAF surveillance?

**Text number 57**

Whitehall was concerned about the failures of the RAF, which is why Dowding (who was due to retire) was replaced on 25 November by Sholto Douglas. Douglas set about deploying more squadrons and dispersing GL's few troops to create a carpet effect in the southern counties. By February 1941, however, only seven squadrons remained with 87 pilots, less than half the required strength. The GL mat was supported by six GCI squadrons flying radar-equipped night fighters. By the peak of the Blitz, they began to perform increasingly well. The number of contacts and fights increased in 1941: from 44 and two 48 sorties in January 1941 to 204 and 74 (643 sorties) in May. But even in May, 67% of the missions were visual cat's-eye flights. Interestingly, while 43% of the contacts in May 1941 were visual sightings, they accounted for 61% of the combat sorties. Yet when compared to the Luftwaffe's daylight operations, German losses fell sharply to 1%. If an alert bomber crew could spot a fighter first, they had a good chance of avoiding it.

**Question 0**

Who replaced Dowding on 25 November?

**Question 1**

How many pilots were left in February 1941?

**Question 2**

What supported the GL mat?

**Question 3**

How many contacts and fights were there in May?

**Question 4**

What did the bomber crew have to do to have a good chance of dodging?

**Text number 58**

However, radar proved to be the decisive weapon in Britain's night battles from then on. Dowding had introduced the concept of air radar and promoted its use. Eventually it would become a success. On 22-23 July, the Dowdowdow was the first to use the Dowdowitz method of dowsing. On the night of July 22nd and 23rd 1940, Flying Officer Cyril Ashfield (pilot), Flying Officer Geoffrey Morris (observer) and Flight Sergeant Reginald Leyland (airborne radar operator) of the Fighter Alert Unit became the first pilots and crew, who had successfully intercepted and destroyed an enemy aircraft using the on-board radar for visual detection, when their late AI fighter brought down a Do 17 aircraft over Sussex. On 19 November 1940, the famous RAF night fighter ace John Cunningham shot down a Ju 88 bomber using airborne radar, just as Dowding had predicted.

**Question 0**

What was decisive in the night battles in Britain?

**Question 1**

Which concept was ultimately successful?

**Question 2**

On what day did airborne radar first help to intercept and destroy enemy aircraft?

**Question 3**

Who was the RAF night fighter ace who destroyed the Ju 88 bomber using air radar?

**Text number 59**

From November 1940 to February 1941, the Luftwaffe changed its strategy and attacked other industrial cities. The West Midlands in particular was targeted. On the night of 13-14 November, 77 He 111s of Kampfgeschwader 26 (26th Bombardment Squadron or KG 26) bombed London and 63 bombers of KG 55 bombed Birmingham. The following night a large force struck Coventry. The 12 'pathfinders' of Kampfgruppe 100 (Kampfgruppe 100 or KGr 100) led 437 bombers from KG 1, KG 3, KG 26, KG 27, KG 55 and Lehrgeschwader 1 (1st Training Squadron or LG 1), dropping 394 short tons (357 t) of explosives, 56 short tons (51 t) of incendiary bombs and 127 parachute bombs. According to other sources, 449 bombers were dropped and a total of 530 short tons (480 t) of bombs. The attack on Coventry was particularly devastating and led to the widespread use of the term 'conventrate'. Over 10 000 bombs were dropped. Some 21 factories were seriously damaged in Coventry, and the loss of public services halted work in nine other factories, interrupting industrial production for several months. Only one bomber was lost to anti-aircraft fire, although the RAF flew 125 night flights. No further attacks were made because the OKL underestimated British recovery power (as Bomber Command did over Germany in 1943-1945). The success of the attack took the Germans by surprise. The concentration had been achieved by accident. The strategic impact of the attack was a brief 20% dip in aircraft production.

**Question 0**

What was the primary focus of the change in Luftwaffe strategy?

**Question 1**

How many parachute mines were dropped?

**Question 2**

What expression became more common as a result of the Coventry raid?

**Question 3**

What stopped work at 9 factories in Coventry?

**Question 4**

What was the strategic impact of the raid?

**Text number 60**

Five nights later, Birmingham was hit by 369 bombers from KG 54, KG 26 and KG 55. By the end of November, 1 100 bombers were available for night raids. On average 200 were able to strike per night. The attacks continued for two months, with the Luftwaffe dropping 13,900 short tons (12,600 t) of bombs. In November 1940, 6 000 flights and 23 major attacks (over 100 tonnes of bombs) were flown. In addition, two heavy raids were flown (50 short tons (45 t) of bombs). In December, only 11 major attacks and five heavy raids were carried out.

**Question 0**

How many bombers hit Birmingham?

**Question 1**

How many months did the nightly raids continue?

**Question 2**

How many tons of bombs had to be dropped to be considered a major attack?

**Question 3**

How many attacks took place in December?

**Text number 61**

Probably the most devastating attack took place on the evening of 29 December, when German aircraft attacked the city of London itself with fire and explosive bombs, causing a firestorm that has been called London's second great fire. The first to use these incendiary bombs was Kampfgruppe 100, which dispatched 10 He 111 aircraft. At 18.17 it launched the first of 10 000 firebombs, which were finally dropped in 300 minutes. In all, 130 German bombers destroyed the historic centre of London. The civilian death toll in London was 28 556 dead and 25 578 wounded. The Luftwaffe had dropped 18 291 short tons (16 593 t) of bombs.

**Question 0**

On what day was London attacked?

**Question 1**

Which group was the first to use fire bottles?

**Question 2**

How many firebombs were dropped per minute?

**Question 3**

How many civilians were killed in the bombings?

**Question 4**

How many short tons of bombs did the Luftwaffe drop?

**Text number 62**

Not all of the Luftwaffe's efforts were directed at inland cities. Port cities were also attacked in order to disrupt trade and maritime traffic. In January, Swansea was bombed four times, very heavily. On 17 January, around 100 bombers dropped a large number of firebombs, some 32 000 in all. The main damage was to commercial and residential areas. Four days later, 230 tonnes were dropped, including 60 000 firebombs. In Portsmouth's Southsea and Gosport area, 150 waves of bombs destroyed large areas of the city with 40 000 firebombs. Warehouses, railways and houses were destroyed and damaged, but port areas were largely untouched.

**Question 0**

Why did the Luftwaffe target port cities?

**Question 1**

How many times was Swansea heavily bombed?

**Question 2**

What was primarily damaged in the strikes?

**Question 3**

Which cities were largely destroyed?

**Question 4**

What remained largely intact?

**Text number 63**

Although the official German air operations doctrine focused on civilian morale, it did not advocate direct attacks on civilians. It hoped to destroy morale by destroying the enemy's factories and public institutions, as well as his food supplies (by attacking shipping). However, official opposition to attacks on civilians became increasingly controversial with the large-scale attacks in November and December 1940. Although not encouraged by official policy, the use of mines and incendiary bombs came close to indiscriminate bombing for tactical reasons. To locate targets in the industrial haze of the sky meant that they had to be illuminated 'without regard for the civilian population'.

**Question 0**

What was the primary objective of the German Air Force doctrine?

**Question 1**

What changed in November and December 1940 so that attacks on civilians became meaningless?

**Question 2**

What was almost considered an indiscriminate bombing?

**Question 3**

Illuminating objects obscured by fog had to be done without what?

**Text number 64**

Special units, such as the KGr 100, became the Beleuchtergruppe, which used cylinders and explosives to mark target areas. The tactic was extended to Feuerleitung (fire control) with the creation of Brandbombenfelder (firebomb fields) for marking targets. These were marked with parachute rockets. Bombers carrying SC 1000 (1 000 kg), SC 1400 (1 400 kg) and SC 1800 (1 800 kg) "Satan" bombs were then used to level streets and residential areas. By December, the SC 2500 (2 500 kg) "Max" bomb was used.

**Question 0**

What was the group that used detonators and explosives to mark the targets?

**Question 1**

Fire control (Blaze Control) tactics led to what kind of creation for marking targets?

**Question 2**

What was the nickname of the bombs used in the streets and neighbourhoods?

**Question 3**

What was the weight of the Max bomb?

**Text number 65**

These decisions, apparently taken at the level of the Luftflotte or Fliegerkorps (see Luftwaffe organisation (1933-1945)), meant that attacks on individual targets were gradually replaced by an unlimited territorial attack or Terrorangriff (terrorist attack). Part of the reason for this was the inaccuracy of navigation. The effectiveness of the British countermeasures against Knickebein, which was designed to avoid area attacks, forced the Luftwaffe to resort to these methods. The shift from precision bombing to area attacks is evident from the tactical methods and weapons dropped. The KGr 100 increased the use of incendiary bombs from 13-28%. By December it had risen to 92%. The use of incendiary bombs, which were inherently inaccurate, showed that much less care was taken to avoid civilian properties in the vicinity of industrial sites. Other units stopped using parachute rockets and opted for explosive target markers. Captured German aircrews also showed that the homes of industrial workers were deliberately targeted.

**Question 0**

What types of attacks led to changes in decisions at organisational level?

**Question 1**

What was one of the reasons for the unlimited territorial attacks?

**Question 2**

How was it known that precision bombing had been converted into area attacks?

**Question 3**

What percentage of incendiary bombs were used in December?

**Question 4**

How was it established that the target was the housing of industrial workers?

**Text number 66**

In 1941, the Luftwaffe changed its strategy again. Erich Raeder, Commander-in-Chief of the Kriegsmarine, had long been of the opinion that the Luftwaffe should support the German submarine force (U-Bootwaffe) in the Battle of the Atlantic by attacking Atlantic shipping and British ports. Eventually he convinced Hitler of the need to attack British ports. Raeder had convinced Hitler that this was the right course of action, as the success rate of the U-boat force at this stage of the war was high. Hitler rightly noted that the greatest damage to the British war economy had been caused by air raids by submarines and a small number of Focke-Wulf Fw 200 naval aircraft. He ordered the attacks to be directed against those targets which were also the target of the Kriegsmarine. This meant that the coastal centres of the United Kingdom and the shipping traffic at sea to the west of Ireland were priority targets.

**Question 0**

What did Erich Raeder think the Luftwaffe should do?

**Question 1**

Raeder made Hitler do what?

**Question 2**

What finally convinced Hitler that Raeder was right?

**Question 3**

Submarines and naval aircraft primarily damaged what?

**Question 4**

What were the new destinations for the Kriegsmarine?

**Text number 67**

Hitler's interest in this strategy forced Göring and Jeschonnek to review the air war against Britain in January 1941. This led Göring and Jeschonnek to agree to Hitler's Directive 23, Instructions for Operations against the British War Economy, issued on 6 February 1941, which gave priority to the prohibition of British imports by air from the sea. This strategy had been recognised before the war, but Operation Eagle Attack and the subsequent Battle of Britain had prevented the destruction of Britain's sea links and diverted the German air force into a campaign against the RAF and its support structures. The OKL had always considered the blocking of sea links less important than the bombing of land-based aircraft industries.

**Question 0**

What was Hitler's Directive 23?

**Question 1**

What was the primary objective of Directive 23?

**Question 2**

What prevented the targeting of maritime communications in the past?

**Question 3**

What was considered more important than blocking sea access?

**Text number 68**

Directive 23 was the only concession Göring made to the Kriegsmarine on the Luftwaffe's strategic bombing strategy against Britain. He then refused to deploy air units to destroy British dockyards, harbours, harbour installations or ships in dock or at sea to prevent the Kriegsmarine from gaining control of more Luftwaffe units. Raeder's successor, Karl Dönitz, would take over one unit (KG 40) after Hitler's intervention, but Göring would soon regain it. Göring's lack of cooperation hampered a single air strategy that could have a decisive strategic impact on Britain. Instead, he wasted Fliegerführer Atlantik (Fliegerführer Atlantik) aircraft on bombing the British mainland instead of attacking convoys. Goering felt that his authority had suffered from the defeat of the Battle of Britain, and he wanted to regain it by subduing Britain by air alone. He was always reluctant to cooperate with Raeder.

**Question 0**

What concession did Göring make in connection with the strategic bombing of Britain?

**Question 1**

What did Goring believe the Kriegsmarine would gain with the additional aid?

**Question 2**

Who was Raeder's successor?

**Question 3**

What hindered the success of the strategic effect against Britain?

**Question 4**

How did Goring expect to regain prestige?

**Text number 69**

However, the OKL's decision to support the Directive 23 strategy was based on two factors, both of which had little to do with the desire to destroy Britain's sea links with the Kriegsmarine. First, the difficulty of assessing the impact of bombing on war production was becoming apparent, and second, the OKL's conclusion that British morale was unlikely to be shattered led the OKL to choose the naval option. The OKL's indifference to Directive 23 was perhaps best reflected in the operational guidance that diluted its impact. They stressed that the strategic essence was to attack ports, but called for maintaining pressure or shifting force to the aircraft, anti-aircraft gun and explosives industries. Other targets would be considered if the primary targets could not be attacked because of weather conditions.

**Question 0**

What was the OKL's first reason for supporting Directive 23?

**Question 1**

What was the second aspect?

**Question 2**

What did the OKL insist on preserving?

**Question 3**

When would other sites be considered available?

**Text number 70**

The directive also stressed the need to inflict maximum casualties, but also to intensify the air war in order to create the impression that an amphibious assault on Britain was being planned for 1941. However, the weather conditions over Britain were not conducive to flying and prevented the acceleration of air activity. The airfields were clogged with water, and the Luftwaffe Kampfgeschwader's 18 Kampfgruppen (Bomb Groups) were moved to Germany to rest and re-equip.

**Question 0**

What was the point of inflicting heavy casualties and increasing air warfare?

**Question 1**

What prevented the expansion of air operations?

**Question 2**

What happened to airports?

**Question 3**

How many bomber groups were transferred to Germany?

**Text number 71**

From the German point of view, there was an improvement in March 1941. The Luftwaffe flew 4,000 flights that month, 12 of which were major attacks and three heavy raids. The electronic warfare intensified, but the Luftwaffe only flew major inland attacks on moonlit nights. Ports were easier to find and better targets. To confuse the British, radio silence was maintained until the bombs fell. X and Y beams were placed on the wrong targets and only changed at the last minute. The X-ray was introduced with rapid frequency changes, as its wider frequency range and greater tactical flexibility ensured its effectiveness, while selective British jamming reduced the effectiveness of the Y-ray.

**Question 0**

How many flights were flown in March 1941?

**Question 1**

When did the Luftwaffe fly inland flights?

**Question 2**

Why were ports better destinations?

**Question 3**

How did the Germans confuse the British?

**Question 4**

Why were more X-Gerat frequencies used?

**Text number 72**

The attacks targeted western ports in March. The attacks caused some fractures in morale, and civilian leaders fled the cities before the offensive reached its peak. However, the Luftwaffe's efforts eased during the last 10 raids, as seven Kampfgruppen moved to Austria to prepare for the Balkan campaign in Yugoslavia and Greece. The lack of bombers forced the OKL to improvise. Some 50 Junkers Ju 87 Stuka attack bombers and Jabos (fighter-bombers) were in service, officially classified as light bombers (Leichte Kampfflugzeuge) and sometimes called Leichte Kesselringe (light Kesselringes). The defence was unable to prevent extensive damage, but in some cases it prevented German bombers from concentrating on their targets. Sometimes only a third of German bombs hit their targets.

**Question 0**

What was the focus in March?

**Question 1**

What was achieved by these attacks?

**Question 2**

Why did OKL have to improvise?

**Question 3**

How many Ju 87 Stuka and Jabo dive bombers were used?

**Question 4**

How many German bombs hit their targets?

**Text number 73**

Moving the heavier bombers to the Balkans meant that the remaining crews and units had to fly two or three flights a night. The bombers were noisy, cold and shook badly. In addition to the stress of the mission, which exhausted and drained the crews, fatigue took many by surprise and killed many. On one occasion between 28 and 29 April, Peter Stahl of KG 30 was flying his 50th mission. He fell asleep at the controls of his Ju 88 and woke up to find the entire crew asleep. He woke them up, made sure they took oxygen and Dextro-Energen tablets, and then completed the mission.

**Question 0**

How many flights per night were crews asked to fly?

**Question 1**

What contributed to the exhaustion of crews flying extra flights?

**Question 2**

What happened to Peter Stahl when he fell asleep on a plane?

**Question 3**

What did Peter's crew take with them to complete their mission?

**Text number 74**

The Luftwaffe was still able to cause enormous damage. Once Germany had occupied Western Europe, the British feared an increase in submarine and air attacks against Britain's sea lines. Such an event would have serious consequences for the future course of the war if the Germans succeeded. Liverpool and its port became an important destination for convoys from North America via the Western approaches, bringing supplies and materials. A substantial rail network distributed goods to the rest of the country. Operations against Liverpool in the Liverpool Blitz were successful. The air raids sank 39,126 long tons (39,754 t) of shipping, with a further 111,601 long tons (113,392 t) damaged. Herbert Morrison, the Secretary of Homeland Security, was also concerned about the breakdown in morale and noted the sense of loss expressed by civilians. According to other sources, half of the port's 144 berths were unusable and cargo unloading capacity had been reduced by 75%. Roads and railways were closed and ships were unable to leave the port. On 8 May 1941, 57 ships totalling 80 000 long tons (81 000 tonnes) were destroyed, sunk or damaged. Some 66 000 houses were destroyed, 77 000 people were left homeless, 1 900 people died and 1 450 were seriously injured in one night. Until May 1941, the operations against London could also have had a serious impact on morale. The population of Hull Harbour became 'trekkers', people who left the cities en masse before, during and after the attacks. However, the attacks failed to stop or damage the railways or port facilities for long, even in the port of London, which was the target of many of the attacks. The Port of London in particular was an important target, as it accounted for a third of foreign trade.

**Question 0**

What did the British fear most?

**Question 1**

What was an important destination for the supply convoys from North America?

**Question 2**

How much shipping was sunk in the Liverpool lightning strike?

**Question 3**

How many ships were destroyed on 8 May 1941?

**Question 4**

How much of the foreign trade was received by the Port of London?

**Text number 75**

On 13 March, the port of Clydebank in the upper Clyde near Glasgow was bombed. All but seven of its 12 000 houses were damaged. Many other ports were also attacked. Plymouth was attacked five times before the end of the month, while Belfast, Hull and Cardiff were also hit. Cardiff was bombed on three nights and Portsmouth city centre was destroyed in five attacks. In September 1940, an average of 40,000 civilian homes were lost each week. In March 1941, 148 000 people were killed in two attacks on Plymouth and London. Although badly damaged, British ports continued to support the war industry, supplies from North America continued to pass through them, and the Royal Navy continued to operate at Plymouth, Southampton and Portsmouth. Plymouth, in particular, came under the heaviest attack because of its vulnerable position on the south coast and its proximity to German air bases. On 10-11 March, 240 bombers dropped 193 tonnes of explosives and 46 000 incendiary bombs. Many houses and commercial centres were badly damaged, electricity was cut off, and five oil tanks and two warehouses exploded. Nine days later, two waves of 125 and 170 bombers dropped heavy bombs, including 160 tonnes of explosives and 32,000 firebombs. Much of the city centre was destroyed. Port facilities were damaged, but many bombs fell on the city itself. On 17 April, 250 bombers led by KG 26 dropped 346 tonnes of explosives and 46 000 incendiary bombs. The damage was extensive and the Germans also used air mines. More than 2 000 anti-aircraft grenades were fired and two Ju 88s were destroyed. By the end of the air campaign over Britain, only 8% of the German effort against British ports had been carried out using mines.

**Question 0**

How many houses were spared damage in Glasgow?

**Question 1**

How many people lost their homes in a week?

**Question 2**

Why was Plymouth the biggest target?

**Question 3**

What did the Germans use besides firebombs and bombs?

**Question 4**

How many AAA grenades were fired?

**Text number 76**

To the north, Newcastle-upon-Tyne and Sunderland, major ports on the east coast of England, were facing considerable efforts. On 9 April 1941, Luftflotte 2 dropped 150 tons of explosives and 50,000 incendiary bombs from 120 bombers during a five-hour raid. Sewers, railways, port areas and power stations were damaged. At Sunderland on 25 April, Luftflotte 2 sent 60 bombers dropping 80 tonnes of explosives and 9 000 incendiary bombs. Much damage was caused. Another attack on Clyde, this time on Greenock, was made on 6 and 7 May. However, the Germans failed to prevent sea traffic and cripple industry in the area, as they did in the attacks to the south.

**Question 0**

What were the two major ports on the east coast of England in the north?

**Question 1**

How many bombers were used in the five-hour attack?

**Question 2**

How many firebombs were used against Sunderland on 25 April?

**Question 3**

What was the result of the German attacks?

**Text number 77**

The last major attack on London took place on 10-11 May 1941, when the Luftwaffe flew 571 flights and dropped 800 tons of bombs. This caused over 2 000 fires. 1,436 people were killed and 1,792 seriously injured, with a severe impact on morale. The second attack took place on 11-12 May 1941. Westminster Abbey and the Houses of Justice were damaged and the House of Commons Chamber was destroyed. A third of London's streets were impassable. All but one railway station was blocked for several weeks. This attack was significant, as 63 German fighters were sent in with the bombers, demonstrating the growing effectiveness of the RAF's night fighter defences.

**Question 0**

When was the last time there was a major attack in London?

**Question 1**

How many tons of bombs did the Luftwaffe use on London?

**Question 2**

How many deaths were caused?

**Question 3**

What damage was done to the streets of London?

**Question 4**

What showed that the RAF's night fighters were becoming more efficient?

**Text number 78**

German air supremacy at night was now also under threat. British night fighter operations over the Channel proved to be very successful. This was not immediately apparent. The Bristol Blenheim F.1 was under-equipped with only four 7.7 mm (.303 inch) machine guns, which had difficulty in destroying Do 17s, Ju 88s or Heinkel He 111s. In addition, the Blenheim had difficulty matching the speed of the German bombers. In addition, interception was dependent on line of sight, and kills were very difficult to achieve even in six-hour sky conditions.

**Question 0**

How did the British night-fighter operations go?

**Question 1**

How did the Bristol Blenheim F.1 fare against German aircraft?

**Question 2**

How did the Bristol Blenheim F.1 match the speed of German aircraft?

**Question 3**

What was the basis for the listening?

**Text number 79**

The Boulton Paul Defiant, despite its poor performance, was a much better night fighter. It was faster, it could catch bombers, and its four-machine-gun turret enabled it (just like the German night fighters of 1943-1945 with the Schräge Musik) to attack an unsuspecting German bomber from below. Attacking from below offered a bigger target than attacking from the tail, and the bomber could be more easily missed (with less chance of evasion) and more likely to explode. Over the following months, more and more German bombers were targeted by night fighters.

**Question 0**

What worked better in night fights?

**Question 1**

How could aircraft fight against bombers when they are equipped with a turret?

**Question 2**

What were the advantages of attacking from below?

**Text number 80**

Improved aircraft designs were being developed for the Bristol Beaufighter, which was under development at the time. It would prove to be formidable, but its development was slow. The Beaufighter had a top speed of 510 km/h (320 mph), an operating ceiling of 7 900 m (26 000 ft) and a climb rate of 760 m (2 500 ft) per minute. Its armament, consisting of four 20 mm Hispano cannons and six .303-inch Browning machine guns, posed a serious threat to German bombers. On 19 November, John Cunningham of the RAF's 604th Squadron shot down a bomber flying an AI-equipped Beaufighter. It was the first aerial victory for the Air Radar.

**Question 0**

What was the maximum speed of the Beaufighter?

**Question 1**

What is the operating ceiling of the Beaufighter?

**Question 2**

how many machine guns were in the Beaufighter?

**Question 3**

What was the date of the RAF's first victory on air radar?

**Text number 81**

In April and May 1941, the Luftwaffe was still getting through to its targets, with losses of no more than one to two percent for each flight. To mark Hitler's 52nd birthday, between 19 and 20 April 1941, a record 1,000 tons of bombs were dropped on Plymouth by 712 bombers. Casualties were minimal. The following month 22 German bombers were lost, 13 of which were confirmed to have been shot down by night fighters. On 3 and 4 May, nine were shot down in one night. On 10/11 May, London suffered heavy damage, but 10 German bombers were shot down. In May 1941, 38 German bombers were shot down by RAF night fighters.

**Question 0**

How much did the Luftwaffe suffer the most losses on any flight?

**Question 1**

How many bombers hit Plymouth on Hitler's birthday?

**Question 2**

How many bombs hit Plymouth on Hitler's birthday?

**Question 3**

How many German bombers were lost on 3 and 4 May?

**Question 4**

How many German bombers did the RAF shoot down in May?

**Text number 82**

The military effectiveness of the bombing varied. During the Blitz, the Luftwaffe dropped some 45 000 short tons (41 000 t) of bombs, disrupting production and transport, reducing food supplies and destabilising British morale. It also helped support the submarine blockade by sinking some 58,000 long tons (59,000 t) of destroyed shipping and 450,000 long tons (460,000 t) of damaged shipping. Overall, however, British production increased steadily throughout this period, although there were significant falls in April 1941, probably influenced by the departure of workers from the Easter holiday, according to the official British history. The official British history of war production states that the major impact was on deliveries of components rather than of complete equipment. In aircraft production, the British were denied the opportunity to meet the planned target of 2 500 aircraft per month, probably the greatest achievement of the bombing campaign, because it forced the industry to decentralise. In April 1941, when British ports were targeted, rifle production fell by 25 %, loaded cartridge production by 4,6 % and small arms production by 4,5 %. The strategic impact on industrial cities varied; most took 10 to 15 days to recover from heavy attacks, but Belfast and Liverpool took longer. Birmingham took the war industry around three months to recover from the attacks on Birmingham. The exhausted population took three weeks to recover from the effects of the attack.

**Question 0**

How many short tons of bombs did the Luftwaffe use during the Blitz?

**Question 1**

The Luftwaffe helped submarines by sinking how much shipping?

**Question 2**

How did British production fare in the wake of the bombing?

**Question 3**

What was the greatest achievement of the bombing?

**Question 4**

How long did it take for industrial cities to recover from the attacks?

**Text number 83**

The air raid on the RAF and British industry did not have the desired effect. More could have been achieved if the OKL had exploited the enemy's weak point, the vulnerability of British sea links. The Allies did so later, when Bomber Command attacked the railway lines and the US Army Air Forces targeted oil, but this would have required an economic and industrial analysis that the Luftwaffe could not provide. Instead, the OKL sought target groups in line with the latest policy (which changed frequently), and disputes within the leadership were more about tactics than strategy. Although militarily ineffective, the Blitz caused enormous damage to Britain's infrastructure and housing stock. It cost some 41 000 lives and may have injured 139 000 people.

**Question 0**

How could more have been achieved in an air attack?

**Question 1**

What were the causes of OKL disputes in general?

**Question 2**

What could the Luftwaffe not do?

**Question 3**

How many deaths did Blitz ultimately cause?

**Text number 84**

The liberated British began to assess the effects of lightning in August 1941, and the RAF Air Staff used the German experience to improve bomber attacks. They concluded that bombers should strike one target each night and use more incendiary bombs because they had a greater impact on production than explosives. They also noted that regional production was severely disrupted when city centres were destroyed because administrative offices, utilities and transport were lost. They believed that the Luftwaffe had failed in precision strikes and concluded that the German example of regional strikes using incendiary bombs was the correct way forward for operations over Germany.

**Question 0**

What helped to increase Bomber Command's attacks?

**Question 1**

What did the RAF conclude?

**Question 2**

What caused the most production disruption?

**Question 3**

Where did the Luftwaffe fail?

**Question 4**

What did the experience of the firebombs used by the Germans mean?

**Text number 85**

Some writers argue that the Air Staff, however, ignored a critical lesson: British morale was not broken. Undermining German morale, as the bomber commander did, was no more successful. Aviation strategists deny that morale was ever the most important aspect of bomber pilot command. In the 16 Western flight plans drawn up between 1933-39, morale is not mentioned as an objective. The first three instructions of 1940 made no mention of the civilian population or morale. Morale was not mentioned until the ninth wartime directive of 21 September 1940. The Tenth Directive of October 1940 mentions morale by name. However, industrial cities were to be hit only if the weather prevented attacks on the main concern of the bomber command, oil.

**Question 0**

What was the critical lesson that the Air Staff ignored?

**Question 1**

What did the aviation strategists argue about?

**Question 2**

What was not mentioned in the 16 Western Air Plan?

**Question 3**

When was morality finally mentioned?

**Question 4**

When were industrial cities to be targeted?

**Text number 86**

Arthur Harris, the bomber commander, considered German morale to be the main objective. But he did not believe that a collapse of morale could happen without the destruction of the German economy. The primary objective of Bomber Command's attacks was to destroy Germany's industrial base (economic warfare) and thus undermine morale. In late 1943, just before the Battle of Berlin, he proclaimed that with the power of the bomber, Bomber Command could achieve "a state of destruction in which surrender is inevitable". The summary of Harris's strategic intentions was clear:

**Question 0**

Without which, according to Arthur Harris, could the collapse of morality occur?

**Question 1**

What was the primary strategy of the Bomber Command attacks?

**Question 2**

Arthur Harris announced that Bomber Command would enable economic warfare to achieve what?

**Text number 87**

The British people during the Second World War became an inverted image: a collection of people locked in national solidarity. This image entered the historiography of the Second World War in the 1980s and 1990s, particularly after the publication of Angus Calder's The Myth of the Blitz (1991). It was revived by both right-wing and left-wing political groups in Britain during the Falklands War, when it was part of a nostalgic narrative in which the Second World War represented aggressive British patriotism successfully defending democracy. This image of the people in the Blitz was and is powerfully portrayed in film, radio, newspapers and magazines. At the time, it was a useful propaganda tool for use at home and abroad. Historians' critical response to this construct focused on what were seen as overstated claims of righteous nationalism and national unity. In Myth of the Blitz, Calder uncovered some counter-evidence of anti-social and divisive behaviour. In his view, the myth - of serene national unity - became a 'historical truth'. In particular, class divisions were the most obvious.

**Question 0**

Which view became popular among the British in the Second World War?

**Question 1**

When did this general view emerge?

**Question 2**

Political factions in Britain supported what view of Britain in the Second World War?

**Question 3**

What was the critical response of historians to this view?

**Question 4**

What was Calder trying to reveal in his book?

**Text number 88**

After the Coventry Blitz, the Communist Party widely promoted the need for bomb shelters. In particular, many Londoners began to use the tube without permission as a shelter and sleep there overnight until the next morning. The government was so concerned about the sudden campaign of leaflets and posters distributed by the Communist Party in Coventry and London that the police were sent to seize the Party's production facilities. Until November 1940, the government opposed the centralised organisation of shelters for the population. Home Secretary Sir John Anderson was replaced by Morrison shortly after the Cabinet was reshuffled following the resignation of the terminally ill Neville Chamberlain. Morrison warned that he could not combat Communist unrest unless shelters were provided. He recognised the public's right to take over the underground stations and approved plans to improve and extend them by building tunnels. Yet many British citizens who had belonged to the Labour Party, which had itself been passive on the issue, turned to the Communist Party. The Communists tried to blame the rich factory owners, big business and landowning interests for the damage and casualties of the Coventry raid and called for a negotiated peace. Although they failed to gain much influence, the party's membership had doubled by June 1941. "The 'Communist threat' was considered so significant that Herbert Morrison, with the support of the Cabinet, ordered the closure of the Daily Worker and The Week, a Communist newspaper and magazine.

**Question 0**

What was the Communist Party agitated about?

**Question 1**

What did the Londoners use as bomb shelters?

**Question 2**

What did Morrison warn you he could not do?

**Question 3**

Who did the communists blame for the damage caused by the monastery attacks?

**Question 4**

What did Morrison have to do in response to the Communist Party?

**Text number 89**

The brief success of the Communists also benefited the British Union of Fascists (BUF). Anti-Semitic attitudes became more widespread, especially in London. Rumours that the rise of the Communists had been supported by Jews were common. Rumours that Jews inflated prices, were responsible for the black market, were the first to panic in the event of an attack (and were even the cause of panic), and secured the best shelters by underhand means, were also widespread. In addition, there was racial hatred between small black, Indian and Jewish communities. However, the dreaded race riots did not occur despite the mixing of different peoples in crowded areas.

**Question 0**

Which political group's success helped the communists?

**Question 1**

Where did anti-Semitic attitudes spread in the first place?

**Question 2**

What was one rumour that the Jews did about shelters?

**Question 3**

What was feared to happen when mixing different races in shelters?

**Text number 90**

In other cities, the class divide was more pronounced. More than a quarter of London's population had moved out of the city by November 1940. Civilians left for more remote areas of the country. The population growth in South Wales and Gloucester showed where these displaced people were going. Other reasons, such as industrial dispersal, may also have played a part. However, the resentment of the self-imposed displacement of the rich or the hostile treatment of the poor were signs of continuing class antagonism, although these factors did not appear to threaten social order. The total number of evacuees was 1.4 million, many of them from the poorest inner-city families. The reception committees were totally unprepared for the condition of some of the children. Far from demonstrating national unity during the war, the system worked against the grain, often exacerbating class hatred and reinforcing prejudice against the urban poor. Within four months, 88% of evacuated mothers, 86% of young children and 43% of schoolchildren had returned home. The absence of bombing in the phoney war contributed significantly to the return of people to the cities, but class conflicts did not ease a year later when evacuation operations had to be repeated.

**Question 0**

How much of London's population left?

**Question 1**

Where did the population increase?

**Question 2**

What was another reason for the population to move?

**Question 3**

How many evacuees were there?

**Question 4**

What proportion of the population returned in four months?

**Text number 91**

In recent years, a large number of wartime recordings relating to the Blitz have been published as audiobooks, including The Blitz, The Home Front and British War Broadcasting, which include interviews with civilians, soldiers, aircrew, politicians and civil defence personnel, as well as lightning recordings, news broadcasts and public information broadcasts. Notable interviews include Thomas Alderson, the first recipient of the George Cross, John Cormack, who survived eight days trapped under rubble on the Clydeside coast, and Herbert Morrison's famous "Britain must not burn" petition for more firefighters in December 1940.

**Question 0**

What are the audiobooks with wartime recordings?

**Question 1**

What things are included in these recordings?

**Question 2**

What is one of the most significant recordings?

**Question 3**

What is another noteworthy recording?

**Document number 358**

**Text number 0**

The Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1531 et seq.) is one of a handful of ten environmental laws enacted in the 1970s in the United States and serves as implementing legislation to enforce the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Signed into law by President Richard Nixon on December 28, 1973, the ESA was designed to protect critically endangered species from extinction as a result of economic growth and development that has not been curbed by adequate care and protection. The US Supreme Court stated that "the clear intent of Congress in enacting the ESA" was "to halt and reverse the trend of species extinction at all costs." The Act is administered by two federal agencies, the US Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA).

**Question 0**

In which year did the Endangered Species Act come into force?

**Question 1**

Which president signed the law?

**Question 2**

Which two federal agencies administer the law?

**Question 3**

On what day was the Endangered Species Act signed?

**Question 4**

What did the Supreme Court refer to as Congress's intent in enacting the Endangered Species Act?

**Question 5**

When was CITES established?

**Question 6**

What did the Supreme Court sign into law in the 1970s?

**Question 7**

Who is the President of the FWS?

**Question 8**

On what day did the Supreme Court rule on ESA?

**Question 9**

Who decided which agencies administered the law?

**Text number 1**

One species in particular, the crane, received widespread attention. The species' historic range extended from central Canada south to Mexico and from Utah to the Atlantic coast. Unregulated hunting and habitat loss led to a steady decline in the crane population until, by 1890, it had disappeared from its primary breeding range in the northern and central United States. It was another eight years before the first national law regulating wildlife trade was signed, and another two years before the first version of the Endangered Species Act was passed. By 1941, the crane population was estimated to be down to around 16 birds in the wild.

**Question 0**

What was the historical range of the crane?

**Question 1**

What two factors caused the continued decline of the cucumber population?

**Question 2**

What was the estimated crane population in 1941?

**Question 3**

How many years after it was discovered that the crane had disappeared from its breeding grounds was the first law passed to regulate trade in wildlife?

**Question 4**

What species are found from Canada to Utah?

**Question 5**

How many years did it take before the crane disappeared?

**Question 6**

How many cranes were there in 1890?

**Question 7**

What was adopted in 1941?

**Question 8**

What year did the crane start to get attention?

**Text number 2**

The Lacey Act of 1900 was the first federal law to regulate the commercial animal market. The Act prohibited the interstate commerce of animals killed in violation of state game laws, and covered all fish and wildlife and their parts or products, as well as plants. Other laws followed, including the Migratory Bird Protection Act of 1929, the 1937 treaty banning the hunting of whales and gray whales, and the Bald Eagle Protection Act of 1940. These later laws came at little cost to society - the species were relatively rare - and attracted little opposition.

**Question 0**

What was the first federal law regulating wildlife trade?

**Question 1**

What did the first federal wildlife trade law prohibit?

**Question 2**

What wildlife was covered by the first federal wildlife trade regulation?

**Question 3**

Which law was passed in 1940 to regulate the population of the US National Bird?

**Question 4**

What legislation was considered expensive?

**Question 5**

What was the first federal treaty?

**Question 6**

What did the first federal wildlife law allow for in terms of interstate commerce?

**Question 7**

What was the name of the 1937 agreement?

**Question 8**

Which laws met with significant opposition?

**Text number 3**

It authorized the Secretary of the Interior to list endangered native fish and wildlife and allows the US Fish and Wildlife Service to spend up to $15 million a year to purchase habitat for listed species. It also directed federal land management agencies to conserve habitat on their lands. The Act also consolidated and even expanded the Secretary of the Interior's authority to administer and manage the National Wildlife Refuge System. Other public agencies were encouraged, but not required, to protect species. The Act did not address trade in endangered species and their parts.

**Question 0**

What did the Endangered Species Act authorise the Home Secretary to do?

**Question 1**

The Endangered Species Act allowed for annual spending by the US Fish and Wildlife Service to purchase habitat.

**Question 2**

The Endangered Species Act gave the Minister of the Interior administrative power over which organisation?

**Question 3**

How did the Endangered Species Act affect the wildlife trade?

**Question 4**

How did the Endangered Species Act affect other agencies not specifically mentioned in the Act?

**Question 5**

How much could the law spend per year?

**Question 6**

Who runs the US Fish and Wildlife Service?

**Question 7**

Which trade was affected by ESA?

**Question 8**

Which animals could not be classified as endangered because of this law?

**Question 9**

What has the National Wildlife Refuge System preserved?

**Text number 4**

This first list is referred to as the "Class of '67" in The Endangered Species Act at Thirty, Volume 1, which states that habitat destruction, which was the greatest threat to the 78 species in question, remains the same threat to the currently listed species. Only vertebrates were included because the Department of the Interior's definition of "fish and wildlife" was limited to vertebrates. Over time, however, scientists realised that animals on the endangered species list were still not receiving adequate protection, further threatening their extinction. The Endangered Species Act of 1969 expanded the endangered species programme.

**Question 0**

What is the nickname given to the first endangered species list?

**Question 1**

What was considered the greatest threat to the listed species?

**Question 2**

How did the first list limit which species were included?

**Question 3**

How did listing initially affect the species?

**Question 4**

How many species are currently on the list?

**Question 5**

Which animal was not included in volume 1?

**Question 6**

Which work was published in 1969?

**Question 7**

Which threat to the species has been neutralised?

**Question 8**

What is the Endangered Species Act 1969?

**Text number 5**

The Endangered Species Protection Act of December 1969 (P.L. 91-135) amended the original law to provide additional protection for species threatened with "global extinction" by banning their import and sale in the United States. The Lacey Act's ban on interstate commerce was extended to mammals, reptiles, amphibians, molluscs and crustaceans. Reptiles were added mainly to reduce the rampant poaching of alligators and crocodiles. This act was the first time invertebrates were included for protection.

**Question 0**

When was the Endangered Species Act adopted?

**Question 1**

How did the Endangered Species Act benefit endangered species?

**Question 2**

What was added to the definition of wildlife in the Lacey Act by the Endangered Species Act?

**Question 3**

Which two reptiles were of particular interest for the inclusion of "reptiles" in the Endangered Species Act?

**Question 4**

What important precedent did this set for invertebrates?

**Question 5**

What repealed the Lacey Act?

**Question 6**

What is the identification number of the Lacey Act?

**Question 7**

Why were mammals added to the list of protected species?

**Question 8**

When was the Lacey Act passed?

**Question 9**

What was not taken into account in the 1969 law?

**Text number 6**

President Richard Nixon declared current species protection measures inadequate and called on the 93rd US Congress to pass comprehensive endangered species legislation. Congress responded with a completely rewritten law, the Endangered Species Act of 1973, signed into law by Nixon on December 28, 1973 (Pub.L. 93-205), drafted by a group of lawyers and scientists, including the first appointed director of the Council on Environmental Quality (CEQ), Dr. Russell E. Train, the successor to NEPA (National Environmental Policy Act of 1969). Train was assisted by a core group of staff, including EPA's Dr. Earl Baysinger (now Assistant Administrator, Office of Endangered Species and International Species). Operations), Dick Gutting (a lawyer with the U.S. Department of Commerce who had joined NOAA the previous year (1972), and Dr. Gerard A. "Jerry" Bertrand, a marine biologist by training (Ph.D. from Oregon State University) who had moved to the newly created White House Office of the Chief of Staff of the U.S. Army Corps of Engineers as Scientific Adviser to the U.S. Army Corps of Engineers. Under Dr. Train's leadership, the staff incorporated dozens of new principles and ideas into landmark legislation and created a document that completely changed the direction of environmental protection in the United States. Dr. Bertrand is credited with writing the most controversial section of the law, the "takings" clause (Section 2).

**Question 0**

Who led the team of lawyers and scientists who drafted the 1973 Endangered Species Act?

**Question 1**

Which organisation's first appointed leader was a team leader?

**Question 2**

Who wrote the most controversial article in the law?

**Question 3**

Who was the key legislative staffer who worked at the EPA and continued to work at the Endangered Species Bureau?

**Question 4**

Which Congress called for the Endangered Species Act of 1973?

**Question 5**

What did the 93rd Congress say was insufficient?

**Question 6**

Who was the 93rd President of the United States?

**Question 7**

Which law did Nixon rewrite?

**Question 8**

Which part of the law did Dr Train write?

**Question 9**

What did CEQ grow into?

**Text number 7**

A species can be listed in two ways. The US Fish and Wildlife Service (FWS) or NOAA Fisheries (also called the National Marine Fisheries Service) can directly list a species through its Candidate Assessment Program, or an individual or organization can request that FWS or NMFS list a species. A "species" under the Act may be a true taxonomic species, a subspecies, or in the case of vertebrates, a "distinct population segment." The procedures are the same for both types of species, except that the person/organization's petition has a 90-day review period.

**Question 0**

How many different ways can a species be added to the list of endangered species?

**Question 1**

What federal program is used to list species?

**Question 2**

How long is the review period for an individual's or organisation's application to list a species?

**Question 3**

For vertebrates, what is the mildest interpretation of "species"?

**Question 4**

How many ways can FWS list a species?

**Question 5**

To whom should the FWS or NMFS petition to list the species?

**Question 6**

How long does an individual have to apply to the FWS?

**Question 7**

In which case is a separate population not counted?

**Question 8**

What is another name for the US Fish and Wildlife Service (FWS)?

**Text number 8**

The listing process cannot take economic factors into account, but must be "based exclusively on the best scientific and commercial information available". The 1982 amendment to the ESA added the word "solely" to exclude all considerations other than the biological status of the species. Congress rejected President Ronald Reagan's Executive Order 12291, which called for an economic analysis of all government agency actions. A House of Representatives committee opinion stated that "economic considerations are not relevant to decisions on the status of species."

**Question 0**

Which word was added to the Endangered Species Act in 1982?

**Question 1**

Following the 1982 amendment to the Endangered Species Act, what is the sole basis for listing?

**Question 2**

Which President issued an executive order requiring economic considerations in all government actions?

**Question 3**

What did Congress do with an executive order that would have included economic considerations as a factor for listing a species?

**Question 4**

When are economic factors taken into account?

**Question 5**

When was Executive Order 12291 introduced?

**Question 6**

Which president added the word "exclusively" to the ESA?

**Question 7**

What was Reagan's opinion on the economic aspects of the status of the species?

**Question 8**

Whose order did President Reagan reject?

**Text number 9**

Public notice is given through statutory notices published in newspapers, and state and county authorities within the species' range are notified. Foreign countries may also receive notice of listing. A public hearing is mandatory if requested by anyone within 45 days of publication of the notice. "The notice and comment requirement is designed to ensure meaningful public participation in the regulatory process," summarized the Ninth Circuit Court in Idaho Farm Bureau Federation v. Babbitt.

**Question 0**

How is listing publicly announced?

**Question 1**

How long after the publication of the listing notice can a public consultation on the listing be requested?

**Question 2**

Do listing notifications cross international soil?

**Question 3**

How are policy changes communicated to the state and provinces?

**Question 4**

How long will the public consultation last?

**Question 5**

Which case took 45 days to process?

**Question 6**

Which court publishes judicial notices?

**Question 7**

What is not given to foreign nations?

**Text number 10**

The provision in Article 4 of the Act creating critical habitat is a regulatory link between habitat protection and recovery objectives, requiring the identification and protection of all land, water and air spaces necessary for the recovery of endangered species. To determine what constitutes critical habitat, account is taken of the open space required for growth of individuals and populations, food, water, light or other nutritional needs, breeding sites, seed germination and dispersal needs, and freedom from disturbance.

**Question 0**

Which section of the Endangered Species Act provides for critical habitats?

**Question 1**

Which two topics are related to the Critical Habitats Regulation?

**Question 2**

What does the Critical Habitats Regulation require?

**Question 3**

What is an example of critical habitat consideration for wild plant species?

**Question 4**

In which section will the recovery targets be set?

**Question 5**

What is the link between identification and protection?

**Question 6**

What listing errors are not necessary to specify?

**Question 7**

What are water and air unnecessary for?

**Question 8**

What are the differences in section 4?

**Text number 11**

All federal agencies are prohibited from approving, funding, or carrying out activities that "destroy or adversely modify" critical habitat (Section 7(a)(2)). Although the critical habitat regulations do not apply directly to private and non-federal landowners, large-scale development, logging, and mining projects on private and state lands generally require a federal permit and thus fall under the critical habitat provisions. Outside or alongside the regulatory processes, critical habitat also focuses on and encourages voluntary actions such as land purchases, grant funding, restoration, and the establishment of protected areas.

**Question 0**

What is the Endangered Species Act's detailed provision for government action on critical habitat?

**Question 1**

How are non-federal government actions that may affect critical habitat often covered by the Endangered Species Act?

**Question 2**

What non-regulatory activities do critical habitats contribute to?

**Question 3**

What are federal agencies allowed to do with critical habitat?

**Question 4**

Which section applies to private landowners?

**Question 5**

What does not require a federal permit?

**Question 6**

What requires voluntary action?

**Question 7**

What aspect applies to non-federal landowners?

**Text number 12**

The ESA requires that critical habitat be designated at the time a species is listed as threatened or within one year of being listed as threatened. In practice, most sites are designated several years after listing. Between 1978 and 1986, the FWS regularly designated critical habitat. In 1986, the Reagan administration issued an executive order limiting the protection status of critical habitat. As a result, few critical habitats were designated between 1986 and the late 1990s. In the late 1990s and early 2000s, a series of court decisions overturned the Reagan regulations and forced the FWS and NMFS to designate several hundred critical habitats, particularly in Hawaii, California and other western states. In the Midwest and Eastern states, fewer critical habitats were designated, mostly in riverine and coastal areas. As of December 2006, the Reagan regulation has not yet been replaced, although its use has been suspended. However, agencies have generally changed course and, since 2005, have sought to designate critical habitat at or near the time of designation.

**Question 0**

What is the deadline for designating a species as critical habitat after it has been added to the list of endangered species?

**Question 1**

Which presidential administration restricted the protection status of critical habitats in 1986?

**Question 2**

After the courts had removed the restrictions on critical habitats, where were the critical habitats primarily established?

**Question 3**

Where geographically are most of the critical habitats in the Midwest and eastern states located?

**Question 4**

What is the one-year waiting period to be called?

**Question 5**

What caused the increase in critical habitats between 1986 and 1990?

**Question 6**

What did Reagan's regulations nullify?

**Question 7**

How many critical habitats were built between 1978 and 1986?

**Question 8**

Which two states in the Midwest and East received less habitat?

**Text number 13**

The Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) must develop an Endangered Species Recovery Plan (ESRP) that outlines the goals, necessary tasks, likely costs, and estimated timeline for recovery of endangered species (i.e., increasing the number of species and improving their management so that they can be removed from the endangered species list). The ESA does not specify when a recovery plan must be drawn up. The FWS has a policy that the plan must be completed within three years of listing, but the average completion time is about six years. The annual rate of recovery plan completion increased steadily from the Ford administration (4) to the Carter (9), Reagan (30), Bush I (44), and Clinton (72) administrations, but declined under Bush II (16 per year as of September 1, 2006).

**Question 0**

Which four topics are required in the recovery plan for endangered species?

**Question 1**

What is the deadline for drawing up a recovery plan for endangered species?

**Question 2**

What is the duration of the recovery plan that the Fish and Wildlife Service is planning in its policy?

**Question 3**

How long does it take on average to draw up a recovery plan for endangered species?

**Question 4**

Under which presidential administration were the most stimulus plans made?

**Question 5**

What does the FWS require NMFS to create?

**Question 6**

By when does NMFS policy require plans to be completed?

**Question 7**

What was the average completion time of the FWS plan?

**Question 8**

Who requires FWS to have a graduation policy?

**Question 9**

Which organisations are not required to have a recovery plan?

**Text number 14**

The question that needs to be answered is whether the listed species will be harmed and, if so, how to minimise the harm. If the harm cannot be avoided, the project authority may seek a waiver from the Endangered Species Committee, an ad hoc board composed of members of the executive branch and at least one appointed representative from the state in which the project will occur. Five of the seven members of the committee must vote in favor of a waiver to allow the taking (harassing, injuring, hunting, shooting, wounding, killing, capturing, trapping, or collecting listed species or significantly modifying habitat or attempting to do so).

**Question 0**

What is the primary consideration in determining whether projects can be carried out in areas where endangered species occur?

**Question 1**

If the species may be harmed, who has the final say on whether the project can proceed?

**Question 2**

How many members are on the ad hoc panel that grants exemptions to projects in cases where the species may be harmed?

**Question 3**

How many votes must be cast in favour of the derogation for it to be granted?

**Question 4**

What is one specific requirement concerning the composition of the Exemption Committee?

**Question 5**

Who does the Committee on Threatened Species get a derogation from?

**Question 6**

How many members must vote against the derogation?

**Question 7**

How many members must the project office have?

**Question 8**

What do project offices vote on?

**Question 9**

What happens if the harm can be minimised?

**Text number 15**

Long before the Endangered Species Committee considers the exemption, the Forest Service and either FWS or NMFS have been negotiating the biological impacts of logging. Consultation can be informal to determine whether harm may occur and formal if harm is considered likely. These consultations must answer the following questions: whether the species will be harmed, whether habitat will be harmed, and whether the action will contribute to or hinder the recovery of the listed species.

**Question 0**

Who reviews derogation decisions in the Committee on Threatened Species?

**Question 1**

What is the aim of the informal consultation?

**Question 2**

What is the reason for the need for a formal consultation?

**Question 3**

What aspects will be weighed during the consultations?

**Question 4**

Who will be consulted after the Endangered Species Committee?

**Question 5**

What impacts will the Committee on Threatened Species take into account?

**Question 6**

What type of consultation will be used if there is no damage?

**Question 7**

What kind of consultation is used by endangered species when disturbance is likely?

**Question 8**

Who will be consulted before the FWS and Forest Service?

**Text number 16**

By 2009, there have been six cases where an exemption procedure has been opened. Of these six, one was granted, one was partially granted, one was rejected and three were withdrawn. Donald Baur, in his book The Endangered Species Act: Law, Policy, and Perspectives, stated that " ... the exemption provision is fundamentally irrelevant to the governance of the ESA. The main reason, of course, is that so few consultations result in a jeopardy opinion, and those that do almost always result in the identification of reasonable and prudent alternatives to avoid jeopardy. "

**Question 0**

How many times has the derogation procedure been used since 2009?

**Question 1**

What were the results of these derogation requests?

**Question 2**

Why is this derogation often considered irrelevant?

**Question 3**

How can dangerous opinions be countered?

**Question 4**

How many exemptions were granted in 2009?

**Question 5**

What is the key factor for ESA?

**Question 6**

What did Donald Baur write in 2009?

**Question 7**

How many exemptions were withdrawn in 2009?

**Question 8**

How many exemptions has Donald Baur granted?

**Text number 17**

More than half of the listed species' habitats are on non-federally owned lands owned by citizens, states, local governments, tribal governments and private organizations. Before the law was amended in 1982, listed species could only be taken for scientific or research purposes. The amendment created a permitting process to circumvent the take ban, called a Habitat Conservation Plan (HCP), to encourage non-federal land users and private landowners to protect listed and non-listed species while allowing economic development that could harm ("take") species.

**Question 0**

Who owns most of the critical habitats?

**Question 1**

What is the programme to encourage private landowners to protect species on their land?

**Question 2**

Before the 1982 amendment, under what circumstances could a listed species be excluded?

**Question 3**

Which part of the habitats of the listed species do citizens own?

**Question 4**

Who drafted the 1982 review?

**Question 5**

When was it decided that species could be taken for scientific purposes?

**Question 6**

For what purpose may listed species not be taken under the HCP?

**Question 7**

What can economic development not do under the HCP?

**Text number 18**

The person or organization submits an HCP, and if approved by the agency (FWS or NMFS), is issued an Incidental Take Permit (ITP), which allows a certain number of "takes" of listed species. The permit can be revoked at any time and may allow incidental take for varying periods of time. For example, the San Bruno Habitat Conservation Plan/Incidental Take Permit is valid for 30 years, and the Wal-Mart store (in Florida) permit expires after one year. Because the permit is issued by a federal agency to a private party, it is a federal action, which means that other federal laws, such as the National Environmental Policy Act (NEPA), may apply. A notice of permit application is published in the Federal Register, followed by a 30-90 day public comment period.

**Question 0**

What is awarded to a species on the basis of an approved HCP?

**Question 1**

How long does ITP last?

**Question 2**

How is the public informed about ITP applications?

**Question 3**

How long does the public have to comment on ITP applications?

**Question 4**

What is given if the HCP is rejected?

**Question 5**

How long does the HCP last?

**Question 6**

In which state is San Bruno located?

**Question 7**

What does not apply when a permit is granted?

**Question 8**

Which body publishes the HCP for public comment?

**Text number 19**

The US Congress was urged to make an exception by supporters of the San Bruno Mountain conservation plan in California. The plan was drawn up in the early 1980s and is the first conservation plan in the country. In a 1982 conference report on the amendments, Congress specified that its intention was that the San Bruno plan would serve as a "model" for future conservation plans under the incidental take exemption and that "the adequacy of similar conservation plans should be evaluated against the San Bruno plan". In addition, Congress found that the San Bruno Plan was based on an "independent comprehensive biological study" and that it protected at least 87% of the listed butterfly habitat that led to the HCP.

**Question 0**

Where was the first HCP held?

**Question 1**

What percentage of critical habitat was protected in the area where the first HCP was carried out?

**Question 2**

What types of animals were protected in the area where the first HCP was carried out?

**Question 3**

Who did the US Congress ask to create an exemption?

**Question 4**

When was the last authorisation issued?

**Question 5**

What was the San Bruno plan compared to when it was drawn up?

**Question 6**

How many of the listed butterfly habitats were located in San Bruno?

**Question 7**

Who did the biological research for the San Bruno plan?

**Text number 20**

Growing scientific recognition of the role of private lands in the recovery of endangered species and the landmark 1981 court decision in Palila v. Hawaii Department of Land and Natural Resources contributed to the emergence of Incidental Take Permits (ITPs) as "a major force in wildlife conservation and a major headache for development," wrote Robert D. Thornton in his 1991 Environmental Law publication Searching for Consensus and Predictability: Habitat Conservation Planning under the Endangered Species Act of 1973.

**Question 0**

Which 1981 Court decision increased the influence of HCPs and ITPs in the field of protection?

**Question 1**

Who wrote the article "Searching for Consensus and Predictability: Habitat Conservation Planning under the Endangered Species Act of 1973"."

**Question 2**

How did Thornton compare scientific and legal progress from the perspective of the development community?

**Question 3**

When did private countries start to get more recognition?

**Question 4**

Who ruled in Palila v. Hawaii Department of Land and Natural Resources?

**Question 5**

According to Thornton, what was the role of private countries in the development community?

**Question 6**

When was the Environmental Law Journal founded?

**Question 7**

Which case limited the effectiveness of the ITP?

**Text number 21**

The purpose of the no-surprise rule is to protect the landowner if "unforeseen circumstances" result in the landowner failing to take action to prevent or mitigate harm to the species. The no-surprises rule may be the most controversial of the recent legislative reforms, because once a permit is issued, the Fish and Wildlife Service (FWS) loses much of its ability to protect the species if the landowner's mitigation measures prove inadequate. The landowner or permittee would not be required to set aside additional land or pay additional conservation fees. The federal government would have to pay for the additional protection measures.

**Question 0**

What is the name of the rule that protects the landowner if his protection measures fall short?

**Question 1**

Why is this rule so controversial?

**Question 2**

If the landowner does not adequately protect the species, what are the consequences under the "no surprises" rule?

**Question 3**

Who will cover the cost of additional measures if the ITP holder's efforts fall short?

**Question 4**

Why is ITP controversial?

**Question 5**

What policies are in place to protect the species from unforeseen circumstances?

**Question 6**

What will be granted after the No Surprises rule comes into force?

**Question 7**

What does the federal government not have to pay?

**Question 8**

What do landowners have to leave aside under the No Surprises rule?

**Text number 22**

A Safe Harbor Agreement is a voluntary agreement between a private landowner and the FWS. The landowner agrees to modify his or her property in a way that benefits or even attracts a listed or proposed species, in exchange for assurances that the FWS will allow future "take" above a predetermined level. The action is based on the "survival enhancement" provision of Section 1539(a)(1)(A). The landowner may have either a "safe harbor" agreement or an "Incidental Take Permit" or both. The policy was developed by the Clinton administration in 1999.

**Question 0**

What two groups are bound by the Safe Harbor agreement?

**Question 1**

What does a landowner get from a Safe Harbor agreement in exchange for changing the property to a more favourable condition?

**Question 2**

Which presidential administration developed the Safe Harbor policy?

**Question 3**

Are Safe Harbor and ITP agreements mutually exclusive?

**Question 4**

Under which provision does the ITP apply?

**Question 5**

When did the FWS create the Safe Harbor agreement?

**Question 6**

What kind of contract can a landowner no longer enter into if he acquires an ITP?

**Question 7**

Which provision is based on the Safe Harbor agreement?

**Question 8**

Which administration developed § 1539(a)(1)(A)?

**Text number 23**

Candidate conservation agreements are closely related to safe harbor agreements, but the main difference is that candidate conservation agreements are designed to protect unlisted species by providing incentives for private landowners and land management authorities to restore, enhance or maintain habitats for unlisted species that are in decline and could become threatened or endangered if critical habitat is not protected. FWS will then ensure that if a non-listed species is listed in the future, the landowner will not be required to do more than what is already agreed to in the CCA.

**Question 0**

How do candidate protection agreements differ from safe harbor agreements?

**Question 1**

How does the CCA help protect the private landowner?

**Question 2**

How will the CCA affect unlisted species?

**Question 3**

What is the main difference between a Safe Harbor agreement and a Safe Harbor agreement?

**Question 4**

How does the Safe Harbor protect unlisted species?

**Question 5**

Which organisation can persuade a landowner to take actions other than those agreed in the CCA?

**Question 6**

What does the Safe Harbor protect?

**Text number 24**

Two examples of species that have recently been delisted are the Virginia squirrel (subspecies), which had been listed since 1985, and the grey wolf (Northern Rocky Mountain DPS) in August 2008. On 15 April 2011, President Obama signed into law the 2011 Department of Defense and Full-Year Appropriations Act. A section of that appropriations bill directed the Department of the Interior, within 60 days of enactment, to republish the April 2, 2009 final rule that designated the Northern Rocky Mountain population of the gray wolf (Canis lupus) as a distinct population segment (DPS) and to revise the list of threatened and endangered wildlife and plants by removing most of the gray wolves in the DPS.

**Question 0**

Which species was delisted in August 2008?

**Question 1**

How long had the squirrel been endangered?

**Question 2**

Which president signed the law that removed the Northern Rockies from the list of the gray population?

**Question 3**

Which animal was added in 2008?

**Question 4**

When was the grey wolf added to the list?

**Question 5**

Who removed the gliding squirrel from the list?

**Question 6**

What did the Home Secretary sign in 2011?

**Question 7**

What is the Latin name for the flying squirrel?

**Text number 25**

By September 2012, 56 species had been removed from the list; 28 species have been delisted due to recovery, 10 species have become extinct (of which 7 species are believed to have become extinct prior to listing), 10 species have been delisted due to changes in taxonomic classification practices, 6 species have been found due to new populations, 1 species has been delisted due to an error in the listing rule, and 1 species has been delisted due to an amendment to the Endangered Species Act requiring delisting. Twenty-five other species have been moved from "threatened" to "endangered" status.

**Question 0**

How many species were delisted in September 2012 due to recovery?

**Question 1**

How many of the ten species that have been removed from the list due to extinction are believed to have been extinct at the time of listing?

**Question 2**

How many species are classified as threatened or endangered?

**Question 3**

How many species were removed from the list because new populations were found?

**Question 4**

How many species were delisted in September 2012?

**Question 5**

How many species have moved from threatened to endangered?

**Question 6**

How many new people were lost?

**Question 7**

How many species have recovered since 2012 thanks to the changes?

**Question 8**

When was the ESA amendment published?

**Text number 26**

Opponents of the Endangered Species Act argue that with more than 2,000 endangered species listed and only 28 species delisted for recovery, a 1% success rate over nearly three decades proves that serious reform of methods is needed to truly help endangered animals and plants. Others argue that the ESA may encourage landowners who fear losing the use of their land to an endangered species to destroy habitats pre-emptively, known colloquially as "shoot, shovel and shut up". One example of such perverse incentives is the case of a forest owner who increased logging and reduced the harvesting age of his trees to ensure that they would not become old enough to become suitable habitat after the red-crowned woodpecker was listed under the ESA. While no study has shown that the overall negative effects of the law outweigh the positive effects, many economists believe that if a way could be found to reduce such perverse incentives, conservation of endangered species would be enhanced.

**Question 0**

How many species are currently on the list?

**Question 1**

What is the success rate of the List and Endangered Species Act initiatives?

**Question 2**

What is the name for landowners destroying habitats pre-emptively for fear of a protected species?

**Question 3**

How did the landowner affect the protected species of red seals?

**Question 4**

How many species are still on the list?

**Question 5**

How long has ESA been using the "shoot, shovel and shut up" method?

**Question 6**

What negative effects have studies shown to be more serious?

**Question 7**

What is another name for ESA practices?

**Question 8**

What is the success rate of Shoot, Shovel, and Shut-Up?

**Text number 27**

According to a 1999 study by Alan Green and the Center for Public Integrity (CPI), the ESA loopholes are commonly exploited in the exotic pet trade. While legislation prohibits interstate and outbound trade in listed species, there are no provisions for intrastate trade, which allows these animals to be sold to roadside stands and private collectors. In addition, the ESA allows for the transport of listed species across state lines as long as they are not sold. According to Green and CPI, this allows dealers to "donate" listed species through supposed "breeding loans" to anyone, and in return they can legally receive a reciprocal monetary "donation" from the receiving party. In addition, an interview with an endangered species expert from the US Fish and Wildlife Service revealed that the agency does not have enough staff for undercover work to catch these bogus "donations" and other fraudulent transactions.

**Question 0**

Which industry is exploiting loopholes in the Endangered Species Act?

**Question 1**

What is one particular loophole that helps roadside zoos and private collectors?

**Question 2**

What allows for the abuse of interstate commerce rules?

**Question 3**

How can fake breeding loans be used to sell wild animals?

**Question 4**

Why are there not more arrests for undercover investigations into transnational wildlife trade?

**Question 5**

When did people start exploiting the loopholes in the ESA?

**Question 6**

Which organisation prohibits the sale of animals to zoos or collectors?

**Question 7**

What is the name of the endangered species expert interviewed?

**Question 8**

Which agency has too many staff?

**Question 9**

Which named organisation has exploited the loopholes?

**Text number 28**

Green and CPI also note another ESA exploitation when discussing the critically endangered cotton-top tamarin (Saguinus oedipus). Not only did they find documentation that 151 primates had inadvertently made their way from the Harvard-affiliated New England Regional Primate Research Center to the exotic pet trade through the aforementioned loophole, but in October 1976 more than 800 cotton-top tamarins were imported into the United States to prevent the species from being officially listed under the ESA.

**Question 0**

The Center for Public Integrity found that 151 what primate was moved from the New England Primate Research Center to an exotic pet store?

**Question 1**

What happened in 1976 that contributed to the classification of this primate as dangerous?

**Question 2**

Which school is affiliated with the New England Primate Research Center?

**Question 3**

Which school ran the pet shop?

**Question 4**

How many cotton tamarisks were traded out of the United States in 1976?

**Question 5**

Who works at the New England Regional Primate Research Center?

**Question 6**

What was the official number of the cotton tamarin species under the ESA?

**Question 7**

How many primates did Harvard acquire?

**Text number 29**

Section 6 of the Endangered Species Act provided funding for the development of threatened and endangered species management programs by state wildlife agencies. Since then, each state has compiled a list of threatened and endangered species occurring within its territory. These state lists often include species that are considered threatened or endangered in a particular state, but not in all states, and are therefore not included in the national list of threatened and endangered species. Examples include Florida, Minnesota, Maine and California.

**Question 0**

For what purpose did Section 6 of the Endangered Species Act provide funding?

**Question 1**

What is one major drawback of having state wildlife agencies compile their own lists?

**Question 2**

Which states list species that are endangered in their state but not in all other states?

**Question 3**

Which countries do not have their own lists?

**Question 4**

Where was the funding for the development of endangered species management programmes provided from?

**Question 5**

In what way did Article 6 of the Act distinguish between the boundaries?

**Question 6**

Who funded the species in certain countries?

**Text number 30**

A reward is paid to a person who provides information leading to an arrest, conviction or revocation of a license, as long as the person is not a local, state or federal employee in the performance of official duties. The Secretary may also award reasonable and necessary expenses incurred in the care of fish, wildlife, forest services, or plant care until the offender has caused the violation. If the balance ever exceeds $500,000, the Secretary of the Treasury must deposit an amount equal to the excess in the Endangered Species Conservation Cooperative Fund.

**Question 0**

Is the public encouraged to report violations of the Endangered Species Act?

**Question 1**

If the offender has caused damage to wildlife, who can provide financial support for the care of the injured wildlife?

**Question 2**

Which over-balance led the Minister of Finance to deposit money into the Endangered Species Conservation Trust Fund?

**Question 3**

What do local workers get if they report information that leads to an arrest?

**Question 4**

How much is the reward worth?

**Question 5**

What should the secretary do if the budget is less than $500 000?

**Question 6**

Which three types of employees are eligible to accept the premium?

**Question 7**

What costs are not covered by the Ministry?

**Document number 359**

**Text number 0**

A vacuum is a space in which there is no matter. The word comes from the Latin adjective vacuus, meaning "empty" or "void". A vacuum is an area with a gas pressure much lower than atmospheric pressure. Physicists often discuss the ideal test results that would be obtained in a perfect vacuum, which they sometimes simply call a "void" or free space, and use the term partial vacuum to refer to a real imperfect vacuum, such as might exist in a laboratory or in space. In engineering and applied physics, on the other hand, a vacuum refers to any space in which the pressure is less than atmospheric pressure. The Latin term in vacuo is used to describe an object in what would otherwise be a vacuum.

**Question 0**

The word vacuum comes from which Latin adjective?

**Question 1**

What is the term partial vacuum used by physicists?

**Question 2**

What is a vacuum?

**Question 3**

What pressure is lower than the atmospheric pressure in a vacuum?

**Question 4**

What is the Latin term used to describe an object in a vacuum?

**Question 5**

Where does the Latin adjective atmospheric pressure come from?

**Question 6**

What is the definition of barometric pressure?

**Question 7**

What do physicists often discuss, what happens at a given air pressure?

**Question 8**

What is meant by the term partial air pressure?

**Question 9**

What is the Latin term used to describe an object that is under atmospheric pressure?

**Text number 1**

The quality of a partial vacuum refers to how close it is to a complete vacuum. Other things being equal, a lower gas pressure means a higher quality vacuum. For example, a typical vacuum cleaner produces enough suction to reduce the air pressure by about 20%. Much higher quality vacuums are possible. In chemistry, physics and engineering, common ultra-high vacuum chambers operate at less than one trillionth (10-12) of atmospheric pressure (100 nPa) and can reach about 100 particles/cm3 . Space is an even higher quality vacuum, with an average of only a few hydrogen atoms per cubic metre. According to current thinking, even if all matter could be removed from the volume, it would still not be "empty" due to vacuum fluctuations, dark energy, gamma rays, cosmic rays, neutrinos and other quantum physics phenomena. In electromagnetism in the 19th century, the vacuum was thought to be filled with a medium called ether. In modern particle physics, the vacuum state is considered the fundamental state of matter.

**Question 0**

What is considered a vacuum?

**Question 1**

A typical vacuum cleaner produces enough suction to do what for air pressure?

**Question 2**

What does the quality of a partial vacuum suggest?

**Question 3**

There is a high-grade vacuum in outer space, which corresponds to what?

**Question 4**

If all matter is removed from a vacuum, would it be empty space?

**Question 5**

How much does a few atoms of hydrogen per cubic metre reduce the air pressure?

**Question 6**

What does the quality of dark energy refer to?

**Question 7**

What do lower levels of dark matter mean?

**Question 8**

In which century was dark matter discovered?

**Question 9**

What does dark matter usually do in space?

**Text number 2**

Historically, there has been much debate about whether a vacuum can exist. Ancient Greek philosophers debated the existence of a vacuum, or void, in the context of atomism, where vacuum and the atom were the fundamental explanatory elements of physics. After Plato, even the abstract notion of a featureless vacuum met with considerable scepticism: it could not be perceived by the senses, it could not in itself provide any additional explanatory power beyond the physical volume to which it was proportional, and by definition it was literally nothing and could not legitimately be said to exist. Aristotle believed that a vacuum could not arise naturally because the surrounding denser material continuum would immediately fill in any incipient rarities that could give rise to a vacuum.

**Question 0**

What did Aristotle believe about emptiness?

**Question 1**

What are the historically debated vacuums?

**Question 2**

What did Plato mean by something that was literally nothing?

**Question 3**

Aristotle wondered, what would fill all the rarities that might create a vacuum?

**Question 4**

What did the Greek philosophers believe could not happen naturally?

**Question 5**

What language did Plato speak?

**Question 6**

What did Aristotle consider to be the basic elements of understanding physics?

**Question 7**

What, according to the Greek philosophers, makes the atom incomprehensible?

**Question 8**

What did the ancient Greek philosophers believe that atoms could not do?

**Text number 3**

In his Physics IV, Aristotle presented a number of arguments against emptiness: for example, that motion in an unobstructed medium could continue indefinitely because there is no reason why something should stop at any particular place. Although Lucretius argued for the existence of a vacuum in the first century BC and Hero of Alexandria tried unsuccessfully to create an artificial vacuum in the first century AD, it was not until European scholars such as Roger Bacon, Blasius Parman and Walter Burley in the 1300s and 1300s that these issues received significant attention. Eventually, following Stoic physics, scholars from the 13th century onwards increasingly departed from the Aristotelian perspective and advocated a supernatural vacuum beyond the boundaries of the cosmos, a conclusion that was widely recognised towards the 17th century, helping to separate scientific and theological issues.

**Question 0**

In which century did beliefs begin to move away from Aristotle's idea of emptiness?

**Question 1**

What kind of thought process was used in the beginning when people believed in the existence of voids?

**Question 2**

Which belief about cosmic emptiness was accepted by most people in the 17th century?

**Question 3**

What century were Roger Bacon, Walter Burley and Blasius of Parma from?

**Question 4**

Which book was written by Lucretius?

**Question 5**

How many arguments against emptiness did Lucretius present in Book IV of Physics?

**Question 6**

In what year did Aristotle first study physics?

**Question 7**

What did Lucretuis try unsuccessfully to create in the 1300s?

**Question 8**

Which belief about emptiness was accepted by most people in the first century AD?

**Text number 4**

Rapid decompression can be much more dangerous than vacuum exposure itself. Even if the victim is not holding their breath, ventilation through the airway may be too slow to prevent fatal rupture of the delicate alveoli in the lungs. Rapid decompression can rupture eardrums and sinuses, soft tissues can bruise and bleed, and the stress of shock accelerates oxygen consumption, leading to hypoxia. Injuries caused by rapid decompression are called barotrauma. A pressure drop of 13 kPa (100 Torr), which causes no symptoms if it occurs gradually, can be fatal if it occurs suddenly.

**Question 0**

What does rapid decompression do to the lungs?

**Question 1**

What causes barotrauma?

**Question 2**

How big a pressure drop can kill you if it happens suddenly?

**Question 3**

What does accelerating oxygen consumption do?

**Question 4**

rapid decompression is more dangerous than what?

**Question 5**

What could be more dangerous than bleeding tissue?

**Question 6**

What does increased oxygen consumption do to the lungs?

**Question 7**

Venting through a ventilation pipe can end up in rupture of the eardrums and where?

**Question 8**

What comes out of your trachea if you hold your breath?

**Question 9**

What is also called ventilation through the breathing tube?

**Text number 5**

Almost two thousand years after Plato, René Descartes also proposed a geometrically based alternative theory of the atom, which did not have the problematic nothing and everything dichotomy of the void and the atom. Although Descartes agreed with his contemporaries that vacuum does not exist in nature, the success of his eponymous coordinate system and, more indirectly, the spatial-spatial component of his metaphysics philosophically defined the modern conception of empty space as a quantified extension of volume. By ancient definition, however, directionality and magnitude were conceptually distinct. As Cartesian mechanistic philosophy agreed to accept the 'brute fact' of action at a distance, and eventually successfully reconfigured it through force fields and increasingly sophisticated geometric structures, the anachronism of empty space expanded until the 'boiling ferment' of 20th century quantum action filled the vacuum with virtual pleroma.

**Question 0**

What did Descartes believe about the vacuum in nature?

**Question 1**

Whose work in metaphysics should define the concept of empty space?

**Question 2**

Which philosophy, together with Descartes, boosted quantum activity in the 20th century?

**Question 3**

Around which dichotomy did Descartes base his theory?

**Question 4**

Which position did Plato agree with?

**Question 5**

Where did Plato believe that the vacuum did not exist?

**Question 6**

What was the philosophy behind Plato's concept of vacuum?

**Question 7**

What did Plato's atomic discoveries come to define empty space?

**Text number 6**

In 1930, Paul Dirac proposed a model in which the vacuum is an infinite sea of particles with negative energy, called the Dirac sea. This theory helped to refine the predictions of his previously formulated Dirac equation and successfully predicted the existence of the positron, which was confirmed two years later. Werner Heisenberg's uncertainty principle, formulated in 1927, predicts a fundamental limit within which instantaneous position and momentum, or energy and time, can be measured. This has far-reaching consequences for the 'emptiness' of space between particles. In the late 20th century, the so-called virtual particles, which arise spontaneously from empty space, were confirmed.

**Question 0**

Who proposed the model of an infinite sea of particles with negative energy?

**Question 1**

What year was the Dirac Sea modelled?

**Question 2**

When were the virtual particles confirmed?

**Question 3**

In what year was the uncertainty principle established?

**Question 4**

What theory says that time and energy can be measured?

**Question 5**

What kind of energy did Werner Heisenberg believe the vacuum contained?

**Question 6**

What did Heisenberg call particles with negative energy in a vacuum?

**Question 7**

What did Heisenberg predict in 1930?

**Question 8**

How long did it take for the Dirac uncertainty principle to be established?

**Question 9**

What did Dirac theorise at the end of the 20th century to measure?

**Text number 7**

In general relativity, the disappearance of the stress-energy tensor implies, through Einstein's field equations, the disappearance of all components of the Ricci tensor. The vacuum does not mean that the curvature of space-time is necessarily flat: the gravitational field can still produce curvature in the vacuum in the form of tidal forces and gravitational waves (technically, these phenomena are components of the Weyl tensor). A black hole (with no electric charge) is an elegant example of a region that is completely "filled" by vacuum, but still has a strong curvature.

**Question 0**

What is a perfect example of a filled vacuum showing curvature?

**Question 1**

Whose equations helped to prove the disappearance of the Ricci tensor?

**Question 2**

what produces curvature in a vacuum?

**Question 3**

What has no electrical charge?

**Question 4**

What is the electrical charge of a vanishing voltage-energy tensor?

**Question 5**

Where does the black hole belong?

**Question 6**

What field did Einstein discover around the Earth?

**Question 7**

Tidal forces and gravity waves can produce zero what?

**Question 8**

What is the shape of the gravitational field?

**Text number 8**

Although it meets the definition of outer space, the atmospheric density at a few hundred kilometres above the Kármán line is sufficient to create a significant drag on satellites. Most artificial satellites operate in this region, known as low Earth orbit, and need to launch their engines every few days to maintain their orbits. The drag here is so low that it could theoretically be overcome by radiation pressure in solar sails, the proposed propulsion system for interplanetary travel. The planets are too massive for these forces to have a significant effect on their trajectories, even if solar winds do corrode their atmospheres.

**Question 0**

Where do most satellites operate?

**Question 1**

What system could possibly be used for interplanetary travel?

**Question 2**

Why do satellites have to start their engines every few days to maintain orbit?

**Question 3**

What is the line above which satellites orbit in outer space?

**Question 4**

How often does the position of the Earth's orbit change?

**Question 5**

What distinguishes satellites?

**Question 6**

Which satellites are too big to be affected by their engines?

**Question 7**

How long is the Karman line?

**Question 8**

What are the proposed uses of satellite engines?

**Text number 9**

In the medieval Middle Eastern world, the physicist and Islamic scholar Al-Farabi (Alpharabius, 872-950) conducted an experiment on the existence of a small vacuum by studying hand-held plungers in water [unreliable source?] He concluded that the volume of air can expand to fill the available space, and he suggested that the concept of a complete vacuum was inconsistent. According to Nader El-Bizri, however, the physicist Ibn al-Haytham (Alhazen, 965-1039) and the Mu'tazili theologians disagreed with Aristotle and Al-Farabi and supported the existence of a vacuum. Ibn al-Haytham used geometry to show mathematically that a place (al-makan) is an imaginary three-dimensional vacuum between the internal surfaces of a body. According to Ahmad Dallal, Abū Rayhān al-Bīrūnī also states that 'there is no observable evidence that excludes the possibility of a vacuum'. The suction pump later appeared in Europe from the 15th century onwards.

**Question 0**

Al-Farabi concluded that the perfect vacuum was inconsistent by using what?

**Question 1**

Ibn al-Haytham used geometry to show what?

**Question 2**

who concluded that there is no evidence to rule out a vacuum?

**Question 3**

what Al-Farabi said extended to fill the available space

**Question 4**

What type of pump appeared in the 1400s?

**Question 5**

What was Aristotle able to show about place?

**Question 6**

In which century did Aristotle invent the suction pump?

**Question 7**

What did Aristotle study to test the existence of a vacuum?

**Question 8**

What did Aristotle suggest about the concept of a perfect vacuum after his experiment?

**Question 9**

What did Aristotle say, that there is no evidence to rule out?

**Text number 10**

Medieval thought experiments on vacuum thought wondered whether there was a vacuum between two flat plates, even if only for a moment, when they were quickly separated. There was much debate about whether air moved fast enough when the plates were separated or, as Walter Burley suggested, whether a 'celestial factor' prevented the vacuum from forming. The commonly held view that nature abhors a vacuum was called horror vacui. Speculation that even God could not create a vacuum at will was put to rest[clarification needed] by Bishop Etienne Tempier's 1277 Paris judgments, which insisted that there must be no limits to God's powers, leading to the conclusion that God could create a vacuum at will. Jean Buridan reported in the 13th century that teams of ten horses could not pull open the blocks when the gate was closed.

**Question 0**

Who did not insist on limitations on the power of God?

**Question 1**

When did Buridan state that ten-horse teams cannot open beams with a closed gap?

**Question 2**

what was the conclusion of the Paris judgments of 1277?

**Question 3**

What was the common belief about vacuum and nature?

**Question 4**

what was the belief that nature abhors a vacuum called?

**Question 5**

What did Bishop Etienne Tempier think prevented the vacuum from forming?

**Question 6**

What was the common view in the Middle Ages that God could not have created the vacuum called?

**Question 7**

Which view of God became popular in the 13th century?

**Question 8**

According to Walter Burley in the 1300s, what ten-horse teams couldn't pull open?

**Question 9**

What did Walter Burley demand in the 13th century?

**Text number 11**

In 1654, Otto von Guericke invented the first vacuum pump and carried out his famous Magdeburg hemisphere experiment, in which he showed that groups of horses could not separate two hemispheres that had been partially deflated. Robert Boyle improved on Guericke's design and, with the help of Robert Hooke, further developed the vacuum pump technique. After this, research into partial vacuum ceased until 1850, when August Toepler invented the Toepler pump, and Heinrich Geissler invented the mercury displacement pump in 1855, which achieved a partial vacuum of about 10 Pa (0.1 Torr). At this vacuum level, a number of electrical properties can be observed, which sparked interest for further research.

**Question 0**

What was the vacuum created by the mercury displacement pump?

**Question 1**

What year was the Toepler pump invented?

**Question 2**

What was Otto von Guericke the first to invent?

**Question 3**

Who carried out the Magdeburg test?

**Question 4**

What appeared in a partial vacuum of 10 Pa?

**Question 5**

What did Robert Boyle invent in 1654?

**Question 6**

What was the name of the famous experiment by Robert Boyle?

**Question 7**

What kind of vacuum did Robert Boyle reach in 1855?

**Question 8**

What did Heinrich Geissler help Otto von Guericke to develop further?

**Question 9**

In what year did Otto von Guericke invent the mercury pump?

**Text number 12**

Although outer space is the rarest example of a partial vacuum in nature, the heavens were originally thought to be seamlessly filled with a rigid, indestructible substance called ether. Borrowing from the pneuma of Stoic physics, ether came to be regarded as rare air, from which it takes its name (see ether (mythology)). Early theories of light assumed that light was propagated by a ubiquitous terrestrial and celestial medium. In addition, this concept influenced Isaac Newton's explanations of both refraction and radiant heat. 19th century experiments on this light-producing ether sought to detect the small gravitational pull on the Earth's orbit. Although the Earth is actually moving in a relatively dense medium compared to interstellar space, the gravitational pull is so small that it could not be detected. In 1912, astronomer Henry Pickering commented: "Although the interstellar absorbing medium may be simply ether, [it] is typically gas, and free gaseous molecules are certainly there".

**Question 0**

What was originally believed to fill the heavens?

**Question 1**

Why were experiments on luminous ether carried out in the 19th century?

**Question 2**

Who stated that the nature of the gas and the free molecule was in the ether?

**Question 3**

Where are the most naturally occurring partial voids?

**Question 4**

What was the ether originally thought to consist of?

**Question 5**

What did Issac Newton believe existed in space in 1912?

**Question 6**

What were molecules originally thought to consist of?

**Question 7**

What is the second name in mythology?

**Question 8**

Where do ideas about the properties of molecules come from?

**Question 9**

What were the molecular experiments trying to detect in Earth's orbit?

**Text number 13**

The quality of a vacuum is indicated by the amount of matter remaining in the system, so a high-quality vacuum is one in which very little matter remains. A vacuum is primarily measured in terms of its absolute pressure, but other parameters, such as temperature and chemical composition, are needed to describe it fully. One of the most important parameters is the mean free path (MFP) of the residual gases, which expresses the average distance that molecules travel between collisions with each other. As the density of the gas decreases, the MFP increases, and when the MFP is longer than a chamber, pump, spacecraft or other objects present, the continuum assumptions of fluid mechanics do not hold. This vacuum state is called a high vacuum, and the study of fluid flows in this state is called particle gas dynamics. The MFP of air at atmospheric pressure is very short, 70 nm, but at 100 mPa (~69971000000000000000000000000000000♠1×10-3 Torr) the MFP of room temperature air is about 100 mm, which is on the order of everyday objects such as vacuum tubes. The Crookes radiometer turns when the MFP is greater than the size of the wings.

**Question 0**

What showed the quality of the vacuum?

**Question 1**

How is a vacuum usually measured?

**Question 2**

What does the MFP of residual gases show?

**Question 3**

What is particle gas dynamics?

**Question 4**

What indicates the quality of the residual gases?

**Question 5**

How much material is left in the residual gases?

**Question 6**

How are residual gases measured?

**Question 7**

What other factors are needed to measure residual gases?

**Question 8**

What is spacecraft residual gas research?

**Text number 14**

The SI unit of pressure is the pascal (symbol Pa), but vacuum is often measured in torras, named after the early Italian physicist Torricelli (1608-1647). Torr is equivalent to the displacement of one millimetre of mercury (mmHg) in a manometer, and 1 Torr is equivalent to 133.3223684 pascals above absolute zero pressure. Vacuum is also often measured on the barometric scale or as a percentage of atmospheric pressure in bars or atmospheres. Low vacuum is often measured in millimetres of mercury (mmHg) or pascals (Pa) below standard atmospheric pressure. "Below atmospheric" means that the absolute pressure is equal to the current atmospheric pressure.

**Question 0**

What is absolute pressure, which is equal to the current air pressure?

**Question 1**

What is the equivalent of one torr?

**Question 2**

What is another frequently used option for measuring vacuum?

**Question 3**

In what years was mercury commonly used?

**Question 4**

What does the barometric scale correspond to?

**Question 5**

Which element was discovered by Torricelli in 1608?

**Question 6**

How many pascals does the barometric scale correspond to?

**Question 7**

What is another way to measure the state of being below the atmosphere?

**Text number 15**

Hydrostatic gauges (such as the mercury column manometer) consist of a vertical column of liquid in a tube, the ends of which are exposed to different pressures. The column rises or falls until its weight is balanced by the pressure difference between the two ends of the tube. The simplest structure is a U-shaped closed tube with one side connected to the area of interest. Any liquid can be used in the tube, but mercury is preferred because of its high density and low vapour pressure. Simple hydrostatic gauges can measure pressures ranging from 1 Torr (100 Pa) above the atmosphere. An important modification is the McLeod gauge, which isolates the known vacuum volume and compresses it to multiply the height variation of the liquid column. The McLeod gauge can measure vacuum down to 10-6 torr (0.1 mPa), the lowest direct pressure measurement possible with current technology. Other vacuum gauges can measure lower pressures, but only indirectly by measuring other pressure-dependent properties. These indirect measurements must be calibrated with a direct measurement, most commonly a McLeod meter.

**Question 0**

Why is mercury a better choice of fluid for hydrostatic meters?

**Question 1**

What is the name of a vertical column of liquid in a pipe with different pressures at each end?

**Question 2**

What is a hydrostatic meter used for?

**Question 3**

Why is the McLeod meter special?

**Question 4**

Indirect pressure measurement is most often calibrated with what?

**Question 5**

At what level is the mercury concentration in the air calibrated?

**Question 6**

What is the density of mercury in air?

**Question 7**

How do you measure the concentration of mercury in the air?

**Question 8**

What is the smallest amount of mercury that can be measured in air?

**Question 9**

What measurements are used to measure mercury in air?

**Text number 16**

Thermal conductivity meters are based on the fact that the ability of a gas to conduct heat decreases with increasing pressure. In this type of meter, the filament of a wire is heated by passing a current through it. A thermocouple or resistance temperature detector (RTD) can then be used to measure the temperature of the filament. The temperature depends on the rate at which the filament loses heat to the surrounding gas, and hence on the thermal conductivity. A common variant is the Pirani meter, which uses a single platinum carbon as both the element to be heated and the RTD. These meters range in accuracy from 10 torr to 10-3 torr, but are sensitive to the chemical composition of the gases being measured.

**Question 0**

Which measurement method exploits the fact that the ability of gases to conduct heat decreases with increasing pressure?

**Question 1**

How is the wire thread of a thermal conductivity meter heated?

**Question 2**

What is the Pirani meter sensitive to?

**Question 3**

What is the RTD used for in a thermal conductivity meter?

**Question 4**

In which areas is the Piran meter accurate?

**Question 5**

How does the ability of planets to conduct heat decrease?

**Question 6**

What kind of filament does RTD use?

**Question 7**

How do thermal conductivity meters use a single platinum carbon?

**Question 8**

How quickly does the filament lose heat?

**Question 9**

Pressure is sensitive to the heated element what?

**Text number 17**

Ion meters are used in an ultra-high vacuum. There are two types: hot cathode and cold cathode ion meters. In the hot-cathode version, an electrically heated filament produces an electron beam. The electrons pass through the meter and ionise the gas molecules around them. The resulting ions are collected in a negative electrode. The current depends on the number of ions, which depends on the pressure of the meter. Hot cathode meters are accurate between 10-3 torr and 10-10 torr. The principle of the cold-cathode version is the same, except that the electrons are produced in a discharge generated by a high-voltage electrical discharge. Cold cathode meters are accurate from 10-2 torr to 10-9 torr. The calibration of an ionisation meter is very sensitive to the geometry of the structure, the chemical composition of the gases to be measured, corrosion and surface deposits. Their calibration can be invalidated by activation under atmospheric pressure or low vacuum. The composition of gases in high vacuum is generally unpredictable, so a mass spectrometer must be used with an ionisation meter to ensure accurate measurement.

**Question 0**

What are the two types of ion meters?

**Question 1**

What affects the number of ions in the meter?

**Question 2**

Which meter has an accuracy ranging from 10-2 torr to 10-9 torr?

**Question 3**

What should be used to accurately measure the composition of gases in a large vacuum?

**Question 4**

Why does a mass spectrometer need to be used with a meter to be accurate in measuring gas in a high vacuum?

**Question 5**

What types of mass spectrometers exist?

**Question 6**

What causes corrosion in the hot-cathode version?

**Question 7**

What is ionised as the electrodes pass through the mass spectrometer?

**Question 8**

What is the accuracy of a mass spectrometer?

**Question 9**

What are electrically heated filaments like in a high vacuum?

**Text number 18**

Cold or oxygen-rich atmospheres can support life at much lower pressures than atmospheric pressure, as long as the oxygen density is similar to that in a normal sea-level atmosphere. Temperatures in colder air, up to 3 km altitude, tend to compensate for the lower pressures there. Above this altitude, oxygen supplementation is needed to prevent people who have not previously adapted from getting altitude sickness, and spacesuits are essential to prevent ebullism at altitudes above 19 km. Most space suits use only 20 kPa (150 Torr) of pure oxygen. This pressure is high enough to prevent ebullism, but decompression sickness and gas embolisms can still occur if decompression is not controlled.

**Question 0**

Why do we need an oxygen density similar to that of the atmosphere at sea level?

**Question 1**

What is the lowest altitude at which no acclimatisation or suit is needed to prevent a person becoming ill?

**Question 2**

What does the colder air temperature above 19 kilometres compensate for?

**Question 3**

What is needed at altitudes of up to 3 km to prevent altitude sickness?

**Question 4**

What is usually caused by cold or oxygen-rich atmospheres?

**Question 5**

How much pure oxygen is in the atmosphere?

**Question 6**

Once people are used to the altitude, gas embolisms and what can happen?

**Text number 19**

People and animals exposed to the vacuum lose consciousness after a few seconds and die of hypoxia within minutes, but the symptoms are not nearly as dramatic as commonly portrayed in the media and popular culture. The reduction in pressure lowers the boiling point of blood and other body fluids, but the elastic pressure in the blood vessels keeps the boiling point above the internal body temperature of 37°C. Even if the blood does not boil, the formation of gas bubbles in body fluids under reduced pressure, known as ebullism, remains a concern. Gas can swell the body to twice its normal size and slow down blood flow, but tissues are elastic and porous enough to prevent rupture. Swelling and ebullism can be contained in a flight suit. Shuttle astronauts wore CAPS (Crew Altitude Protection Suit), which prevents ebullism at pressures up to 2 kPa (15 Torr). The rapid boiling cools the skin and causes frostbite, especially in the mouth, but this is not a significant risk.

**Question 0**

When does a human or animal lose consciousness when exposed to a vacuum?

**Question 1**

What object do the astronauts on the shuttle use to prevent ebullism at 2 kPa?

**Question 2**

What is called the formation of gas bubbles in body fluids at reduced pressure?

**Question 3**

What prevents the body from rupturing at low altitude when the human body is inflated from a gas bubble?

**Question 4**

At what temperature does frost usually occur in space?

**Question 5**

Who dies from exposure to freezing temperatures in a few minutes from ebullism?

**Question 6**

What does frost do to body fluids at reduced pressure?

**Question 7**

What can a person use to prevent their skin from freezing?

**Question 8**

What does a CAPS suit do to prevent frost at such low pressures as?

**Text number 20**

In ultra-high vacuum systems, some very "strange" leakage paths and gas sources have to be taken into account. Water adsorption of aluminium and palladium becomes an unacceptable source of gas, and even the adsorption of hard metals such as stainless steel or titanium must be considered. Some oils and fats boil in extreme vacuum. The permeability of metallic chamber walls may need to be considered and the grain direction of metallic flanges may need to be parallel to the flange surface.

**Question 0**

What can boil away in extreme vaccine exposure?

**Question 1**

How should the straight grain size of metallic flanges run in relation to the flange surfaces?

**Question 2**

What are the 2 metals that can be absorbed in an ultra-high vacuum system?

**Question 3**

What is worrying about an ultra-high vacuum system for aluminium or palladium?

**Question 4**

What boils away when aluminium absorbs water?

**Question 5**

How should palladium be placed when it is covered with oil?

**Question 6**

Which two metals can be absorbed into a metal flake?

**Question 7**

In which area does the water boil?

**Question 8**

Which side does fat usually run alongside?

**Text number 21**

In quantum mechanics and quantum field theory, a vacuum is defined as the state (i.e. the solution to the equations of the theory) with the lowest possible energy (the fundamental state of Hilbert space). In quantum electrodynamics, this vacuum is called the 'QED vacuum' to distinguish it from the vacuum in quantum chromodynamics, which is called the QCD vacuum. A QED vacuum is a state in which there are no matter particles (hence the name) and no photons. As described above, this state is impossible to achieve experimentally. (Even if every particle of matter could somehow be removed from the volume, it would be impossible to remove all the photons in a blackbody. ) Nevertheless, it provides a good model for a feasible vacuum, and is consistent with a number of experimental observations, as described below.

**Question 0**

In quantum mechanics, the state with the lowest possible energy determines what?

**Question 1**

What is called a vacuum state, where there are no matter particles or photons?

**Question 2**

Why is the QED vacuum impossible to reach?

**Question 3**

What is QCD?

**Question 4**

What are blackbody photons in quantum mechanics?

**Question 5**

What are the photons in a blackbody that do not contain matter particles or photons?

**Question 6**

Why is the blackbody field impossible to achieve?

**Question 7**

What should be removed to create a black box?

**Question 8**

What is a blackbody photon in quantum mechanics?

**Text number 22**

The QED vacuum has interesting and complex properties. In a QED vacuum, the mean values of the electric and magnetic fields are zero, but their scatter is not zero. As a result, the QED vacuum contains vacuum fluctuations (virtual particles that jump in and out of existence) and a finite energy called vacuum energy. Vacuum fluctuations are an essential and ubiquitous part of quantum field theory. Experimentally verified effects of vacuum fluctuations include spontaneous emission and Lamb shift. Coulomb's law and the electric potential in a vacuum near an electric charge change.

**Question 0**

When are the mean values of the electric and magnetic fields zero, but their scatter is not zero?

**Question 1**

What is the verified effect of vacuum fluctuation?

**Question 2**

what is vacuum fluctuation?

**Question 3**

What is called finite energy in QED?

**Question 4**

What changes Coulomb's law in a vacuum?

**Question 5**

What are the electric and magnetic fields in quantum field theory?

**Question 6**

What are the characteristics of Coulomb's law?

**Question 7**

What values does vacuum energy have according to Coulomb's law?

**Question 8**

What are the variations in vacuum energy according to Coulomb's law?

**Question 9**

What do the particles defined in Colombo's law do?

**Text number 23**

Stars, planets and moons maintain their atmospheres by gravitational attraction, and atmospheres do not have a clearly defined boundary: the density of atmospheric gas simply decreases with increasing distance from an object. The Earth's atmospheric pressure drops to about 699832320000000000000000000♠3.2×10-2 Pa at an altitude of 100 kilometres, the Kármán line, a common definition of the outer space boundary. Outside this line, the isotropic gas pressure quickly becomes insignificant compared to the solar radiation pressure and the dynamic pressure of the solar winds, making the definition of pressure difficult to interpret. The thermosphere in this region exhibits large gradients in pressure, temperature and composition, and varies greatly due to space weather. Astrophysicists prefer to describe these environments in terms of number density, expressed in units of particles per cubic centimetre.

**Question 0**

"Why does the thermosphere past the Karman line vary so much?

**Question 1**

What is commonly called the outer space frontier?

**Question 2**

What do astrophysicists use to describe space beyond the Karma line?

**Question 3**

What is more significant than isotropic gas pressure past the Karman line?

**Question 4**

What is commonly called the solar limit?

**Question 5**

What do astrophysicists use to describe solar radiation?

**Question 6**

What units do astrophysicists use to describe solar radiation?

**Question 7**

How high does the air pressure in the Sun drop at an altitude of 100 km?

**Question 8**

What becomes irrelevant when it reaches the surface of the moon?

**Text number 24**

Vacuum is useful in many processes and devices. Its first widespread use was in the filament lamp to protect the filament from chemical degradation. The chemical inertness provided by vacuum is also useful in electron beam welding, cold welding, vacuum packaging and vacuum baking. Ultrahigh vacuum is used to study atomically clean substrates, as only a very good vacuum can preserve atomically clean surfaces for a reasonably long time (minutes to days). High or very high vacuum removes air barriers, allowing particle beams to deposit or remove materials without contamination. This is the principle of chemical vapour deposition, physical vapour deposition and dry etching, which are essential in semiconductor and optical coating manufacturing and surface science. Convection reduction allows thermal insulation of thermosets. Deep vacuum lowers the boiling point of liquids and promotes low temperature degassing used in freeze drying, adhesives, distillation, metallurgy and process cleaning. The electrical properties of vacuum enable electron microscopes and vacuum tubes such as cathode ray tubes. The elimination of air friction is useful for flywheel energy storage and ultra-centrifuges.

**Question 0**

What was the destination first used in a widespread way in the process of vacuum?

**Question 1**

What does vacuum produce and what is used in electron beam welding and vacuum arc welding?

**Question 2**

High or very high vacuums remove which obstacle?

**Question 3**

How do freeze drying, distillation and metallurgy benefit from a deep vacuum?

**Question 4**

Which two things are enabled by the electrical properties of a vacuum?

**Question 5**

What three things are incandescent light bulbs useful for?

**Question 6**

Which light bulbs are used for the study?

**Question 7**

What do incandescent light bulbs do to particulate air pollution?

**Question 8**

Which food preservation method is dependent on the use of light bulbs?

**Question 9**

Which substance can light bulbs lower the boiling point of?

**Text number 25**

The vacuum in the manifolds can be used to operate accessories on cars. The best known application is the vacuum servo, which is used to power brakes. Obsolete applications include vacuum powered windscreen wipers and Autovac fuel pumps. Some aircraft gauges (attitude indicator (AI) and heading indicator (HI)) are typically vacuum powered because they protect against the loss of all (electrically powered) gauges, because early aircraft often had no electrical systems, and because a moving aircraft has two readily available sources of vacuum - the engine and an external venturi. Vacuum induction fusion uses electromagnetic induction in a vacuum.

**Question 0**

What gives power to your car brakes?

**Question 1**

What are the two available sources of negative pressure in a moving aircraft?

**Question 2**

Why are the position and orientation lights vacuum-operated?

**Question 3**

What is the vacuum in the intake manifold doing in the car?

**Question 4**

What accessories were no longer used in the vacuum?

**Question 5**

What do electrical systems use in a vacuum?

**Question 6**

What can electric systems drive in cars?

**Question 7**

What are electrical systems used to help power cars?

**Question 8**

What are the two instruments that electrical systems usually feed in some aircraft?

**Question 9**

Why are AI and HI usually powered by autovac fuel pumps?

**Text number 26**

Evaporation and sublimation into a vacuum is called outgassing. All substances, both solid and liquid, have a low vapour pressure, and their degassing becomes important when the vacuum pressure falls below this vapour pressure. In man-made systems, the escape of gases has the same effect as leakage and can limit the vacuum that can be achieved. Exhaust products can condense on nearby colder surfaces, which can be difficult if they coat optical instruments or react with other materials. This is a major concern for space missions, where a darkened telescope or solar cell can ruin an expensive flight.

**Question 0**

what is evaporation and sublimation in a vacuum?

**Question 1**

When is degassing important in any solid or liquid substance?

**Question 2**

Why can volatile products ruin space flight?

**Question 3**

Which liquid has the same effect as a telescope?

**Question 4**

What can solar cells limit the achievement of?

**Question 5**

On what surfaces can space flights be made?

**Question 6**

How much does a space flight telescope cost?

**Question 7**

What is the name of a solid that touches a cold surface?

**Text number 27**

To continue emptying the chamber indefinitely without the need for infinite growth, the vacuum compartment can be repeatedly closed, emptied and re-expanded. This is the principle behind positive displacement pumps, such as a hand-operated water pump. A mechanism inside the pump expands a small closed cavity to create a vacuum. The pressure differential causes some of the fluid from the chamber (or, in our example, the well) to push into the pump's small cavity. The pump cavity is then closed off from the chamber, opened to the atmosphere and squeezed back to a small size.

**Question 0**

What does the repeated closure of the vacuum compartment allow?

**Question 1**

How is a vacuum created inside a manual water pump?

**Question 2**

Why does the liquid from a hand pump push into the pump cavity when the small closed cavity is enlarged?

**Question 3**

What is the name given to pumps based on pulling, pushing and expanding a closed compartment?

**Question 4**

What does the repeated release of water into the atmosphere by hand make possible?

**Question 5**

How does a vacuum form in the atmosphere?

**Question 6**

What kind of growth occurs when liquid enters the atmosphere?

**Question 7**

What expands outside the pump?

**Question 8**

What size is the vacuum in the pump?

**Text number 28**

The above explanation is only a simple introduction to vacuum pumping and does not represent the full range of pumps in use. Many variations of the transfer pump have been developed and many other pump designs are based on completely different principles. Torque transfer pumps, which are somewhat similar to dynamic pumps used at higher pressures, can achieve much higher quality vacuums than positive displacement pumps. Displacement pumps can capture gases in a solid or absorbed state, often without moving parts, seals or vibrations. None of these pumps is universal; each type has significant performance limitations. All of these pumps have difficulty pumping low molecular weight gases, especially hydrogen, helium and neon.

**Question 0**

Which pump can be used to recover gases in solid or absorbed state?

**Question 1**

Shut-off pumps often operate without seals, moving parts and what else?

**Question 2**

Which pump has a better vacuum than a positive displacement pump?

**Question 3**

What can positive displacement pumps achieve more than trap pumps?

**Question 4**

What can torque transfer pumps recover?

**Question 5**

Dynamic pumps often operate without moving parts, seals and what?

**Question 6**

Which are the trap pumps that are usually considered more important than others?

**Question 7**

What other pumps are trap pumps similar to?

**Text number 29**

The lowest pressure achievable in a system also depends on many factors other than the nature of the pumps. To achieve higher negative pressures, several pumps can be connected in series, known as stages. The choice of seals, chamber geometry, materials and pump draining procedures all play a role. All these are called vacuum technology. Sometimes the ultimate pressure is not the only important characteristic. Pumping systems differ in terms of oil contamination, vibration, preference for certain gases, pumping speed, intermittent duty, reliability or tolerance of large leaks.

**Question 0**

When several pumps are connected in series to produce a larger vacuum, it is called a what?

**Question 1**

For example, the choice of seals or the geometry of the chamber will affect the pump. Together these options are called why?

**Question 2**

What are the two other characteristics of a pumping system besides the discharge pressure?

**Question 3**

How can ventricular geometry be combined?

**Question 4**

What can oil contamination depend on instead of pumped storage?

**Question 5**

How does the leak usually happen?

**Question 6**

What do certain gases usually help the pump to achieve?

**Question 7**

What are the other two features of the seal?

**Text number 30**

Liquids cannot usually be drawn, so suction cannot create a vacuum. Suction can spread and dilute a vacuum by allowing higher pressure to push fluids into it, but the vacuum must first be created before suction can occur. The easiest way to create an artificial vacuum is to expand the volume of the vessel. For example, the diaphragm expands the chest cavity, increasing the volume of the lungs. This expansion reduces the pressure and creates a partial vacuum, which is soon filled by air pushed by atmospheric pressure.

**Question 0**

What can be measured in the atmosphere?

**Question 1**

What can the tank spread and dilute?

**Question 2**

What is the fluid pushing into the lungs?

**Question 3**

What drives high pressure in the atmosphere?

**Question 4**

What can be used in the chest cavity during surgery?

**Document number 360**

**Text number 0**

The Han dynasty (Chinese 漢朝; pinyin: Hàn cháo) was the second imperial dynasty of China, preceded by the Qin dynasty (221-207 BC) and followed by the Three Kingdoms period (220-280 AD). The Han period, which lasted more than four centuries, is considered the golden age of Chinese history. Even today, the majority ethnic group in China calls itself the 'Han people' and the Chinese script 'Han characters'. It was founded by the rebel leader Liu Bang, posthumously known as Han Emperor Gaozu, and was briefly interrupted by the Xin dynasty of former ruler Wang Mang (9-23 AD). This interregnum divided the Han dynasty into two periods: the Western Han or former Han (206 BC-9 AD) and the Eastern Han or later Han (25-220 AD).

**Question 0**

Which period followed the Han Dynasty?

**Question 1**

Which dynasty preceded the Han dynasty?

**Question 2**

Who founded the Han Dynasty?

**Question 3**

When did the former Han period begin?

**Question 4**

When did the later Han period end?

**Text number 1**

The Emperor was at the top of Han society. He led the Han government, but shared power with both the nobility and the appointed ministers, who came largely from the learned noble class. The Han Empire was divided into regions, directly controlled by the central government using an innovation inherited from the Qin called command counties, and a number of semi-autonomous kingdoms. These kingdoms gradually lost all vestiges of their independence, especially after the Seven Kingdoms Rebellion. From the reign of Emperor Wu onwards, the Chinese court officially supported Confucianism in education and court politics, and associated it with the cosmology of later scholars such as Dong Zhongshu. This policy continued until the fall of the Qing Dynasty in 1911 AD.

**Question 0**

When did the Qing dynasty fall?

**Question 1**

What innovation was acquired from Qin?

**Question 2**

Which educational philosophy was adopted by the Chinese court?

**Question 3**

What was the factor that caused the loss of independence of empires during the Han Dynasty?

**Question 4**

From which category did most of the appointed ministers come during the Han Dynasty?

**Text number 2**

The Han Dynasty was an era of economic prosperity, and it was during the Zhou Dynasty (circa 1050-256 BC) that the first monetary economy was introduced and grew significantly. The coin issued by the central mint in 119 BC remained the standard coin of China until the Tang Dynasty (618-907 AD). Some limited institutional reforms were made during this period. To finance its military expeditions and the settlement of newly settled frontier areas, the government nationalised the private salt and iron industries in 117 BC, but these state monopolies were abolished during the Eastern Han period. Science and technology developed significantly during the Han period, including paper manufacture, the nautical steering wheel, the use of negative numbers in mathematics, the embossed map, the hydraulically operated arm sphere for astronomy and the reversible pendulum seismometer.

**Question 0**

In what year did the central government issue coins?

**Question 1**

What industry did the government use to finance its military campaigns?

**Question 2**

During which period were several state monopolies abolished?

**Question 3**

The money-based economy was first established during which dynasty?

**Question 4**

What type of pendulum was used in the early Han Dynasty seismometer?

**Text number 3**

Xiongnut, a nomadic alliance of steeds, defeated Han in 200 BC, forcing Han to submit as a de facto inferior partner, but continued to raid the borders of Han. The Han emperor Wu (r. 141-87 BC) launched several military campaigns against them. Han's final victory in these wars finally forced the Xiongnu to accept vassal status as Han subjects. These campaigns extended Han sovereignty into the Tarim Basin of Central Asia, divided the Xiongnu into two separate alliances, and helped to establish a vast trade network known as the Silk Road, which extended as far as the Mediterranean world. The areas north of the Han borders were quickly conquered by the nomadic Xianbei Confederacy. Emperor Wu also launched successful military campaigns in the south, where he annexed Nanyue in 111 BC and Dian in 109 BC, and in the Korean peninsula, where he established the Xuantu and Lelang commanderies in 108 BC.

**Question 0**

Which alliance defeated the Khans in 200 BC?

**Question 1**

What kind of campaign helped to set up Silk Road?

**Question 2**

What year was Nanyue annexed?

**Question 3**

Which alliance conquered the territories north of the Han border?

**Question 4**

In what year did the reign of Emperor Wu of Han end?

**Text number 4**

After 92 AD, the eunuchs of the palace became increasingly involved in court politics and engaged in violent power struggles between the various half-clan of the empress and empress-wives, leading to the final fall of Han. Imperial power also came under serious challenge from the major Daoist religious communities, who launched the Yellow Turban Rebellion and the Five Rice Hills Rebellion. After the death of Emperor Ling (r. 168-189 AD), military officers slaughtered the palace eunuchs, allowing members of the aristocracy and military governors to become warlords and divide the empire. When the Wei King Cao Pi usurped the throne of Emperor Xian, the Han dynasty ceased to exist.

**Question 0**

Which religious communities fuelled the Yellow Turban uprising?

**Question 1**

Who killed the palace eunuchs after the death of Emperor Ling?

**Question 2**

Which king took power from Emperor Xian?

**Question 3**

Who was the last emperor of the Han dynasty?

**Question 4**

What year did Emperor Ling die?

**Text number 5**

China's first imperial dynasty was the Qin dynasty (221-206 BC). The Qin united the warring states of China through conquests, but their empire became unstable after the death of the first emperor, Qin Shi Huangdi. Within four years, the dynasty's power had collapsed due to rebellions. Two former rebel leaders, Chun Xiang Yu (d. 202 BC) and Han's Liu Bang (d. 195 BC), fought a war over who would rule China. China was divided into 18 kingdoms, each loyal to either Xiang Yu or Liu Bang. Although Xiang Yu proved to be a capable commander, Liu Bang defeated him at the Battle of Gaixia (202 BC) in present-day Anhui. Liu Bang took the title 'emperor' (huangdi) at the urging of his supporters, and was posthumously known as Emperor Gaozu (ca. 202-195 BC). Chang'an was chosen as the new capital of the unified empire under Han.

**Question 0**

By what action did Qin unite the warring Chinese states?

**Question 1**

Who did Commander Liu Bang defeat at the Battle of Gaixia?

**Question 2**

Who was the first emperor of the Qin Dynasty?

**Question 3**

What finally caused the collapse of the Qin Dynasty?

**Question 4**

Who urged Liu Bang to become emperor?

**Text number 6**

At the beginning of the Western Han Dynasty, the western third of the empire consisted of thirteen centrally controlled commanderies - including the metropolitan area - while the eastern two-thirds were divided into ten semi-autonomous kingdoms. To satisfy his most prominent commanders after the war with Chu, Emperor Gaozu elected some of them as kings. By 157 BC, the Han court had replaced all these kings with members of the Liu royal family, as the loyalty of non-relatives to the throne was questioned. After several revolts by the Han kings - the largest of which was the Seven Kingdoms Rebellion in 154 BC - the imperial court implemented a series of reforms from 145 BC onwards, limiting the size and power of these kingdoms and dividing their former territories into new, centrally controlled commanderies. The kings could no longer appoint their own staff, but the court took over this function. The kings became the nominal heads of their fiefdoms and collected part of the tax revenue as personal income. The kingdoms were never completely abolished and existed throughout the rest of the Western and Eastern Han period.

**Question 0**

How many commanderies were there in the western third of the empire?

**Question 1**

Who could appoint the staff of kings?

**Question 2**

When was the Seven States Rebellion?

**Question 3**

Where did kings get their personal income from?

**Question 4**

The Han court replaced several kings with members of which royal family?

**Text number 7**

North of China proper, the pastoral Xiongnu chieftain Modu Chanyu (c. 209-174 BC) conquered several tribes in the eastern part of the Eurasian steppes. By the end of his reign, he ruled Manchuria, Mongolia and the Tarim Basin and subdued more than twenty states east of Samarkand. Emperor Gaozu was concerned about the abundant trade in Han-made iron weapons to the Xiongnu on the northern frontier, and imposed an embargo on the group. While the embargo was in place, the Xiongnu found merchants willing to supply their needs. Chinese troops also carried out surprise attacks against Xiongnu traders in the border market. In revenge, the Xiongnu invaded what is now Shanxi province, where they defeated Han forces in Baideng in 200 BC. In a negotiated heqin pact in 198 BC, the Xiongnu and Han leaders were nominally equal partners in a royal marriage alliance, but the Han were forced to send the Xiongnu large amounts of tribute, including silk clothing, food and wine.

**Question 0**

Who was the chief of the Xiongnu?

**Question 1**

Against which group was the embargo created?

**Question 2**

In what year were the Han forces defeated at Baideng?

**Question 3**

Which treaty created equality between the Xiongnu and the Han?

**Question 4**

What kind of clothes were sent as a tribute to Xiongnu?

**Text number 8**

Although Laoshang Chanyu (r. 174-160 BC) and Emperor Wen (r. 180-157 BC) renegotiated tribute and reopened the border market, many of Chanyu's Xiongnu subjects chose not to follow the agreement and occasionally raided Han areas south of the Great Wall for more goods. At a court conference convened by Emperor Wu (r. 141-87 BC) in 135 BC, the majority consensus among the ministers was to maintain the Heqin Treaty. Emperor Wu accepted this, even though the Xiongnu continued to attack. At the court conference the following year, however, the majority was convinced that a limited battle in May, including the assassination of Chanyu, would drive the Xiongnu empire into chaos and benefit Han. When this plot failed in 133 BC. Emperor Wu launched a series of massive military invasions of Xengnu territory. Chinese armies captured fortress after fortress and established agricultural colonies to consolidate their power. The offensive culminated in 119 BC. In 119 BC, the offensive began with the Battle of Mobei, in which Han commanders Huo Qubing (d. 117 BC) and Wei Qing (d. 106 BC) forced the Xengnu court to flee to the north of the Gobi Desert.

**Question 0**

In what year did the court uphold the Heqin contract?

**Question 1**

In what year did Emperor Wu begin a series of invasions of Xiongnu territories?

**Question 2**

What kind of settlement did the Chinese armies use to strengthen their grip on the forts they conquered?

**Question 3**

What year was the Battle of Mobei fought?

**Question 4**

Which Han commander died in 106 BC?

**Text number 9**

In 121 BC. The Han forces expelled the Xiongnu from a vast area stretching from the Hexi Corridor to Lop Nur. In 111 BC they repelled a joint Xiongnu-Qiang attack on this north-western region. In the same year, the Han court established four new frontier commanderies in this area: Jiuquan, Zhangyi, Dunhuang and Wuwei. The majority of the inhabitants of the border area were soldiers. At times, the court forcibly relocated peasant farmers to the new border settlements, as well as state-owned slaves and prisoners in forced labour. The court also encouraged ordinary people, such as farmers, traders, landowners and hired labourers, to move voluntarily to the border.

**Question 0**

Who made up the majority of people in the border region?

**Question 1**

Who forced peasants to move to new places?

**Question 2**

In what year did the Han forces stop the joint Xiongnu-Qiang invasion?

**Question 3**

Where were landowners encouraged to move to voluntarily?

**Question 4**

In 111 BC, how many commanderies did the Han court establish on the new frontier?

**Text number 10**

Even before the Han's expansion into Central Asia, the travels of the diplomat Zhang Qian in 139-125 BC had brought the Chinese into contact with many surrounding civilisations. Zhang encountered Dayuan (Fergana), Kangju (Sogdiana) and Daxia (Bactria, the former Greco-Bactrian kingdom); he also gathered information about Shendu (Indus River Valley in northern India) and Anxi (Parthian Empire). Han embassies were eventually sent to all these countries. These contacts marked the beginning of the Silk Road trade network, which extended into the Roman Empire and brought Han products such as silk to Rome and Roman products such as glassware to China.

**Question 0**

What kind of Roman goods were traded on the Silk Road network?

**Question 1**

Which diplomat helped gather information about Anxi's country?

**Question 2**

When did Zhang Qian end his journey?

**Question 3**

Which network was used to exchange goods with Rome?

**Question 4**

Which empire had set up an embassy in Anxi?

**Text number 11**

From about 115 to 60 BC. Han forces fought the Xiongnu for control of the oasis city-states of the Tarim Basin. The Han eventually won and in 60 BC established a protectorate of the western territories, which took care of the region's defence and foreign affairs. The Han also expanded southwards. The naval conquest of Nanyue in 111 BC extended the Han Empire into the territories of present-day Guangdong, Guangxi and North Vietnam. Yunnan was incorporated into the Han Empire with the conquest of the Kingdom of Dian in 109 BC, and then part of the Korean peninsula with the colonial establishment of the Xuantu and Lelang Commands in 108 BC. The first known nationwide census of China in 2 AD recorded a population of 57 671 400 people in 12 366 470 households.

**Question 0**

What group were the Han forces fighting against in the Tarm Basin?

**Question 1**

When was the first national census conducted in China?

**Question 2**

What was the population of China in 2 AD?

**Question 3**

In what year was the Western Protectorate established?

**Question 4**

Which kingdom did Han conquer in 109 BC?

**Text number 12**

To finance his military expeditions and colonial expansion, Emperor Wu nationalised several private industries. He created centrally-owned monopolies, largely run by former merchants. These monopolies included the production of salt, iron, liquor and bronze coins. The wine monopoly lasted only from 98 to 81 BC, and the salt and iron monopolies were finally abolished at the beginning of the Eastern Han. Money circulation remained a monopoly of the central government throughout the rest of the Han Dynasty. Government monopolies were eventually abolished when a political faction called the reformists gained more influence at court. The reformists opposed the modernist faction that had dominated court politics under Emperor Wu and the subsequent reign of Huo Guang (d. 68 BC). The modernists advocated an aggressive and expansionist foreign policy, supported by revenues from the state's heavy intervention in the private economy. The reformists, however, reversed these policies and advocated a cautious, non-expansionist foreign policy, austerity budget reform and lower tax rates for private entrepreneurs.

**Question 0**

Who made up the majority of the managers of the new state monopolies?

**Question 1**

When was the wine monopoly abolished?

**Question 2**

Which grouping did the reformists oppose?

**Question 3**

Which political group supported the budget reform?

**Question 4**

What year did Huo Guang die?

**Text number 13**

Wang Mang initiated several major reforms that ultimately failed. These reforms included banning slavery, nationalising the land so that it could be shared equally between households, and introducing new currencies, which lowered the value of coins. Despite considerable opposition to these reforms, the Wang regime was finally overthrown in the massive floods of around 3 AD and 11 AD. The gradual accumulation of silt in the Yellow River had raised its water level and overwhelmed flood control efforts. The Yellow River split into two new branches, one flowing north and the other south of the Shandong Peninsula, although the Han engineers managed to dam the southern branch by 70 AD.

**Question 0**

Who tried to ban slavery?

**Question 1**

What caused the water level in the Celta River to rise?

**Question 2**

Who built the dam on the South Fork of the Yellow River?

**Question 3**

What emptied south of the Shandong Peninsula?

**Question 4**

What caused the end of Wang Mang's regime?

**Text number 14**

The period between the establishment of the Han dynasty and the reign of Wang Mang is known as the Western Han dynasty (simplified Chinese: 西汉; traditional Chinese: 西漢; pinyin: Xī Hàn) or the former Han dynasty (simplified Chinese: 前汉; traditional Chinese: 前漢; pinyin: Qiánhàn) (206 BC-9 AD). During this period, the capital was in Chang'an (present Xi'an). From the reign of Guangwu, the capital was moved east to Luoyang. The period from his reign to the fall of Han is known as the Eastern Han Dynasty (simplified Chinese: 东汉; traditional Chinese: 東漢; pinyin: Dōng Hàn) or the Later Han Dynasty (simplified Chinese: 后汉; traditional Chinese: 後漢; pinyin: Hòu Hàn) (25-220 AD).

**Question 0**

Where did the capital move to after Guangwu's reign?

**Question 1**

What era does Guangwu's reign belong to?

**Question 2**

What is the name of the Eastern Han Dynasty?

**Question 3**

Where was the capital located during the Western Han Dynasty?

**Question 4**

What can the Western Han dynasty be called?

**Text number 15**

The Eastern Han, also known as the Later Han, officially began on 5 August 25 August, when Liu Xiu became Emperor Guangwu of Han. During the widespread rebellion against Wang Mang, the Goguryeo state was free to raid Han's Korean commanderies; Han did not reassert control of the region until 30 AD. The Trưng islands of Vietnam rebelled against Han in 40 AD. Their rebellion was crushed by Han general Ma Yuan (d. 49 AD) in a campaign in 42-43 AD. Wang Mang resumed hostilities against the Xiongnu, who were estranged from Han, until their leader Bi (比), a rival to his cousin Punu (蒲奴), submitted to Han as a vassal in 50 AD. Thus two rival Xiongnu states were born: the southern Xiongnu state, led by Han's ally Bi, and the northern Xiongnu state, led by Han's enemy Punu.

**Question 0**

On what day did the Eastern Han Dynasty begin?

**Question 1**

Which state raided the Korean command posts in Han?

**Question 2**

Who started the revolt against Han in 40 AD?

**Question 3**

In what year did Ma Yuan die?

**Question 4**

Who was the leader of the Xiongnu?

**Text number 16**

During Wang Mang's turbulent reign, Han lost control of the Tarim Basin, which was conquered by the northern Xiongnu in 63 AD and used as a base for their attack on Han's Hexi Corridor in Gansu. Dou Gu (d. 88 AD) defeated the northern Xiongnu at the Battle of Yiwulu in 73 AD, driving them out of Turpan and chasing them as far as Lake Barkol before establishing a garrison at Ham. After the new marshal-general of the western regions, Chen Mu (d. 75 AD), was killed by Xengnu allies in Karasahr and Kucha, the garrison at Ham was withdrawn. In the battle of Ikh Bayan in 89 AD, the army of the Khan was destroyed by the Khan's army. Dou Xian (d. 92 AD) defeated the northern Xiongnu chanyu, which retreated to the Altai Mountains. When the northern Xiongnu fled to the Ili River valley in 91 AD, the nomadic Xianbeit occupied the area from the borders of the Buyeo Kingdom in Manchuria to the Ili River of the Wusun people. The Xianbei reached their peak under Tanshihuai (檀石槐) (d. 180 AD), who continually defeated Chinese armies. However, the Tanshihuai alliance collapsed after his death.

**Question 0**

In which pool did Han lose power?

**Question 1**

When did Chen Mu die?

**Question 2**

Where did the northern Xiongnu flee to in 91 AD?

**Question 3**

Who was the Inspector General of the Western Territories?

**Question 4**

Who conquered the Tarim Basin in 63 AD?

**Text number 17**

Ban Chao (d. 102 AD) enlisted the help of Kashgar and its ally Sogdiana to defeat the Kushan Empire, which occupied what is now India, Pakistan, Afghanistan and Tajikistan. When the Kushan ruler Vima Kadphises (c. AD 90-100) was refused a request to marry Han in AD 90, he sent his troops to Wakhan (Afghanistan) to attack Ban Chao. The conflict ended with the Kushans withdrawing due to lack of supplies. In 91 AD, the post of marshal-general of the western regions was reinstated when it was given to Ban Chao.

**Question 0**

Which ruler asked to marry Han in 90 AD?

**Question 1**

Who was the marshal general of the western territories in 91 AD?

**Question 2**

What was the kingdom asked to help subdue Kashgar?

**Question 3**

Which empire sent an army to attack Ban Chao?

**Question 4**

Who was Kashgar's ally?

**Text number 18**

In addition to maintaining tributary relations with the Kushans, the Han Empire received gifts from the Parthian Empire, now king of Burma and ruler of Japan, and in 97 AD began an unsuccessful missionary journey to Daqin (Rome) under Gan Ying's ambassadorship. The Roman mission of Emperor Marcus Aurelius (161-180 AD) is recorded in Hou Hanshu as having arrived at the court of Han Emperor Huan (146-168 AD) in 166 AD, but Rafe de Crespigny argues that it was probably a group of Roman merchants. Other travellers from eastern Han to China included Buddhist monks who translated works into Chinese, such as An Shigao from Parthia and Lokaksema from the Kushan-period Gandhara of India.

**Question 0**

Which member of the Han Empire was sent to Daqin in 97 AD?

**Question 1**

Who translated literary works into Chinese?

**Question 2**

Who arrived at the court of Emperor Huan in 166 AD?

**Question 3**

When did the reign of Emperor Huang begin?

**Question 4**

Which empire sent the Han gifts?

**Text number 19**

Later scholars of Eastern Han considered the reign of Emperor Zhang (c. 75-88 AD) to be the high point of the dynasty. In the reigns that followed, the eunuchs became increasingly involved in court politics and took part in violent power struggles between the imperial clans. Emperor He (r. 88-105 AD), with the help of the eunuch Zheng Zhong (d. 107 AD), had the emperor's widowed wife Dou (d. 97 AD) placed under house arrest and her clan deprived of power. This was in retaliation for Dou's purging the clan of his natural mother, Mistress Liang, and then concealing her identity from him. After the death of Emperor He, his wife, Empress Deng Sui (d. 121 AD), managed the affairs of state as regent-mistress during the turbulent economic crisis and widespread Qiang rebellion of 107-118 AD.

**Question 0**

Who was prevented from leaving their house?

**Question 1**

When did the reign of Emperor He end?

**Question 2**

Who led the state after the death of Emperor He?

**Question 3**

When did the Qiang rebellion end?

**Question 4**

Who hid the identity of Emperor He's mother?

**Text number 20**

When Empress Deng died, Emperor An (r. 106-125 AD) was convinced by the eunuch Li Rui (李閏) and Jiang Jing (江京) that Deng and his family had plotted to overthrow her. An dismissed members of the Deng clan from office, exiled them and forced many to commit suicide. After An's death, his wife, the empress's widow Yan (d. 126 AD), placed the infant Beixiang Marquis on the throne in an attempt to maintain power within her family. However, the palace eunuch Sun Cheng (d. 132 AD) staged a successful coup d'état, resulting in the accession of the Han Emperor Shun (d. 125-144 AD). Yan was placed under house arrest, his relatives were either killed or exiled, and his eunuch allies were slaughtered. Ruler Liang Ji (d. 159 AD), brother of Empress Liang Na (d. 150 AD), had his consort Deng Mengnü (later Empress) (d. 165 AD), a brother-in-law, killed after Deng Mengnü resisted Liang Ji's attempts to rule him. Emperor Huan then used eunuchs to oust Liang Ji, who was then forced to commit suicide.

**Question 0**

Who had forced a large number of members of Empress Deng's clan to kill themselves?

**Question 1**

Which person conspired to overthrow the Empress Dowager Empress Yan's regime?

**Question 2**

Who did Emperor Huan hire to replace Liang Ji?

**Question 3**

Which family's relatives were deported after Sun Cheng overthrew the regime?

**Question 4**

How did Liang Ji die?

**Text number 21**

Students at the Imperial University staged a large student protest against the eunuchs of Emperor Huang's court. Huan further alienated the bureaucracy by embarking on grandiose building projects and hosting thousands of concubines in his harem during an economic crisis. Palace eunuchs imprisoned official Li Ying (李膺) and his associates from the Imperial University on suspicious charges of treason. In 167 AD, the grand chief Dou Wu (d. 168 AD) persuaded his son-in-law Emperor Huan to release them. However, the emperor permanently banned Li Ying and his associates from holding office, marking the beginning of the partisan ban.

**Question 0**

On what charge was Li Ying imprisoned?

**Question 1**

Who was responsible for Li Ying's imprisonment?

**Question 2**

During which crisis did Emperor Huan alienate the bureaucracy?

**Question 3**

Which university students led the protest against the Huan court members?

**Question 4**

When did Dou Wu die?

**Text number 22**

After Huan's death, Dou Wu and the great tutor Chen Fan (陳蕃) (d. 168 AD) attempted a coup against the eunuchs Hou Lan (d. 172 AD), Cao Jie (d. 181 AD) and Wang Fu (王甫). When the plot was uncovered, the eunuchs arrested the Empress Dowager Dou (d. 172 AD) and Chen Fan. General Zhang Huan (張奐) favoured the eunuchs. He and his troops confronted Dou Wu and his servants at the palace gate, with each side shouting accusations of treason against the other. As the servants gradually abandoned Dou Wu, he was forced to commit suicide.

**Question 0**

Who arrested Chen Fan for a failed plot?

**Question 1**

Who accused Dou Wu of treason?

**Question 2**

How did Dou Wu die?

**Question 3**

Which group favoured Zhang Huan?

**Question 4**

What kind of measures were tried to target the eunuchs?

**Text number 23**

The partisan bans were lifted during the Yellow Turban and Five Pecks of Rice rebellions in 184 AD, mainly because the court did not want to continue to alienate a significant part of the noble class that might otherwise have joined the rebellions. The followers of the Yellow Turbans and the Five Pieces of Rice belonged to two different hierarchical Daoist religious communities, led by the faith healers Zhang Jue (d. 184 AD) and Zhang Lu (d. 216 AD). Zhang Lu's rebellion in what is now northern Sichuan and southern Shaanxi was only suppressed in 215 AD. Zhang Jue's massive rebellion, which encompassed eight provinces, was crushed by Han forces within a year, but there were many smaller recurring rebellions in the following decades. Although the Yellow Turban was defeated, many of the generals appointed during the crisis never disbanded their assembled militia forces and used these forces to gather power outside the collapsing imperial rule.

**Question 0**

In which year did the partisan bans end?

**Question 1**

What year did Zhang Lu's rebellion end?

**Question 2**

In how many provinces did the Zhang Jue rebellion take place?

**Question 3**

What kind of healer was Zhang Jue?

**Question 4**

What religion did Zhang Jue practice?

**Text number 24**

Supreme Commander He Jin (d. 189 AD), half-brother of Empress He (d. 189 AD), conspired with Yuan Shao (d. 202 AD) to oust the eunuchs by having several generals march to the outskirts of the capital. There, in a written petition to Empress Hei, they demanded the execution of the eunuchs. After some hesitation, Empress He agreed to the request. However, when the eunuchs found out, they persuaded her brother He Miao (何苗) to revoke the order. He Jin was assassinated by the eunuchs on 22 September 189 AD. Yuan Shao then laid siege to the northern palace of Luoyang, while his brother Yuan Shu (d. 199 AD) laid siege to the southern palace. On 25 September, both palaces were captured and about two thousand eunuchs were killed. Zhang Rang had earlier fled with Emperor Shao (d. 189 AD) and his brother Liu Xie - the future Han Emperor Xian (d. 189-220 AD). In pursuit of the Yuan brothers, Zhang committed suicide by jumping into the Yellow River.

**Question 0**

Who was assassinated on 22 September in 189 AD?

**Question 1**

Who agreed to the execution of the eunuchs?

**Question 2**

Who overturned the execution order on the eunuchs?

**Question 3**

Which family member did Emperor Shao escape with?

**Question 4**

What did Commander General He ask Empress He to do?

**Text number 25**

General Dong Zhuo (d. 192 AD) found the young emperor and his brother wandering in the countryside. He escorted them safely back to the capital and was made Minister of Labour, taking control of Luoyang and forcing Yuan Shao to flee. After Dong Zhuo demoted Emperor Shao and promoted his brother Liu Xie to Emperor Xian, Yuan Shao led a coalition of former officials and officers against Dong, who burned Luoyang to the ground and re-installed the court in Chang'an in May 191 AD. Dong Zhuo later poisoned Emperor Shao.

**Question 0**

How was Luoyang destroyed?

**Question 1**

Who demoted Emperor Shah?

**Question 2**

To what position would young Liu Xie finally be promoted?

**Question 3**

Who had taken over Luoyang?

**Question 4**

When did Dong Zhuo die?

**Text number 26**

After Cao's defeat at the Battle of the Red Rock in 208 AD. China was divided into three spheres of influence: Cao Cao ruled the north, Sun Quan (182-252 AD) the south and Liu Bei (161-223 AD) the west. Cao Cao died in March 220 AD. By December 220, his son Cao Pi (187-226 AD) persuaded Emperor Xian to abdicate the throne, and was posthumously known as Emperor Wen of Wei. This officially ended the Han dynasty and ushered in an era of conflict between three states: the Cao Wei, Eastern Wu and Shu Han.

**Question 0**

Who was defeated at the Battle of the Red Rock in 208 AD?

**Question 1**

To whom did Emperor Xian give his throne?

**Question 2**

Which country was in conflict with Eastern Wu and Shu-Han?

**Question 3**

Who ruled the south of China?

**Question 4**

In which month did Cao Cao Cao die?

**Text number 27**

Each successive value gave its holder more pensions and legal privileges. The highest rank, the full marquis, brought with it a state pension and a regional fief. The holder of the immediately lower rank of ordinary marquis received a pension, but had no territorial power. Government officials belonged to a broader social class of commoners, and their social rank was below that of nobles. The highest civil servants could be rewarded as marquises. During the Eastern Han period, the local elite of unattached scholars, teachers, students and civil servants began to identify themselves as members of a wider, national noble class with shared values and a commitment to mainstream scholarship. As the government became considerably corrupt in the mid to late East Han, many gentlemen considered the cultivation of morally grounded personal relationships even more important than holding public office.

**Question 0**

At what point was it obvious that corruption was widespread in government?

**Question 1**

Which hierarchy offered its holder a breakthrough?

**Question 2**

Which category included people who acted as government officials?

**Question 3**

What was considered more important to some than serving local government?

**Question 4**

Which value is lower than the value of the awning?

**Text number 28**

The farmer, or in particular the small farmer and the peasant, was immediately below the scholars and officials in the social hierarchy. Other peasants, such as tenants, wage labourers and in rare cases slaves, were subordinate. The legal and socio-economic status of artisans and craftsmen was between that of peasants and ordinary merchants. State-registered tradesmen, who by law had to wear white clothes and pay high commercial taxes, were considered by the nobility to be social parasites with a despicable status. They were often petty traders in urban trading posts; merchants such as industrialists and itinerant traders who worked between urban networks could avoid merchant registration, and were often wealthier and more influential than the majority of state officials. Wealthy landowners, such as nobles and officials, often provided accommodation for servants who were doing valuable work or performing duties that sometimes included fighting bandits or riding into battle. Unlike slaves, servants could come and go from their masters' houses at will. Doctors, pig breeders and butchers had a fairly high social status, while occult diviners, runners and messengers had a low status.

**Question 0**

Who were considered to be below the social status of scientists?

**Question 1**

What colour clothes were registered traders obliged to wear?

**Question 2**

Against whom would servants in the service of the nobility sometimes have to fight?

**Question 3**

Who were generally considered by some to be social parasites?

**Question 4**

How could a trader avoid registration?

**Text number 29**

The Han family was patrilineal, with four to five nuclear family members usually living in one household. The extended family members of several generations did not live in the same house, unlike the families of later dynasties. According to Confucian family norms, different members of the family were treated with different degrees of respect and closeness. For example, different time limits were accepted for mourning the death of the father and paternal uncle. Arranged marriages were common, and the father's opinion of his offspring's spouse was considered more important than the mother's. Monogamous marriages were also common, although nobles and high officials were wealthy enough to procure and support concubines as extra mistresses. Under certain circumstances, which were determined by custom, not law, both men and women could divorce their spouses and remarry.

**Question 0**

In general, how many family members lived in a single household during the Han period?

**Question 1**

Whose opinion on the spouse in an arranged marriage was considered more important?

**Question 2**

Who could afford several lovers?

**Question 3**

What was considered a typical Han family?

**Question 4**

What kind of marriage was considered a normal event in this era?

**Text number 30**

Apart from the transfer of noble or gentry titles, there was no succession by marriage, with each son receiving an equal share of the family's property. Unlike in later dynasties, the father usually sent his adult married sons away with their shares of the family property. Daughters received a share of the family property when they married through dowry, although it was usually much smaller than the sons' shares. The distribution of the residual property could be otherwise specified in the will, but it is unclear how common this was.

**Question 0**

Which family member usually sent an adult married offspring away with family property?

**Question 1**

What kind of document could be drawn up for the partial distribution of the inheritance?

**Question 2**

How did the daughters get their share of the family fortune?

**Question 3**

Was it guaranteed that the first-born son would inherit the whole family fortune?

**Question 4**

What kind of title could be inherited?

**Text number 31**

Women were expected to obey the will of their father, then their husband, and in old age, their adult son. However, we know from contemporary sources that this rule was often broken, especially in the case of mothers over their sons and empresses who openly commanded and humiliated their fathers and brothers. Women were exempt from the annual corvée work obligations, but they often engaged in various income-generating occupations alongside domestic chores such as cooking and cleaning.

**Question 0**

Which sex was exempt from the annual ear-work obligations?

**Question 1**

What emotional state do empresses usually put their closest family members in?

**Question 2**

What kind of occupation did women usually take part in?

**Question 3**

Who were women obliged to obey in the old days?

**Question 4**

Which parental figures often avoided common family rules?

**Text number 32**

The early Western Han court simultaneously adopted the philosophical teachings of legalism, Huang-Lao Daoism and Confucianism when making state decisions and formulating government policy. However, the Han court under Emperor Wu gave Confucianism exclusive protection. In 136 BC, he abolished all academic chairs or erudites (bóshì 博士) that did not deal with the five Confucian classics, and encouraged candidates for office to receive a Confucian education at the imperial university he founded in 124 BC. Unlike the original ideology of Confucius, or Kongzi (551-479 BC), Han Confucianism during the reign of Emperor Wu was the creation of Dong Zhongshu (179-104 BC). Dong was a learned and unimportant official who combined ethical Confucian ideas of ritual, filial piety and harmonious relationships with the five stages and yin-yang cosmology. Dong's synthesis justified the ruler's interest in the natural order of the universe in the imperial system of government. The importance of the imperial university grew as the number of students increased to over 30,000 by the 2nd century AD. Confucian education was also offered in the schools of the commandant level, and private schools were opened in small towns, where teachers earned a respectable income from tuition fees.

**Question 0**

Which philosophy was given exclusive court privileges under Emperor Wu?

**Question 1**

Who put an end to all scholars?

**Question 2**

How many students were there at the Imperial University in the second century?

**Question 3**

What kind of philosophy was offered to individuals in the commands?

**Question 4**

Where did teachers get their money from in private schools?

**Text number 33**

Researchers will draft and study some important texts. The philosophical works of Yang Xiong (53 BC - 18 AD), Huan Tan (43 BC - 28 AD), Wang Chong (27-100 AD) and Wang Fu (78-163 AD) questioned whether human nature was innately good or evil, and challenged the universal order of Dong. The Great Historian's Notes, written by Sima Tan (d. 110 BC) and his son Sima Qian (145-86 BC), set the standard for all standard histories of imperial China, including the Book of Han by Ban Biao (3-54 AD), his son Ban Gu (32-92 AD) and his daughter Ban Zhao (45-116 AD). There were also dictionaries such as Shuowen Jiezi by Xu Shen (c. 58 - c. 147 AD) and Fangyan by Yang Xiong. Various noblemen wrote biographies of important people. Poetry in the Han Dynasty was dominated by the fu genre, which reached its greatest importance under Emperor Wu.

**Question 0**

Who had written biographies of important people?

**Question 1**

What kind of poetry had a great influence during the Han Dynasty?

**Question 2**

Who had written the dictionary Fangyan?

**Question 3**

Who was the author of Han's book?

**Question 4**

What was the name of Ban Biao's female descendant?

**Text number 34**

The trial resulted in charges of multiple counts of rape, physical assault and murder. Women were allowed to bring civil and criminal charges against men, although they usually had fewer rights. Although suspects were imprisoned, convicted criminals were never imprisoned. Instead, the punishments were usually monetary fines, forced labour for convicted criminals and the death penalty by beheading. Early Han punishments for torturous mutilation were borrowed from Qin law. Through a series of reforms, the punishment of mutilation was abolished, and beatings by bastinadoes gradually decreased.

**Question 0**

What kind of torture was adopted from Qin law?

**Question 1**

What finally replaced torture as a punishment for mutilation?

**Question 2**

What would be the most extreme punishment likely to be meted out to those who committed the most serious crimes?

**Question 3**

What could the criminal expect not to happen to him during that time if he were convicted of a crime?

**Question 4**

What did women tend to have less of?

**Text number 35**

During the Han period, the most common staple crops were wheat, barley, millet, sorghum, rice and beans. Commonly eaten fruits and vegetables included chestnuts, pears, plums, peaches, melons, apricots, strawberries, red bay berries, jujubes, calabash, bamboo shoots, mustard plants and taro. Chickens, mandarin ducks, geese, cows, sheep, pigs, camels and dogs were also kept as pets (various species were raised specifically for food, but most were used as pets). Turtles and fish were caught in streams and lakes. Commonly hunted game such as owl, pheasant, magpie, pig-deer and Chinese bamboo partridge were eaten. Condiments included sugar, honey, salt and soy sauce. Beer and wine were regularly consumed.

**Question 0**

What was rice considered a crop during that period?

**Question 1**

What dogs were most likely to be kept during this period?

**Question 2**

What type of partridge was commonly eaten?

**Question 3**

Where were the turtles acquired?

**Question 4**

What colour were the bearing berries?

**Text number 36**

Throughout Han China, families ritually sacrificed animals and food to gods, spirits and ancestors in temples and shrines in the belief that these objects could be used by those living in the spiritual realm. It was believed that each person had a two-part soul: the spirit soul (hun 魂), which travelled to the afterlife of the immortals (xian), and the body soul (po 魄), which remained in its tomb or burial chamber on earth and reunited with the spirit soul only through ritual ceremony. These tombs were commonly decorated with uniquely decorated hollow clay tiles, which also served as the tomb's doorframe. These objects, also known as tomb tiles, have holes at the top and bottom of the tile that allow the tile to turn. Similar tiles have been found in the Chengdu area of Sichuan province in south-central China.

**Question 0**

What kind of decoration was often seen on graves?

**Question 1**

What could be done to prevent the door from closing on a burial site?

**Question 2**

What was the name of the afterlife of the immortals during this period?

**Question 3**

What do you call the commonly held concept of the dual nature of the soul?

**Question 4**

For what purpose did the holes above and below the gravestones allow them to be used?

**Text number 37**

Among his many other duties, the emperor served as the highest priest of the land, offering sacrifices to the sky, to the chief deities called the five powers, and to the spirits of the mountains and rivers (shen 神). It was believed that the three kingdoms of heaven, earth and humanity were linked through the natural cycles and five phases of yin and yang. If an emperor did not behave according to proper rituals, ethics and morals, he could upset the delicate balance of these cosmological cycles and cause calamities such as earthquakes, floods, droughts, epidemics and locust swarms.

**Question 0**

Who made sacrifices to the main deities this season?

**Question 1**

What geological event was feared to have been caused by the Emperor's morality?

**Question 2**

What is another term that could be used to describe the main deities?

**Question 3**

How many worlds were commonly thought to be connected through the natural cycle?

**Question 4**

What kind of flock was the Emperor concerned about ethics?

**Text number 38**

It was believed that immortality could be achieved by entering the lands of the Queen Mother of the West or Mount Penglai. In the Han period, Daoists gathered in small groups of hermits who tried to achieve immortality through breathing exercises, sexual techniques and the use of medical elixirs. In the 2nd century AD, Daoists formed large hierarchical religious communities, such as the Way of the Five Rice Branches. Its followers believed that the wise philosopher Laozi (circa 6th century BC) was a holy prophet who offered salvation and good health if his devout followers confessed their sins, renounced the worship of impure gods who accepted meat sacrifices and chanted the Daodejing.

**Question 0**

What was the purpose of breathing exercises for a Daoist?

**Question 1**

What kind of religion did the society of the Five Rice Roads practice?

**Question 2**

What could the prophet Laozi offer in return for confessing his sins?

**Question 3**

What literal work were Laozi's followers expected to sing?

**Question 4**

What could you earn if you had made it to the Queen Mother of the West?

**Text number 39**

Buddhism first arrived in China during the Eastern Han period, and was first mentioned in 65 AD. Liu Ying (d. 71 AD), half-brother of the Han emperor Ming (r. 57-75 AD), was one of its earliest Chinese adherents, although Chinese Buddhism at this time was strongly associated with Huang-Lao Daoism. China's first known Buddhist temple, the Temple of the White Horse, was erected during the Ming dynasty. Important Buddhist canons were translated into Chinese in the 2nd century AD. including the Sutra of the Forty-second Chapter, Perfection of Wisdom, the Shurangama Sutra and the Pratyutpanna Sutra.

**Question 0**

During which period did Buddhism appear in the region?

**Question 1**

When did the reign of Han Emperor Ming end?

**Question 2**

Which philosophical practice did Liu Ying believe in?

**Question 3**

What is believed to have been the first Buddhist temple in the area?

**Question 4**

In which century were important Buddhist concepts translated into Chinese?

**Text number 40**

In the Han government, the emperor was the supreme judge and legislator, the commander-in-chief of the armed forces and the sole appointer, who appointed the official assistants to the highest posts in the central and local governments; those who earned a salary of at least 600 dan. In theory, there were no limits to his power. However, state bodies with competing interests, and institutions such as the court conference (tingyi 廷議), to which ministers were summoned to reach majority consensus on an issue, put pressure on the emperor to accept his ministers' advice on policy decisions. If the emperor rejected the court conference's decision, he risked angering his senior ministers. However, emperors sometimes rejected the majority opinion reached at court conferences.

**Question 0**

Who was responsible for appointing local administrators to the board?

**Question 1**

Was the Emperor able to overrule the opinion of the Court Conference?

**Question 2**

Who often pressured the emperor on local politics?

**Question 3**

What was the emperor's risk if he did not accept the decisions of the Court?

**Question 4**

Who was considered the supreme judge of the Han government?

**Text number 41**

Below the three governors were nine ministers, each of whom headed a specialised ministry. The Minister of Ceremonies was the senior official responsible for religious rites, rituals, prayers and the maintenance of ancestral temples and altars. The Minister of Household was responsible for the security of the emperor within the palace grounds, in the outer imperial parks and wherever the emperor made excursions in his chariot. The Minister of Guards was responsible for securing and guarding the walls, towers and gates of the imperial palaces. The butler was responsible for maintaining the imperial stables, horses, carriages and stalls for the emperor and his palace servants, and for providing horses for the armed forces. The Minister of Justice was the highest official responsible for the maintenance, application and interpretation of the law. The Minister Herald was the chief official responsible for receiving guests of honour at the Imperial Court, such as nobles and foreign ambassadors. The Minister of the Imperial Clan oversaw the Imperial Court's interaction with the nobility of the realm and the extended Imperial family, such as the granting of fiefs and titles. The Minister of Finance was the treasurer of the official bureaucracy and the armed forces, handling tax revenues and setting standards for units of measurement. The Minister Steward served the Emperor exclusively and was responsible for his entertainment and amusements, proper food and clothing, medicines and physical care, valuables and equipment.

**Question 0**

Whose job was it to maintain the imperial stables?

**Question 1**

Whose minister was responsible for interpreting the laws during this period?

**Question 2**

Which minister could you expect to see at the Court of Honour?

**Question 3**

Who gave the emperor food and medical aid?

**Question 4**

Who was responsible for overseeing the interaction between the nobles of the realm and the court?

**Text number 42**

The county was made up of a number of counties and was headed by an administrator. He was the Commandery's chief civil and military officer, dealing with defence, trials, seasonal instructions to farmers and recommendations for candidates to be sent to the capital each year under the quota system first introduced by Emperor Wu. The head of a large district of about 10 000 households was called a prefect, while the heads of smaller districts were called chiefs, and both could be called judges. The magistrate maintained law and order in his county, registered the population for taxation, mobilised ordinary citizens for the annual corvée, repaired schools and supervised public works.

**Question 0**

Which person was typically at the head of the command?

**Question 1**

How many households was the prefect responsible for?

**Question 2**

Who was responsible for law and order in the province?

**Question 3**

Which emperor originally created the quota system?

**Question 4**

Who was responsible for counties with less than 10 000 inhabitants?

**Text number 43**

At the beginning of the Han Dynasty, every male commoner over the age of twenty-three was a conscript. The minimum age of conscription was lowered to twenty after the reign of Emperor Zhao (r. 87-74 BC). Conscript soldiers underwent one year of training and one year of service as non-professional soldiers. The year of training was served in one of three branches of the armed forces: infantry, cavalry or navy. The year of active service was spent either on the frontier, at the royal court or in the capital under a minister of the Guard. A small professional (paid) standing army was stationed near the capital.

**Question 0**

What gender was expected to be called up for the army?

**Question 1**

At what age could an ordinary male citizen expect to be called up for military service?

**Question 2**

How long can a conscripted soldier expect to be in training?

**Question 3**

What was the minimum age at which a soldier could be called up after the end of Emperor Zhao's reign?

**Question 4**

Under which minister could a conscript soldier expect to serve during his year of service?

**Text number 44**

During the Eastern Han period, conscription could be avoided if you paid a reasonable tax. The court of East Han favoured the recruitment of a volunteer army. The volunteer army consisted of the Southern Army (Nanjun 南軍), while the permanent army stationed in and around the capital was the Northern Army (Beijun 北軍). The Northern Army, led by the Colonel (Xiaowei 校尉), consisted of five regiments, each with several thousand soldiers. When the central government collapsed after 189 AD, wealthy landowners, members of the aristocracy/nobility and regional military rulers relied on their servants to act as their personal troops (buqu 部曲).

**Question 0**

How could conscription be avoided?

**Question 1**

Which army was stationed near the capital?

**Question 2**

What army was considered a volunteer army?

**Question 3**

How many regiments were there in the northern army?

**Question 4**

How many soldiers were in each regiment of the Northern Army?

**Text number 45**

The Han dynasty inherited the ban liang coin type from the Qin. At the beginning of the Han period, Emperor Gaozu closed the state mint in favour of the private mint. This decision was reversed in 186 BC by his widow, the Great Dowager Empress Lü Zhi (d. 180 BC), who abolished the private mint. In 182 BC, the private bank was abolished by the late Lü Zhi, who in turn abolished the private bank. Lü Zhi issued a bronze coin that was much lighter than previous coins. This caused widespread inflation, which only slowed down in 175 BC. when Emperor Wen allowed private mints to produce coins weighing exactly 2.6 grams (0.09 oz).

**Question 0**

Where did the Han Dynasty get its coin type?

**Question 1**

Who closed the state mint?

**Question 2**

In what year was the decision reversing the closure of the State Mint implemented?

**Question 3**

Who issued the new lighter coins, which caused a significant amount of inflation because of their weight?

**Question 4**

In what year were private manufacturers allowed to produce coins weighing exactly 2.6 grams?

**Text number 46**

In 144 BC, Emperor Jing abolished private coinage and replaced it with coinage at the level of central government and commanders; he also introduced a new coin. Emperor Wu introduced a second coin in 120 BC, but a year later he abandoned the ban liang altogether and introduced the wuzhu (五銖), weighing 3.2 g. The wuzhu became the standard coin of China until the Tang Dynasty (618-907 AD). Its use was briefly interrupted by the introduction of several new currencies during Wang Mang's reign, until it was reintroduced by Emperor Guangwu in 40 AD.

**Question 0**

Who introduced the new coins in 120 BC?

**Question 1**

Which coin replaced the ban liang after only one year of distribution?

**Question 2**

During which dynasty did the wuzhu cease to be the standard coin?

**Question 3**

What was the mass of the wuzhu coin?

**Question 4**

What interrupted the use of the wuzhu coin during Wang Mang's reign?

**Text number 47**

Smallholders made up the bulk of the Han tax base; this income was threatened in the second half of the eastern Han, when many peasants became indebted and were forced to work as tenants for wealthy landowners. The Han government implemented reforms to keep smallholders debt-free and on their own farms. These reforms included lowering taxes, temporarily suspending taxes, granting loans and providing temporary accommodation and work for landless peasants in agricultural colonies until they could cope with their debts.

**Question 0**

Which group made up the largest share of the Han tax base?

**Question 1**

Who deducted the taxes that landowners and farmers had to pay?

**Question 2**

During which period did a large proportion of peasants become indebted?

**Question 3**

What kind of housing did the Han government provide for landless indebted peasants?

**Question 4**

What did the Han government do to help smaller landowners?

**Text number 48**

In the early days of the Western Han, a wealthy salt or iron industry operator, whether a semi-autonomous king or a wealthy merchant, could boast assets that rivalled the imperial treasury and amass a peasant population of over a thousand. This kept many peasants off their farms and prevented the government from receiving a significant share of the land tax revenue. To remove the influence of such private entrepreneurs, Emperor Wu nationalised the salt and iron industries in 117 BC and allowed many former industrialists to become officials managing the monopolies. In the Eastern Han period, central government monopolies were abolished in favour of commanderial and provincial governments and private businessmen.

**Question 0**

In what year did Emperor Wu monopolise several industries?

**Question 1**

Who allowed industrialists to become civil servants in the industries recently approved by the state?

**Question 2**

During which period were state monopolies privatised once again?

**Question 3**

What did Emperor Wu do to prevent the influence of private entrepreneurs?

**Question 4**

In what era could a wealthy railway entrepreneur compete with the Treasury for funds?

**Text number 49**

Liquor was another profitable private industry, nationalised by the central government in 98 BC. However, this was abolished in 81 BC. , and a property tax of two coins for every 0.2 litre was levied on those trading privately in liquor. By 110 BC, Emperor Wu also intervened in the profitable grain trade by eliminating speculation by selling grain stored by the state at a price lower than that demanded by traders. With the exception of the short-term price regulation and stabilisation bureau set up by Emperor Ming, which was abolished in 68 AD, central government regulations on price regulation were largely absent during the Eastern Han period.

**Question 0**

Which industry was monopolised by the state in 98 BC?

**Question 1**

In which year was the wine industry privatised once again?

**Question 2**

What was missing most often during the Eastern Han?

**Question 3**

What did Emperor Wu sell that offended the traders?

**Question 4**

Which office did Emperor Ming create?

**Text number 50**

Evidence suggests that blast furnaces for making pig iron from raw ore, which can be remelted in a cupola furnace to produce cast iron by cold and hot blasting, were already in operation in China in the late spring and autumn (722-481 BC). There was no blast furnace in ancient China, but the Chinese of the Han period produced wrought iron by injecting excess oxygen into the furnace and causing decarburisation. Cast iron and pig iron could be turned into wrought iron and steel by a process of refining.

**Question 0**

What type of oven was used in China in 722 BC?

**Question 1**

What element was used to make the wrought iron?

**Question 2**

What kind of iron could pig iron be converted into?

**Question 3**

What process was used to transform the different metals into steel?

**Question 4**

What can iron ore be converted into in a blast furnace?

**Text number 51**

During the Han period, the Chinese used bronze and iron to make weapons, cutlery, carpentry tools and household items. A major product of improvements in iron smelting techniques was the manufacture of new agricultural tools. The three-legged iron planter, invented in the 2nd century BC, enabled farmers to carefully plant crops in rows rather than throwing seeds by hand. Also invented during the Han Dynasty, the heavy iron plough required only one man to steer it and two oxen to pull it. It had three ploughs, a seed box for the seed drills, a tool to turn the soil, and could sow about 45 730 m2 (11.3 acres) of land in one day.

**Question 0**

What was the invention that allowed farmers to place their crops in rows?

**Question 1**

How many animals were needed to pull the iron plough?

**Question 2**

How many hectares of land could be successfully sown with a seed box in a day?

**Question 3**

Which method was used to produce new agricultural tools?

**Question 4**

How many people were needed to operate the iron plough?

**Text number 52**

To protect crops from wind and drought, grain agent Zhao Guo (趙過) created a system of alternating fields (daitianfa 代田法) during the reign of Emperor Wu. This system alternated the location of ditches and ridges between growing seasons. When experiments with this system produced successful results, the government officially supported it and encouraged peasants to use it. Han farmers also used the pit-field system (aotian 凹田), which consisted of heavily fertilized pits that did not require ploughing or oxen and could be placed on sloping land. In the southern parts of Han-era China and small parts of central China, rice fields were mainly used, while along the Huai River, farmers used transplanting methods for rice cultivation.

**Question 0**

What helped to ensure the safety of crops from the wind?

**Question 1**

What was the name of the farming system that did not require ploughing?

**Question 2**

What were paddy fields primarily used to grow in smaller areas?

**Question 3**

Which system did the government recommend?

**Question 4**

What was the name of the cereals agent?

**Text number 53**

Wood was the main building material during the Han Dynasty, used to build palace halls, multi-storey residential towers and halls, and single-storey houses. As wood decays rapidly, the only remaining evidence of Han wooden architecture is a collection of scattered ceramic roof tiles. The oldest surviving wooden halls in China date back to the Tang Dynasty (618-907 AD). Architectural historian Robert L. Thorp points to the paucity of Han archaeological remains and argues that historians often use unreliable Han-era literary and artistic sources to obtain clues about lost Han architecture.

**Question 0**

What building materials were mainly used during the Han Dynasty?

**Question 1**

In which dynasty can the oldest wooden buildings in China be dated?

**Question 2**

What is considered the last year of the Tang Dynasty?

**Question 3**

What is the only evidence of wooden structures in Hani?

**Question 4**

What was the most important part of the palace hall during the Han Dynasty?

**Text number 54**

Although the wooden structures of the Han dynasty have decayed, some Han dynasty ruins made of brick, stone and piled earth have survived intact. These include stone pillar gates, brick burial chambers, city walls built of dam walls, lighthouse towers built of dam walls and bricks, parts of the Great Wall built of dam walls, the dam wall platforms that once housed the raised halls, and two dam wall castles in Gansu. The ruins of the pile earth walls that once surrounded the capitals Chang'an and Luoyang still remain, as do their drainage systems, consisting of brick arches, ditches and ceramic water pipes. Monumental stone pillared gates, twenty-nine of which survive from the Han period, formed the entrances to the walls of shrines and tombs. The pillars are artistic imitations of wooden and ceramic building elements such as roof tiles, eaves and balustrades.

**Question 0**

How many stone pillar gates have survived from the Han period?

**Question 1**

Which architectural feature included an imitation of a balustrade?

**Question 2**

What building material was used to construct the tombs?

**Question 3**

What were the walls surrounding the city of Luoyang made of?

**Question 4**

What kind of system uses ceramic water pipes?

**Text number 55**

The evidence for Han-era engineering comes largely from selected illustrative writings by Confucian scholars who have sometimes taken an interest in the subject. Professional craftsmen-mechanics (jiang 匠) did not leave behind detailed notes of their work. Han scholars, who often had little or no expertise in mechanical engineering, sometimes provided inadequate information about the various techniques they described. However, some Han literature does provide crucial information. For example, the philosopher Yang Xiong described in 15 BC his invention of the belt drive of a belt machine in 15 BC, which was of great importance in early textile manufacture. The inventions of the craftsman engineer Ding Huan (丁緩) are mentioned in miscellaneous notes on the western capital. Around 180 AD. Ding invented a hand-operated rotary fan, which was used for air conditioning in palace buildings. Ding also used gimbals to articulate one of his incense burners and invented the world's first known zoetrope lamp.

**Question 0**

Which researchers have proven that mechanical engineering played a significant role during the Han period?

**Question 1**

Which philosopher described the invention of the sleeve?

**Question 2**

Which engineer first invented the zoetrope lamp?

**Question 3**

What can be used as a support structure in incense?

**Question 4**

What invention was used to air-condition the palace buildings?

**Text number 56**

Modern archaeology has led to the discovery of Han artwork depicting inventions that are otherwise missing from Han literary sources. In Han miniature models, but not in the written sources, it was found that the crank handle was used to drive the fans of the sieving machines used to separate grain and chaff. The odometer cart, invented during the Han period, measured the distance travelled using mechanical figures that banged drums and gongs to indicate the distance travelled. This invention is described in Han artwork from the 2nd century AD, but detailed written descriptions were not offered until the 3rd century AD. Modern archaeologists have also unearthed examples of equipment used during the Han dynasty, such as a pair of sliding metal rulers used by craftsmen to make the smallest measurements. These scales bear markings that tell the exact day and year they were made. These tools are not mentioned anywhere in Han's written sources.

**Question 0**

When was the odometer trolley first created?

**Question 1**

What object was used to make very small measurements in this era?

**Question 2**

What has enabled us to discover long-lost Han-era inventions?

**Question 3**

What was used to separate the parts of the grain?

**Question 4**

What was the use of the odometer trolley?

**Text number 57**

The water wheel appears in Chinese documents from the Han period. As mentioned by Huan Tan around 20 AD, they were used to turn gear wheels that lifted iron hammers, and were used to crush, thresh and polish grain. However, there is insufficient evidence of water mills in China before about the 5th century. Du Shi (d. 38 AD), the commander of Nanyang, created a reciprocating waterwheel that ran on bellows for smelting iron. Waterwheels were also used to power chain pumps to pump water into irrigation ditches. The chain pump was first mentioned in China by the philosopher Wang Chong in his 1st century AD work The Balanced Discourse.

**Question 0**

What was used to drive the chain pumps to lift water into the irrigation ditches?

**Question 1**

Which command was the creator of the counter-flow waterwheel?

**Question 2**

Who wrote an essay called The Balancing Debate?

**Question 3**

In which century is the water mill likely to have appeared in China?

**Question 4**

In which era did the waterwheel first appear on recordings?

**Text number 58**

The hand-operated ball, a three-dimensional representation of the movements of the celestial sphere, was invented in Han China in the 1st century BC. The court astronomer Zhang Heng (78-139 AD) was able to use a water clock, a water wheel and gears to mechanically rotate a sacred ball with a metal ring. To solve the problem of the slowing down of the clock, Zhang was the first in China to install an additional tank between the reservoir and the intake basin. In 132 AD, Zhang also invented the seismometer (Houfeng didong yi 候风地动仪), which enabled him to detect the exact cardinal or sequence direction of earthquakes hundreds of kilometres away. It used an upside-down pendulum which, when disturbed by earthquakes, set in motion gears that dropped a metal ball from one of eight dragon mouths (representing all eight directions) into the mouth of a metal toad.

**Question 0**

Who was responsible for inventing the seismometer?

**Question 1**

In what year was the seismometer first invented?

**Question 2**

Which invention included the inverted pendulum?

**Question 3**

How many dragons did the seismometer invented by Zhang Heng represent?

**Question 4**

What was exchanged from mouth to mouth when using the seismometer?

**Text number 59**

Three of Han's mathematical papers still exist. They are a book on numbers and counting, an arithmetic classic on Gnomon and the circles of heaven, and nine chapters on the art of mathematics. Among the mathematical achievements of the Han period are solving problems of right triangles, square roots, cube roots and matrix methods, finding more accurate approximations for pi, mathematical proofs of Pythagoras' theorem, the use of decimal fractions, Gaussian elimination to solve linear equations and continued fractions to find the roots of equations.

**Question 0**

What type of thesis is considered a record of numbers and counting?

**Question 1**

How many mathematical papers have survived to this day?

**Question 2**

What Han-era achievement can be used to help solve linear equations?

**Question 3**

From which era do the nine chapters of Mathematical Art originate?

**Question 4**

What can be used to help find the roots of equations?

**Text number 60**

One of Han's greatest mathematical achievements was the world's first use of negative numbers. Negative numbers first appeared in the nine chapters of Mathematical Art as black bars, while positive numbers were represented by red bars. Negative numbers are used in the ancient Indian Bakhshali manuscript, but the exact date of its composition is not known. The Greek mathematician Diophantos also used negative numbers around 275 AD, but they were not widely accepted in Europe until the 1500s AD.

**Question 0**

In which study did the negative numbers first appear?

**Question 1**

How were negative numbers first described in the Han period?

**Question 2**

In which century did negative numbers become common in Europe?

**Question 3**

Which Indian script also uses negative numbers?

**Question 4**

How were positive numbers described in the Nine Chapters of Mathematical Art?

**Text number 61**

Han-era astronomers adopted a geocentric model of the universe, which theorised that the universe was spherical and surrounded the Earth as its centre. They assumed that the Sun, the Moon and the planets were spherical rather than disc-shaped. They also thought that the Moon and planets were illuminated by sunlight, that lunar eclipses occurred when the Earth blocked sunlight from reaching the Moon, and that solar eclipses occurred when the Moon blocked sunlight from reaching the Earth. Although others disagreed with his model, Wang Chong accurately described the water cycle, where water evaporates into clouds.

**Question 0**

In which era was the geocentric view of the universe introduced?

**Question 1**

Who was able to describe the evaporation process?

**Question 2**

Which object was thought to block sunlight during a lunar eclipse?

**Question 3**

What shape did astronomers believe the Sun would be in this era?

**Question 4**

What did astronomers believe to be the centre of the universe in this region?

**Text number 62**

Chinese literature and archaeological finds show that cartography existed in China before the Han period. The earliest Han maps found were silk maps written in ink, which were found in a tomb of Mawangdu silk texts from the 2nd century BC. General Ma Yuan created the world's first known relief map of rice in the 1st century AD. This date may be revised if the tomb of Qin Shi Huang is excavated and the account of the model map of the empire in the great historian's notes proves to be true.

**Question 0**

What textile were some of the early Han maps made from?

**Question 1**

What kind of building were the silk maps found in?

**Question 2**

Who created the first relief map?

**Question 3**

Where was the first relief map of a food holding created?

**Text number 63**

The Chinese of the Han period sailed different ships from those of earlier periods, such as the tower ship. The junk model was developed and implemented during the Han period. The trains had a square bow and stern, a flat-bottomed hull or carved hull with no keel or sternpost, and fixed transverse bulkheads instead of the structural ribs found on Western ships. In addition, Han ships were the first in the world to be steered by a rudder at the stern, unlike the simpler oar used in river navigation, which enabled them to sail on the open sea.

**Question 0**

What type of boat model was first invented in the Han period?

**Question 1**

In which areas were Han ships able to sail partly thanks to the rudder?

**Question 2**

Which ship model had a flat-bottomed hull?

**Question 3**

In which type of traffic was the steering wheel most likely to be used?

**Text number 64**

The doctors of the Han period believed that the human body was influenced by the same natural forces that governed the entire universe, namely the cosmological cycles and five phases of yin and yang. Each organ of the body was associated with a particular phase. Illness was taken as a sign that the channels of qi or 'vital energy' leading to a particular organ were disturbed. Consequently, Han doctors prescribed medicines that were believed to correct this imbalance. For example, since the wood phase was believed to promote the fire phase, medicines associated with the wood phase could be used to heal the organ associated with the fire phase. To this end, the physician Zhang Zhongjing (c. 150-219 AD) prescribed regulated diets rich in certain foods that were believed to cure certain diseases. It is now known that these diseases were nutritional disorders caused by a lack of certain vitamins in the diet. In addition to diet, Han doctors also prescribed moxibustion, acupuncture and strength training as methods of maintaining health. When the physician Hua Tuo (d. 208 AD) performed surgery, he used anaesthesia to numb the pain of his patients and prescribed a rubbing ointment that was said to speed up the healing of surgical wounds.

**Question 0**

Who believed that the same forces that ruled the universe also ruled the human body?

**Question 1**

What was used during the surgery to relieve patients' pain?

**Question 2**

What was Zhang Zhongjing's occupation?

**Question 3**

How did Zhang Zhongjing try to cure various diseases?

**Question 4**

When did Hua Tuo die?

**Document number 361**

**Text number 0**

Muslims believe that God revealed the Koran to Muhammad through the angel Gabriel (Jibril) gradually over a period of about 23 years, starting on 22 December 609 AD. when Muhammad was 40 years old, and ending in 632, when he died. Muslims consider the Qur'an to be Muhammad's most important miracle, proof of his prophethood and the culmination of a series of divine messages that began with those revealed to Adam and ended with Muhammad. The word "Qur'an" appears some 70 times in the text of the Qur'an, although various names and words are also said to refer to the Qur'an.

**Question 0**

Which angel is believed to have transmitted the Koran to Muhammad?

**Question 1**

On what day did Muhammad start receiving the Koran?

**Question 2**

In the year AD. Muhammad died?

**Question 3**

What is the Arabic variant of Gabriel?

**Question 4**

How many times is the word "Quran" used in the Quran?

**Question 5**

Which devil is believed to have transmitted the Koran to Muhammad?

**Question 6**

On what day did Muhammad stop receiving the Koran?

**Question 7**

In the year AD. Muhammad fell ill?

**Question 8**

What is the Jewish variant of Gabriel?

**Question 9**

How many times is the word "Quran" not used in the Quran?

**Text number 1**

According to the traditional story, several of Muhammad's companions acted as scribes and were responsible for writing the announcements. Soon after Muhammad's death, his companions compiled the Qur'an and wrote down and memorised parts of it. There were differences in these codes that motivated Caliph Uthman to compile a standard version, now known as the Uthman Codex, which is generally regarded as the archetype of the Qur'an we know today. However, there are different ways of reading the Qur'an, most of which have minor differences in meaning.

**Question 0**

Who first recorded the revelations of Mohammed?

**Question 1**

Who was the first to standardise the earliest versions of the Koran?

**Question 2**

What is the name of the first standardised version of the Koran?

**Question 3**

Who was the last person to record the revelations of Mohammed?

**Question 4**

Who was the last person to standardise the earliest versions of the Koran?

**Question 5**

Who was the first to standardise the latest versions of the Koran?

**Question 6**

What is the name of the last standardised version of the Koran?

**Question 7**

By what name is the first standardised version of the Qur'an unknown?

**Text number 2**

The Qur'an assumes that the most important stories told in the scriptures have been studied. It summarises some of them, discusses others in detail, and in some cases presents alternative accounts and interpretations of events. The Qur'an describes itself as a book of guidance. Sometimes it details specific historical events, and often it emphasises the moral significance of an event more than its narrative order. The Qur'an is used in conjunction with the hadith in interpreting Sharia law. During prayers, the Qur'an is read only in Arabic.

**Question 0**

In which language is the Quran spoken during prayer?

**Question 1**

What kind of law is the Koran used to interpret?

**Question 2**

Which stories form the basis of most of the narratives in the Qur'an?

**Question 3**

Which religious text calls itself a manual?

**Question 4**

In which language is the Quran not recited during prayer?

**Question 5**

What kind of law is the Koran not used to interpret?

**Question 6**

The Koran is not used to interpret what kind of law?

**Question 7**

What are the stories on the basis of which none of the stories in the Qur'an is made?

**Question 8**

Which scientific text calls itself a guidebook?

**Text number 3**

The word qurʼān appears about 70 times in the Koran in different senses. It is the verb noun (maṣdar) of the Arabic verb qaraʼa (قرأ), which means 'he read' or 'he recited'. The Syriac equivalent is (ܩܪܝܢܐ) qeryānā, which means 'to read the scriptures' or 'a lesson'. Although some Western scholars attribute the word to the Syriac language, most Muslim authorities consider the origin of the word to be qaraʼa itself. Nevertheless, it had become an Arabic term by the time Muhammad lived. The important meaning of the word is 'recitation', as stated in an early passage of the Qurʼān: 'It is for us to collect it and recite it (qurʼānahu).'

**Question 0**

From which Arabic verb could "Quran" be derived?

**Question 1**

Which Syriac word could be related to the word "Quran"?

**Question 2**

The words that can be used to describe the name "Qur'an" are related to what act?

**Question 3**

What word do most Muslim scholars consider to be the origin of the name of the Quran?

**Question 4**

From which Arabic noun "Qur'an" could it be derived?

**Question 5**

Which Arabic verb "Quran" might not be derived from?

**Question 6**

Which Syriac word is not related to the word "Quran"?

**Question 7**

The words from which the name "Quran" can be described are not related to any act?

**Question 8**

Which word does no Muslim scholar refer to the origin of the Quranic name?

**Text number 4**

The term also has closely related synonyms, which are used throughout the Qur'an. Each synonym has its own distinct meaning, but its use can approximate the use of the Qurʼān in certain contexts. Such terms include kitāb (book), āyah (sign) and sūrah (inscription). The latter two terms also refer to units of revelation. In most contexts, the word is usually referred to by the definite article (al-) as "revelation" (waḥy) that is "sent down" (tanzīl) at certain intervals. Other related words are: dhikr (remembrance), used to refer to the Qur'an in the sense of reminder and warning, and ḥikmah (wisdom), sometimes used to refer to a revelation or part of a revelation.

**Question 0**

Which term used in the Qur'an to refer to itself means "book"?

**Question 1**

What term does the Quran use when it calls itself "holy scripture"?

**Question 2**

What does the Koran mean when it calls itself a hikma?

**Question 3**

What name does the Qur'an use for itself, meaning "revelation"?

**Question 4**

What term is not used in the Quran to indicate that it means "book"?

**Question 5**

What term does the Quran not use when it calls itself "holy scripture"?

**Question 6**

What term does the Qur'an use to refer to itself as "piercing"?

**Question 7**

What meaning does the Koran not take when it calls itself a hikma?

**Question 8**

What name does the Qur'an not use for itself that means "revelation"?

**Text number 5**

The Qur'an describes itself as "discernment" (al-furqān), "mother book" (umm al-kitāb), "guide" (huda), "wisdom" (hikmah), "remembrance" (dhikr) and "revelation" (tanzīl; something that is sent down and signifies the descent of an object from a higher place to a lower place). Another term is al-kitāb (book), although it is also used in Arabic for other writings such as the Torah and the Gospels. The adjective "Qur'an" has several transliterations, such as "quranic", "koranic" and "qur'anic", or with capital letters "Qur'anic", "koranic" and "quranic". The term mus'haf ('written work') is often used to refer to specific manuscripts of the Qur'an, but it is also used in the Qur'an to identify earlier published books. Other transliterations of 'Qur'an' include 'al-Coran', 'Coran', 'Kuran' and 'al-Qurʼan'.

**Question 0**

What is the term "mother book" used by the Qur'an for itself?

**Question 1**

What term is used in the Qur'an to refer to previous revelations?

**Question 2**

What is the Arabic term commonly used to refer to works such as the Torah or the Gospels?

**Question 3**

What is the English translation of the word huda?

**Question 4**

What term, meaning "mother book", does the Qur'an not apply to itself?

**Question 5**

What term is not used in the Qur'an to refer to previous revelations?

**Question 6**

What term is used in the Qur'an to express future revelations?

**Question 7**

What is not the English translation of the word huda?

**Text number 6**

According to Islamic tradition, Muhammad had his first revelation in the cave of Hira during one of his retreats in the mountains. After that he had revelations for 23 years. According to Hadith and Muslim history, after Muhammad had moved to Medina and formed an independent Muslim community, he ordered many of his companions to recite the Qur'an and to learn and teach the laws revealed daily. It is said that some of the Quraysh captured in the Battle of Badr regained their freedom after teaching some Muslims the simple scriptures of the time. Thus a group of Muslims gradually became literate. As originally discussed, the Qur'an was written on tablets, on bones and on the broad, flat ends of date palm leaves. Most surals were in use among early Muslims, as they are mentioned in numerous statements from both Sunni and Shiite sources relating to how Muhammad used the Qur'an as a call to Islam, the way of prayer and the way of recitation. However, the Qur'an did not exist as a book at the time of Muhammad's death in 632. Scholars agree that Muhammad himself did not write down the revelation.

**Question 0**

In which mountain cave did Mohammed have his first revelation?

**Question 1**

Where did Mohammed move to establish a separate Muslim community?

**Question 2**

Which prisoners of war are believed to have helped Muslims learn to write?

**Question 3**

Which tree vegetation served as an early recording medium for the Qur'an?

**Question 4**

When Mohammed dies, what had not yet been compiled into a book?

**Question 5**

In which mountain cave did Mohammed have his last revelation?

**Question 6**

Where did Mohammed not move to find a separate Muslim community?

**Question 7**

Which prisoners of war are believed to have helped Muslims learn to sing?

**Question 8**

Which tree's vegetation later served as a storage medium for the Qur'an?

**Question 9**

When Muhammad dies, what was compiled into a book?

**Text number 7**

The Quran describes Muhammad as "ummi", which is traditionally interpreted as "illiterate", but the meaning is much more complex. Medieval commentators, such as Al-Tabari, argued that the term had two meanings: firstly, the inability to read or write in general and secondly, inexperience or ignorance of previous books or writings (but they gave preference to the first meaning). Muhammad's illiteracy was taken as a sign of the authenticity of his prophethood. For example, according to Fakhr al-Din al-Raz, if Muhammad had been able to read and write, he might have been suspected of having studied the books of the ancestors. Some scholars, such as Watt, prefer another meaning of "umm" - they believe it refers to his lack of knowledge of earlier sacred texts.

**Question 0**

What is the most common interpretation of the word "ummi" that the Quran applies to Muhammad?

**Question 1**

Since Muhammad was an "ummi", what would he not have known that would have given credibility to his prophethood?

**Question 2**

What term does the Quran use to describe Mohammed's lack of familiarity with the scriptures?

**Question 3**

What skills would have made others suspect that Mohammed did not receive his revelations as he said?

**Question 4**

What is the rarest interpretation of the word "ummi" that the Quran applies to Muhammad?

**Question 5**

What is the most common misinterpretation of the word "ummi" applied to Muhammad in the Quran?

**Question 6**

Since Muhammad was an "ummi", what would he have known that would have given credibility to his prophethood?

**Question 7**

What term does the Quran not use to describe Mohammed's lack of familiarity with the scriptures?

**Question 8**

What skills would have made others more doubtful that Mohammed received his revelation in the way he said?

**Text number 8**

According to earlier reports, in 632, after Muhammad's death, a number of his companions who knew the Qur'an by heart were killed in the battle of Musaylimah, and the first caliph Abu Bakr (d. 634) decided to collect the book in a single volume in order to preserve it. Zayd ibn Thabit (d. 655) was the person who collected the Qur'an because "he used to write with divine inspiration on behalf of Allah's Apostle". Thus, a group of scribes, Zayd being the most important, collected the verses and produced a handwritten manuscript of the entire book. According to Zayd, the manuscript remained with Abu Bakr until his death. Zayd's reaction to the task and the difficulties of collecting the Qur'an from parchments, palm leaves, thin stones and men who knew it by heart are recorded in earlier accounts. After Abu Bakr, the manuscript was entrusted to Hafsa bint Umar, Muhammad's widow. Around 650, the third caliph Uthman ibn Affan (d. 656) began to notice slight differences in the pronunciation of the Qur'an as Islam expanded beyond the Arabian Peninsula into Persia, the Levant and North Africa. In order to preserve the sanctity of the text, he ordered a committee led by Zayd to use a copy of Abu Bakr and to produce a standard copy of the Qur'an. Thus the Qur'an was written within 20 years of Muhammad's death. This text became the model from which copies were made and distributed throughout the urban centres of the Muslim world, and other versions are believed to have been destroyed. Muslim scholars accept the current form of the Qur'anic text as the original version written by Abu Bakr.

**Question 0**

Which caliph decided to keep the Koran as a single book after some of Muhammad's companions had died in battle?

**Question 1**

Which scribe led the production of the first written Quran?

**Question 2**

What year did Abu Bakr die?

**Question 3**

Who took over the first manuscript of the Koran after Abu Bakr?

**Question 4**

Who was the caliph who ordered the manuscript of the Qur'an to be copied and standardised?

**Question 5**

Which caliph decided to keep the Koran as a single book after some of Muhammad's companions were saved in battle?

**Question 6**

Which scribe was in charge of producing the last written Quran?

**Question 7**

What year did Abu Bakr survive?

**Question 8**

Who took over the last manuscript of the Quran after Abu Bakr?

**Question 9**

Which caliph ordered the manuscript of the Koran to be copied and destroyed?

**Text number 9**

In 1972, manuscripts were discovered in a mosque in the Yemeni city of Sana'a, which later proved to be the oldest Quranic texts known to exist at the time. The Sana'a manuscripts contain palimpsests, or manuscript pages from which the text has been washed away to make the parchment usable again - a practice that was common in ancient times due to the scarcity of writing materials. However, the lightly washed text (scriptio inferior) is still barely visible and is believed to be 'pre-Uthman' Qur'anic content, while the superimposed text (scriptio superior) is believed to date from the time of Uthman. Radiocarbon dating studies show that there is a 99% probability that the parchments predate 671 AD.

**Question 0**

What is the term for the recycled parchments used in ancient manuscripts?

**Question 1**

Before what year were the manuscripts of the Word produced?

**Question 2**

In 1972, in which city was evidence of Quranic writing before the time of Uthman found?

**Question 3**

Which version of the Qur'an was the superior manuscript of the Sana'a manuscripts?

**Question 4**

What is the term for recycled parchments not used in ancient manuscripts?

**Question 5**

What is the term for recycled parchments used in modern manuscripts?

**Question 6**

After which year were the manuscripts for Sana completed?

**Question 7**

In 1927, in which city was evidence of Quranic writing before the time of Uthman found?

**Question 8**

Which version of the Qur'an was the inferior script of the Sana'a manuscripts?

**Text number 10**

In 2015, fragments of a very early Koran dating back to 1370 were discovered in the University of Birmingham Library in England. According to tests by the University of Oxford's Radiocarbon Accelerator Unit, "there is a more than 95% probability that the parchment dates from between 568 and 645". The manuscript is written in the Hijazi script, an early form of the Arabic script. It is possibly the earliest surviving copy of the Qur'an, but as the tests allow for several possible dates, it is not possible to say with certainty which of the existing versions is the oldest. The Saudi scholar Saud al-Sarhan has expressed doubts about the age of the fragments because they contain dots and number separators that are believed to have been created later.

**Question 0**

How many years old were the Quran fragments found in Birmingham in 2015?

**Question 1**

In what script were the fragments of the Birmingham Qur'an written?

**Question 2**

Which modern spelling derives from the spelling of the Birmingham Qur'an fragments?

**Question 3**

What feature of the text of the Birmingham Qur'an fragments leads some to suspect that it is older than other known versions of the Qur'an?

**Question 4**

How many years old were the pieces of the Koran found in Birmingham in 1915?

**Question 5**

How many years old were the pieces of the Koran that went missing in Birmingham in 2015?

**Question 6**

Which script was not used for the Birmingham Qur'an fragments?

**Question 7**

Which non-modern spelling derives from the spelling of the Birmingham Qur'an fragments?

**Question 8**

What feature of the text of the Birmingham Qur'an fragments leads some to suspect that it is more recent than other known versions of the Qur'an?

**Text number 11**

For many Muslims, respect for the written text of the Koran is an important part of their religious faith, and the Koran is treated with respect. Based on tradition and a literal interpretation of 56:79 ("only the pure may touch"), some Muslims believe that they must perform ritual purification with water before touching a copy of the Qur'an, although this view is not universal. Worn copies of the Qur'an are wrapped in cloth and stored in a safe place for the time being, buried in a mosque or Muslim cemetery, or burned and the ashes buried or sprinkled with water.

**Question 0**

What passage in the Koran inspires some Muslims to ritually wash themselves before touching their copy?

**Question 1**

What to do with the ashes of the burnt copies of the Koran?

**Question 2**

In which state are copies of the Koran sometimes wrapped in cloth and buried?

**Question 3**

What are the safest places to exchange an old copy of the Koran?

**Question 4**

Which passage in the Qur'an instructs all Muslims to ritually wash themselves before touching their copy?

**Question 5**

What passage in the Koran inspires some Jews to ritually wash themselves before touching their copy?

**Question 6**

What not to do with the ashes of burnt copies of the Koran?

**Question 7**

In which state are copies of the Koran never wrapped in cloth and buried?

**Question 8**

What are the safest places to keep a more recent copy of the Quran?

**Text number 12**

Qur'anic inimitability (or "I'jaz") is the belief that no human speech matches the Qur'an in content and form. Muslims regard the Qur'an as an inimitable miracle, valid until the day of resurrection - and thus as the central proof granted to Muhammad to prove his prophetic status. The concept of inimitability comes from the Qur'an, where in five different verses opponents are challenged to produce something like the Qur'an: "If men and spirits were to join forces to produce something like this Qur'an, they would never produce anything like it, even if they supported each other." So the suggestion is that if there is any doubt about the divine authorship of the Quran, step forward and create something like it. From the ninth century onwards, numerous works appeared examining the Qur'an and examining its style and content. Medieval Muslim scholars, such as al-Jurjani (d. 1078) and al-Baqillani (d. 1013), wrote treatises on the subject, discussed various aspects of it and used linguistic approaches to study the Qur'an. Others argue that the Qur'an contains noble ideas, has intrinsic meanings, has retained its freshness over time and has caused great changes at the individual level and in history. Some scholars argue that the Qur'an contains scientific knowledge that agrees with modern science. The Qur'an's doctrine of miracles is further underlined by Muhammad's illiteracy, since an illiterate prophet could not have been suspected of writing the Qur'an.

**Question 0**

Which term refers to the fact that the contents of the Quran cannot be repeated in speech?

**Question 1**

Until when is the Quran believed to be valid?

**Question 2**

What year did the medieval Muslim scholar al-Baqillani die?

**Question 3**

Which Muslim scholar studied the inimitability of the Koran until his death in 1078?

**Question 4**

Which term refers to the fact that the contents of the Qur'an should be repeated in speech?

**Question 5**

Until what date is the Koran not believed to be valid?

**Question 6**

In what year did the medieval Muslim scholar al-Baqillani survive his illness?

**Question 7**

Which Muslim scholar studied the inimitability of the Koran until his death in 1087?

**Question 8**

Which Jewish scholar studied the inimitability of the Koran until his death in 1078?

**Text number 13**

The Quran consists of 114 chapters of different lengths, each of which is called a surah. The sura is classified as Meccan or Medinan depending on whether the verses were revealed before or after Muhammad's move to Medina. However, a sura classified as Medinan may contain Meccan verses and vice versa. Sura headings are derived from the name or attribute discussed in the text or from the first letters or words of the sura heading. The sura are arranged in roughly descending order. The order of the sura is therefore not related to the order of revelation. Each sura except the ninth begins with Bismillah (بسم الله الرحمن الرحيم), an Arabic expression meaning "in the name of God". However, there are 114 more occurrences of Bismillah in the Qur'an, as it appears in Qur'an 27:30 as the opening of Solomon's letter to the Queen of Sheba.

**Question 0**

What is the name of a chapter in the Quran?

**Question 1**

How many surahs are there in the Koran?

**Question 2**

Which two urban categories are shared by the Qur'anic suralas?

**Question 3**

What determines the order in which the Qur'anic surals are placed in the Qur'an?

**Question 4**

Which Arabic phrase opens almost all suras?

**Question 5**

What is not the name of a chapter in the Koran?

**Question 6**

How many surahs are not in the Koran?

**Question 7**

Which three urban categories are shared by the Qur'anic suralas?

**Question 8**

Which two urban categories multiply the Qur'anic surals?

**Question 9**

What determines the order in which there are no surals in the Qur'an?

**Text number 14**

In addition to the division of the Qur'an, and regardless of how it is divided into surahs, there are different ways of dividing the Qur'an into roughly equal lengths to make it easier to read. 30 juz' (plural ajzāʼ) can be used to read the entire Qur'an in a month. Some of these sections are known by the names of the first words with which the juzʼ begin. The juzʼ is sometimes further divided into two ḥizb (plural aḥzāb), and each hizb is divided into four rubʻ al-ahzab. The Qur'ān is also divided into seven roughly equal parts, manzil (plural manāzil), so that it can be recited in a week.

**Question 0**

Which Quranic verse is used for the month-long reading?

**Question 1**

How many ajzahs cover the entire Qur'an?

**Question 2**

How many ahzabs are there in a juz?

**Question 3**

What is the term for the subsection of hizb?

**Question 4**

What verse is used for the recitation of the Qur'an for a week?

**Question 5**

Which part of the Qur'an is not used for a month's worth of reading?

**Question 6**

How many ajzāa cover the partial Qur'an?

**Question 7**

How many ahzabs are not in the juz?

**Question 8**

What is not a term for a subset of hizb?

**Question 9**

Which verse is unused for a week-long recitation of the Qur'an?

**Text number 15**

The content of the Koran is related to the fundamental beliefs of Islam, such as the existence of God and the resurrection. The Qur'an also contains stories about the early prophets, ethical and legal issues, historical events in the time of Muhammad, charity and prayer. The verses of the Qur'an contain general exhortations about right and wrong, and historical events are linked to the outlining of general moral teachings. Muslims have interpreted the verses relating to natural phenomena as evidence of the authenticity of the Qur'anic message.

**Question 0**

Which verses of the Qur'an do Muslims think confirm its content?

**Question 1**

What events does the Qur'an narrate to support its moral teachings?

**Question 2**

Among the holy books, whose historical narratives from which era are unique in the Qur'an?

**Question 3**

Which Qur'anic verses about phenomena do Muslims consider to be inauthentic?

**Question 4**

What kind of phenomena do the Qur'anic verses about which the Jews believe they have proved its content?

**Question 5**

What events does the Qur'an not mention in support of its moral teachings?

**Question 6**

Which events does the Quran not link to each other to support its moral teachings?

**Question 7**

Historical narratives from an era not unique among the Qur'anic holy books?

**Text number 16**

The Last Day and eschatology (the final fate of the universe) can be considered the second great doctrine of the Qur'an. It is estimated that about a third of the Qur'an is eschatological, i.e. it deals with the afterlife in the next world and the Day of Judgement at the end of time. Most pages of the Qur'an refer to the afterlife, and belief in the afterlife is often mentioned together with belief in God, as in the general expression: 'Belief in God and the Last Day'. Several suralas, such as 44, 56, 75, 78, 81 and 101, relate directly to the afterlife and preparations for it. Some surahs refer to the imminence of the event and warn people to prepare for the approaching day. For example, the first verses of Sura 22, which deal with the great earthquake and the human situation on that day, represent this style of divine address: 'O people! O people, honour your Lord. The hour of the earthquake is a mighty thing."

**Question 0**

Which part of the Quran deals with eschatology?

**Question 1**

What is the general subject of eschatology?

**Question 2**

Which natural disaster is occurring in Sura 22?

**Question 3**

What topic is common to sura 44, 56, 75 and 101?

**Question 4**

Which part of the Qur'an deals with emmatology?

**Question 5**

What general topic does eschatology not cover?

**Question 6**

What unnatural disaster occurs in Sura 22?

**Question 7**

Which natural disaster is occurring in Sura 32?

**Question 8**

What topic is common to sura 44, 65, 75 and 101?

**Text number 17**

According to the Koran, God communicated with people and made his will known through signs and revelations. The prophets, or "messengers of God", received revelations and delivered them to mankind. The message was identical and intended for all mankind. "Nothing is said to you that was not said to the messengers before you, that your Lord has commanded forgiveness and the severest punishment." The revelation does not come directly from God to the prophets. The angels who act as God's messengers deliver divine revelation to them. This is clear from Qur'an 42:51, which states, "It is not for any mortal that God should speak to them except by revelation, or from behind a veil, or by sending a messenger who, with His permission, reveals what He wills."

**Question 0**

In what form does the Quran say God sends his message to people?

**Question 1**

Who acts as an intermediary between God and the prophets?

**Question 2**

Where in the Qur'an is it described that God intervenes between Himself and His prophets?

**Question 3**

How does the Qur'an illustrate how similar messages have been given by God throughout human history?

**Question 4**

Which people are God's messengers?

**Question 5**

In what form does the Qur'an say that God does not send his messages to people?

**Question 6**

Who stands between Jesus and the prophets?

**Question 7**

In which part of the Qur'an is it described that Muhammad used intermediaries between himself and his prophets?

**Question 8**

How does the Qur'an illustrate the differences in God's messages throughout human history?

**Question 9**

Which non-humans are God's messengers?

**Text number 18**

In the Qur'an, faith is a fundamental element of morality, and scholars have tried to define the semantic content of "faith" and "believer" in the Qur'an. The ethical-legal concepts and exhortations dealing with righteous behaviour are linked to a profound awareness of God and thus emphasise the importance of faith, responsibility and belief in the ultimate encounter of every human being with God. People are called upon to practice charity, especially towards the needy. Believers who "spend their wealth night and day, in secret and in public" are promised that they "will receive their reward from their Lord; they shall not be afraid nor need they be troubled". It also strengthens family life by enacting laws on marriage, divorce and inheritance. Several practices, such as usury and gambling, are banned. The Koran is one of the basic sources of Islamic law (Sharia). The Qur'an devotes much attention to some formal religious practices, such as formal prayers (salat) and fasting during the month of Ramadan. As regards the way of performing prayer, the Qur'an refers to bowing down to the ground. The expression for charity, zakat, literally means purification. According to the Qur'an, charity is a means of self-purification.

**Question 0**

What state of mind is the basis of morality as described in the Qur'an?

**Question 1**

What financially related acts are prohibited by the Quran?

**Question 2**

What is the name of the formal prayer forbidden by the Quran?

**Question 3**

Which month in the Qur'an is meant for fasting?

**Question 4**

The Quran uses the term, which also means purification, of what social act?

**Question 5**

What physical state is the basis of morality as described in the Qur'an?

**Question 6**

What non-financial acts are prohibited by the Quran?

**Question 7**

What is the name of the informal prayer forbidden by the Koran?

**Question 8**

Which month is no longer mentioned in the Qur'an for fasting?

**Question 9**

The Quran uses the term, which also means to pollute, from what social act?

**Text number 19**

Astrophysicist Nidhal Guessoum is highly critical of the pseudoscientific claims made about the Quran, but he has stressed that the Quran encourages science by developing the "concept of knowledge". He writes: "The Qur'an draws attention to the danger of conjecture without evidence (Do not follow that of which you have no (certain) knowledge...). 17:36) and in several verses asks Muslims to demand evidence (Say: Bring your evidence if you are truthful 2:111) in matters of both theological faith and science." Guessoum quotes Ghaleb Hasan as saying that "proof" in the Qur'an is "clear and strong... convincing proof or argument". Such proof cannot rely on an argument from authority either, and he cites verse 5:104. Finally, both assertions and rejections require evidence, according to verse 4:174. Ismail al-Faruqi and Taha Jabir Alalwani argue that the revival of Muslim civilization must start from the Qur'an; however, the main obstacle to this path is the "centuries-old legacy of tafseerism (exegesis) and other classical sciences", which prevents a "universal, epidemiological and systematic understanding" of the Qur'anic message. The philosopher Muhammad Iqbal considered the methodology and epistemology of the Qur'an to be empirical and rational.

**Question 0**

Which astrophysicist has written about how the Quran encourages scientific thinking?

**Question 1**

Qur'anic verse 2:111 supports what aspect of scientific thought and practice?

**Question 2**

To whose scholarship on the concept of Quranic witness is Guessoum appealing?

**Question 3**

Which philosopher believed that the Koran had a rational and empirical basis like science?

**Question 4**

Which astrobiologist has written about how the Quran encourages scientific thinking?

**Question 5**

Which astrophysicist has written about how the Koran hinders scientific thinking?

**Question 6**

Qur'anic verse 2:111 supports what aspect of unscientific thinking and practice?

**Question 7**

Whose Quranic scholarship on the concept of testimony is not cited by Guessoum?

**Question 8**

Which philosopher believed that the Koran had an irrational and empirical basis like science?

**Text number 20**

It is generally accepted that the Qur'an contains about 750 verses dealing with natural phenomena. In many of these verses, the study of nature is "encouraged and highly recommended", and historical Islamic scholars such as Al-Biruni and Al-Battani were inspired by Qur'anic verses. Mohammad Hashim Kamali has stated that "scientific observation, experimental knowledge and rationality" are the primary means by which humanity can achieve the goals set for it in the Qur'an. Ziauddin Sardar argued that Muslims have developed the basis of modern science, highlighting the Qur'an's repeated injunctions to observe and reflect on natural phenomena. "The 'scientific method', as it is understood today, was first developed by 'Muslim scientists' such as Ibn al-Haytham and Al-Biruni, as well as numerous other Muslim scientists.

**Question 0**

How many verses in the Qur'an mention nature and its phenomena?

**Question 1**

Al-Battani is an example of a Muslim scholar who drew inspiration from what text?

**Question 2**

Who recommended science as a means to achieve the goals of the Koran?

**Question 3**

Who claimed that the Qur'an inspired the first practitioners of the scientific method we use today?

**Question 4**

Al-Biruni is an example of a scholar of which religion?

**Question 5**

How many verses in the Qur'an do not mention nature and its phenomena?

**Question 6**

Al-Battani is an example of a Muslim scholar who rejected inspiration from what text?

**Question 7**

Who rejected science as a means to achieve the goals of the Koran?

**Question 8**

Who claimed that the Qur'an inspired the last practitioners of the scientific method we use today?

**Question 9**

Al-Biruni is an example of an artist of which religion?

**Text number 21**

Physicist Abdus Salam quoted a well-known verse from the Koran (67:3-4) in his Nobel Prize speech and then stated: "The deeper we search, the more our wonder becomes heightened, the more our gaze is dazzled". One of Salami's central beliefs was that there is no contradiction between Islam and the discoveries that science allows mankind to make about nature and the universe. Salam also believed that the Qur'an and the Islamic spirit of study and rational reflection were the source of an exceptional civilisation. Salam particularly emphasises the work of Ibn al-Haytham and al-Biruni as pioneers of empiricism, who introduced the experimental approach, broke away from the influence of Aristotle and thus gave birth to modern science. Salam was also careful to distinguish between metaphysics and physics, and urged against empirical investigation of certain matters about which "physics is and remains silent", such as the doctrine of "creation out of nothing", which Salam considered to be outside the bounds of science and thus "giving room" to religious considerations.

**Question 0**

Which physicist quoted the Koran in his speech after winning the Nobel Prize?

**Question 1**

Which verse of the Koran did Abdus Salam quote at his Nobel Prize ceremony?

**Question 2**

Which two Muslim scientists are celebrated by Salam as the inventors of empirical methods?

**Question 3**

Salam suggests that physics and science be kept separate, which subjects are better suited to religion?

**Question 4**

Which biologist quoted the Koran in his Nobel Prize speech?

**Question 5**

Which verse of the Koran did Abdus Salam not quote at his Nobel ceremony?

**Question 6**

Which two Muslim scientists are celebrated by Salam as the inventors of the unemployed method?

**Question 7**

Salam suggests that physics and science be held together, on what subjects that are more suited to religion?

**Question 8**

Salam suggests that physics and science be kept separate from what subjects are less suited to religion?

**Text number 22**

The language of the Qur'an has been described as "rhymed prose" because it contains both poetry and prose; however, this description runs the risk of not reflecting the rhythmic quality of the Qur'anic language, which is more poetic in some passages and more prosaic in others. Although rhyming occurs throughout the Qur'an, it is conspicuous in many of the earlier Meccan surahs, where relatively short verses emphasize rhyming words. The effectiveness of such a form is evident in Sura 81, for example, and there is no doubt that these passages impressed the conscience of the listeners. Often the change of rhyme from one verse to another marks a change in the subject of the conversation. In later episodes this form is also preserved, but the style is more explanatory.

**Question 0**

Which description of the Qur'anic scripture highlights its poetic aspect?

**Question 1**

Which Qur'anic surahs are particularly rhythmic?

**Question 2**

What often changes with the rhyming of verses from the Koran?

**Question 3**

Which parts of the Quran are the least poetic?

**Question 4**

Which description of the reading of the Qur'an highlights its poetic aspect?

**Question 5**

Which description of the Quranic scripture highlights its unethical side?

**Question 6**

Which Qur'anic surahs are particularly rhythmless?

**Question 7**

What often remains the same while rhyming verses of the Koran?

**Question 8**

Which parts of the Koran are the most poetic?

**Text number 23**

The text of the Koran seems to have no beginning, middle or end, but its non-linear structure resembles a web. The order of the text is sometimes considered to be discontinuous, lacking chronological or thematic order, and repetitive. Michael Sells, citing the work of the critic Norman O. Brown, acknowledges Brown's observation that the apparent disorder of the Qur'an's written expression - in Sells' words, its fragmented or fragmentary compositional style - is in fact a literary device capable of producing profound effects, as if the intensity of the prophetic message crushed the medium of human language by which it was conveyed. Sells also discusses the much-debated repetition of the Qur'an, which he also considers a literary device.

**Question 0**

What is missing from the arrangement of the Quranic text?

**Question 1**

Which critic is Michael Sells referring to on the question of the disorder of the Koran?

**Question 2**

How does Sells describe the recurrence of the Koran?

**Question 3**

Which scholar believes that the fragmentary writing style of the Qur'an is an effective literary means of conveying the prophetic message?

**Question 4**

What is remarkable about the order of the Quranic text?

**Question 5**

Which critic is Michael Sells not referring to for the disorganization of the Quran?

**Question 6**

Which critic is Michael Sells referring to when he asks about the ordering of the Qur'an?

**Question 7**

How does Sells describe the non-repetition of the Qur'an?

**Question 8**

Which scholar believes that the fragmentary writing style of the Quran is not an effective literary vehicle for a prophetic message?

**Text number 24**

A text is self-referential when it speaks about itself and refers to itself. According to Stefan Wild, the Qur'an demonstrates this metatextuality by explaining, classifying, interpreting and justifying the words it conveys. Self-referentiality is manifested in those passages where the Qur'an refers to itself as revelation (tanzil), memory (dhikr), news (naba'), criterion (furqan) in a self-naming manner (explicitly asserting its divinity: 'And this is the blessed memory which We have sent down; do you now deny it?"), or in the frequent occurrence of "Say" when Muhammad is commanded to speak (e.g., "Say: 'The guidance of God is the right guidance' ", "Say: 'Would you then like to argue with us about God?' "). According to Wild, the Qur'an is very self-referential. The feature is more evident in the early Meccan surahs.

**Question 0**

Which metatextual figure does Stefan Wild focus on in his discussion of the Qur'an?

**Question 1**

What quality does the Qur'an claim in the different ways it refers to itself?

**Question 2**

What is the term used by the Qur'an itself for "news"?

**Question 3**

The Koran is more self-referential where its surahs?

**Question 4**

Which metatextual figure does Stefan Wild not focus on in his discussion of the Qur'an?

**Question 5**

What quality does the Qur'an not claim in the various ways it refers to itself?

**Question 6**

What quality does the Qur'an claim in the same ways it refers to itself?

**Question 7**

Which term used in the Qur'an for itself does not mean "news"?

**Question 8**

The Koran is less self-referential where in its surahs?

**Text number 25**

Tafsir is one of the earliest academic activities of Muslims. According to the Qur'an, Muhammad was the first person to describe the meanings of the verses to early Muslims. Other early exegetes were some of Muhammad's companions, such as ʻAli ibn Abi Talib, ʻAbdullah ibn Abbas, ʻAbdullah ibn Umar and Ubayy ibn Kaʻb. Exegesis at that time was limited to explaining the literary aspects of a verse, the background to its appearance and sometimes interpreting one verse by means of another verse. If the verse dealt with a historical event, sometimes a few of Muhammad's traditions (hadith) were recounted to make its meaning clear.

**Question 0**

What is the name of the activity that explains what the verses of the Quran mean?

**Question 1**

Who was the first Tafsir practitioner?

**Question 2**

What is the Arabic term for Quranic exegesis?

**Question 3**

Who were 'Ali ibn Abi Talib and 'Abdullah ibn 'Abbas?

**Question 4**

What is the name of the activity that does not explain what the verses of the Koran mean?

**Question 5**

Who was the last carrier of Tafsir?

**Question 6**

Who was the first Tafsir reject?

**Question 7**

What is not an Arabic term for Quranic exegesis?

**Question 8**

Who were not 'Ali ibn Abi Talib and 'Abdullah ibn 'Abbas?

**Text number 26**

Because the Qur'an is spoken in classical Arabic, many later converts to Islam (mostly non-Arabs) did not always understand the Arabic of the Qur'an, they did not understand the references that were clear to early Muslims fluent in Arabic, and they were concerned about reconciling the apparent contradictions in the Qur'an. Skilled commentators in Arabic explained the references and, perhaps most importantly, explained which verses of the Qur'an had been revealed early in Muhammad's prophetic career, when they were appropriate for the earliest Muslim community, and which had been revealed later, when the earlier text (mansūkh) had been abrogated or 'abrogated' (nāsikh). Other scholars, however, argue that there has been no abrogation of the Qur'an. The Ahmadiyya Muslim community has published a ten-volume commentary on the Qur'an in Urdu, entitled Tafseer e Kabir.

**Question 0**

In which language is the Quran read?

**Question 1**

What is the Arabic term for the abrogation of one part of the Quran by another?

**Question 2**

What is the name of the commentary on the Quran published by the Ahmadiyya Muslim community?

**Question 3**

In which language is Tafseer e Kabir written?

**Question 4**

What is the term for the earlier parts of the Qur'an that may have been replaced by later parts?

**Question 5**

In which language is the Koran not recited?

**Question 6**

In which language is the Koran not read?

**Question 7**

What is the Arabic term for the continuation of one part of the Qur'an by another?

**Question 8**

What is the name of the commentary on the Koran published by the Ahmadiyya Jewish community?

**Question 9**

What is the term for later parts of the Qur'an that may have been replaced by earlier parts?

**Text number 27**

Esoteric or Sufi interpretation seeks to reveal the inner meanings of the Koran. Sufism goes beyond the apparent (zahir) point of the verses and instead relates the verses of the Qur'an to the inner or esoteric (batin) and metaphysical dimensions of consciousness and existence. According to Sands, esoteric interpretations are suggestive rather than declarative, they are allusions (isharat) rather than explanations (tafsir). They suggest possibilities as much as they indicate the insights of the respective authors.

**Question 0**

What is another term for the Sufi interpretation of the Qur'an?

**Question 1**

Which Arabic word describes the aspects of the Qur'anic verses that Sufism tries to transcend?

**Question 2**

Sands says that interpretations of suffixes usually use what literary device instead of direct explanation?

**Question 3**

What is the Arabic term for references?

**Question 4**

What is another term for the Sufis' misinterpretation of the Koran?

**Question 5**

What is not another term for the Sufi interpretation of the Koran?

**Question 6**

Which Arabic word describes the aspects of the Bible verses that Sufism tries to transcend?

**Question 7**

Sands says that interpretations of the Sufis usually use what literary device instead of an implicit explanation?

**Question 8**

What is not the Arabic term for allusions?

**Text number 28**

Moses, 7:143, comes in the way of those who are in love, he asks to be seen, but his wish is denied, he is made to suffer when he is told to look at something other than the Beloved, while on the mountain there is a chance to see God. The mountain breaks and Moses faints at the sight of God appearing on the mountain. In the words of Qushayr, Moses became like thousands of men who had travelled great distances and nothing remained of Moses. In that self-destructed state, Moses was granted the revelation of realities. From the Sufi perspective, God is always loved, and the wanderer's longing and suffering lead to the realisation of truths.

**Question 0**

Beloved is the term for God used in which style of Quranic interpretation?

**Question 1**

Which verse in the Qur'an describes Moses' encounter with God on the mountain?

**Question 2**

Which experiences bring us closer to the truth?

**Question 3**

Who wrote that Moses had lost Moses himself on his way to meet God?

**Question 4**

Beloved is the term for God used in which style of Quranic misinterpretation?

**Question 5**

Beloved is a term for God used in which style of biblical interpretation?

**Question 6**

Which Bible verse describes Moses' encounter with God on the mountain?

**Question 7**

Which experiences take you further away from the truth?

**Question 8**

Who wrote that Moses had found Moses in himself on his way to meet God?

**Text number 29**

One of the most important writers of esoteric interpretation before the 1200s is Sulami (d. 1021), without whom most of the very early Sufi commentaries would not have survived. Sulami's most important commentary is a book called haqaiq al-tafsir ('Truths of Exegesis'), a collection of commentaries on the earlier Sufis. From the 1100s onwards, several other works appeared, including commentaries by Qushayr (d. 1074), Daylam (d. 1193), Shiraz (d. 1209) and Suhraward (d. 1234). These works include material from Sulam's books as well as the author's own contributions. Many works are written in Persian, such as the kash al-asrar ("Revelation of Secrets") of Maybud (d. 1135). Rumi (d. 1273) wrote an enormous amount of mystical poetry in his book Mathnawi. Rumi makes extensive use of the Koran in his poems, which is sometimes omitted from translations of Rumi's works. Mathnawi contains a large number of passages from the Qur'an, and is considered by some to be a kind of Sufi interpretation of the Qur'an. Rumi's book is not exceptional in the sense that it contains quotations from the Qur'an and its refinements, but Rumi nevertheless mentions the Qur'an more frequently. Simnani (d. 1336) wrote two influential works on the esoteric exegesis of the Qur'an. He reconciled notions of God's manifestation through and in the physical world with the ideas of Sunni Islam. The 17th century saw the appearance of comprehensive Sufi commentaries, such as Ismail Hakki Bursev's (d. 1725) work. His work ruh al-Bayan (Spirit of Explanation) is a comprehensive exegesis. Written in Arabic, it combines the author's own ideas with those of his predecessors (notably Ibn Arabi and Ghazali), woven together in the Persian poetic form of hafiz.

**Question 0**

Who was an important esoteric interpreter of the Koran in the 11th century?

**Question 1**

What is the English title of Sulam's magnum opus?

**Question 2**

In which language did Maybudi write?

**Question 3**

What year did the poet Rumi die?

**Question 4**

Which Sufi commentator wrote the spirit of the Explanation?

**Question 5**

Who was an important esoteric interpreter of the Koran in the 10th century?

**Question 6**

What is the English title of the Sulam spin-off?

**Question 7**

In which language did Maybudi not write?

**Question 8**

In what year did the poet Rumi not die?

**Question 9**

Which Sufi commentator read the spirit of the Beatitudes?

**Text number 30**

Commentaries dealing with the zahir (external aspects) of the text are called tafsir, and hermeneutic and esoteric commentaries dealing with the batin are called ta'wil ("interpretation" or "explanation"), taking the text back to its beginning. Esoterically oriented commentators believe that the ultimate meaning of the Qur'an is known only to God. In contrast, the literalism of the Qur'an held by Salafists and Zahirists is the belief that the Qur'an should be taken only in its apparent meaning[citation needed].

**Question 0**

What is the Arabic term for the surface level of a text?

**Question 1**

Which Arabic term refers to interpretations that aim at the deeper, esoteric meanings of a text?

**Question 2**

Who is the only one who knows the full meaning of the verses of the Koran according to the esoteric view?

**Question 3**

Which two groups are examples of Muslims who support a very literal reading of the Quran?

**Question 4**

What is the Jewish term for the surface level of a text?

**Question 5**

What is the Arabic term for the surface features of a piece?

**Question 6**

What is the Arabic term for misinterpretations aimed at deeper, esoteric meanings of a text?

**Question 7**

Who is the only one who will ever know the partial meaning of the Quranic verses from an esoteric perspective?

**Question 8**

Which two groups are examples of Muslims who advocate a very non-literal reading of the Quran?

**Text number 31**

The first fully attested complete translations of the Qur'an were made between the 10th and 12th centuries in Persian. The Samanid king Mansur I (961-976) ordered a group of scholars from Khorasan to translate the original Arabic Tafsir al-Tabar into Persian. Later, in the 1100s, one of Abu Mansur's disciples, Abdullah al-Ansari, wrote the complete Qur'an in Tafsir Persian. In the 1200s, Najm al-Din Abu Hafs al-Nasafi translated the Qur'an into Persian. The manuscripts of all three books have survived and have been published several times.

**Question 0**

Into which language was the Quran first translated?

**Question 1**

Which book was translated by Khorasan scribes in the 10th century?

**Question 2**

Whose student wrote the tafsir of the Persian Koran in the 11th century?

**Question 3**

Who wrote the Persian translation of the Koran in the 13th century?

**Question 4**

Which dynasty was the king who commissioned the first translation of the Quranic texts?

**Question 5**

Into which language was the Quran last translated?

**Question 6**

Which work was translated by Khorasan scribes in the 1100s?

**Question 7**

Whose student wrote the Persian tafsir from the Koran in the 10th century?

**Question 8**

Who wrote the Persian translation of the Koran in the 1100s?

**Question 9**

Which dynasty was the king who commissioned the last translation of the Quranic texts?

**Text number 32**

Robert of Ketton's translation of the Koran in 1143 for Peter the Venerable, the pseudo-prophet Lex Mahumet, was the first in a Western language (Latin). Alexander Ross provided the first English version in 1649 of Andre du Ryer's French translation L'Alcoran de Mahomet (1647). In 1734, George Sale produced the first scientific English translation of the Qur'an; a second translation was produced by Richard Bell in 1937 and another by Arthur John Arberry in 1955. Not all these translators were Muslim. Muslims have made numerous translations. The Ahmadiyya Muslim community has published translations of the Koran in 50 languages, as well as a five-part English commentary and an English translation of the Koran.

**Question 0**

In what year was the Koran first translated into Western languages?

**Question 1**

Who completed the first Latin version of the Koran?

**Question 2**

Whose French translation of the Koran was the model for the first English version?

**Question 3**

Which organisation offers versions of the Koran in 50 languages?

**Question 4**

In which language was Alexander Ross's version of the Koran published in 1649?

**Question 5**

In what year was the Quran last translated into Western languages?

**Question 6**

Who completed the last Latin version of the Koran?

**Question 7**

Whose French translation of the Koran was the inspiration for the latest English version?

**Question 8**

Which organisation offers versions of the Koran in 60 languages?

**Question 9**

In which language was Alexander Ross's version of the Koran published in 1694?

**Text number 33**

The correct pronunciation of the Qur'an is the subject of a separate discipline, tajwid, which specifies in detail how the Qur'an should be pronounced, how each individual syllable should be pronounced, how attention should be paid to pauses, elisions, where pronunciation should be long and where short, where letters should be pronounced together and where they should be kept apart, etc. It can be said that this discipline studies the laws and methods of proper recitation of the Qur'an and covers three main areas: the correct pronunciation of consonants and vowels (articulation of the Qur'anic sounds), the rules for pauses and continuation of recitation, and the musical and melodic aspects of recitation.

**Question 0**

What discipline is there about how to recite the Qur'an correctly?

**Question 1**

Tajwid discusses what aspects of the Quranic phonemes are involved?

**Question 2**

Does Tajwid describe the rules of what silent aspects of the articulation of Quranic verses are followed?

**Question 3**

The rhythm is an example of which aspects of Qur'anic recitation fall under tajwid?

**Question 4**

What discipline applies to the mispronunciation of the Qur'an?

**Question 5**

What discipline is there about not reciting the Qur'an correctly?

**Question 6**

Tajwid describes the rules of what silent aspects of the inarticulateness of the Quranic verses?

**Question 7**

Tajwid discusses what aspects of biblical phonemes are involved?

**Question 8**

The rhythm is an example of what features of Quranic recitation does tajwid reveal?

**Text number 34**

In the late 9th century, Arabic introduced vowel signs indicating certain vowel sounds. The first manuscripts of the Qur'an lacked these signs, which is why many of the utterances are still acceptable. The nature of the missing vowel markings allowed the text to be read in a variety of ways, which led to an increase in the number of readings in the 10th century. The 10th century Muslim scholar Ibn Mujāhid of Baghdad is famous for defining the seven acceptable textual readings of the Qur'an. He studied the different ways of reading and their reliability and selected seven 8th century readings from the cities of Mecca, Medina, Kufa, Basra and Damascus. Ibn Mujahid did not explain why he chose seven readers instead of six or ten, but this may be related to the prophetic tradition (saying of Muhammad) that the Qur'an was revealed in seven "ahrufs" (meaning seven letters or ways). Today, the most popular ways of reading are those transmitted by Ḥafṣ (d. 796) and Warsh (d. 812), according to two reciters of Ibn Mujahid, Aasim ibn Abi al-Najud (Kufa, d. 745) and Nafi' al-Madan (Medina, d. 785). The influential Cairo Standard Qur'an (1924) uses a complex system of modified vowel signs and a number of additional symbols for minor details, and is based on the recitation of ʻAsimʻ, the 8th century recitation of Kufa. This edition has become the standard for modern editions of the Qur'an.

**Question 0**

What linguistic feature did the absence of which made early Quranic recitation more diverse?

**Question 1**

Which Baghdad scholar correctly identified seven different ways of reading the Koran?

**Question 2**

Which statement is the original basis of the Cairo Koran?

**Question 3**

In which century were the seven readings chosen by Ibn Mujāhid produced?

**Question 4**

Which city corresponds to Asim's Koranic statement?

**Question 5**

What linguistic feature did the absence of which made the later recitation of the Qur'an more diverse?

**Question 6**

Which Baghdad scholar identified the unjustified seven different ways of reading the Koran?

**Question 7**

Which phrase was later used as the basis for the Cairo Qur'an?

**Question 8**

In which century were the eight readings chosen by Ibn Mujāhid produced?

**Question 9**

Which city does not match the Quranic statement of Asim?

**Text number 35**

Before the widespread introduction of printing in the 19th century, the Koran was transmitted in manuscripts by calligraphers and copyists. The earliest manuscripts were written in Ḥijāzī script. However, the Hijazīz manuscripts confirm that the written transmission of the Qur'an began at an early stage. It is likely that in the ninth century, thicker lines, traditionally known as the Kufic script, began to be used. Towards the end of the ninth century, new scripts began to appear in copies of the Qur'an, replacing the earlier scripts. The reason for discontinuing the earlier style was that it took too long to produce and the demand for copies increased. Copiers therefore opted for simpler styles. From the 1100s onwards, the Naskh, Muhaqqaq and Rayḥānī styles were mainly used and, less frequently, the Thuluth script. Naskh was very widely used. In North Africa and Spain, the Maghribī style was popular. More specific is the Bihari script, which was used only in the northern parts of India. Nastaʻlīq was also rarely used in the Persian world.

**Question 0**

Who created the manuscripts of the Koran before the 1800s?

**Question 1**

What is the name of the thicker script that was used in the Koran from the 9th century onwards?

**Question 2**

What was the most common script used by copyists in the 1100s?

**Question 3**

Where did the Quranic copyists most commonly use the Maghribi script?

**Question 4**

What scripture was used to copy the Quran only in North India?

**Question 5**

Who created the manuscripts of the Koran before the 1700s?

**Question 6**

What is the name of the thicker script that was used in the Koran from the 800s onwards?

**Question 7**

What was the most common font used by copyists in the 10th century?

**Question 8**

Where did the imitators of the Koran use the least maghribi script?

**Question 9**

What script did the people of North India never use to copy the Koran?

**Text number 36**

The Koran initially had no phonetic signs. The current system of vowel marking seems to have been introduced towards the end of the ninth century. As it would have been too expensive for most Muslims to buy a manuscript, copies of the Qur'an were kept in mosques to make them available to the public. These copies were often in sets of 30 parts or juzʼ. In terms of productivity, the Ottoman copyists are the best example. This was in response to widespread demand, the unpopularity of printing methods and aesthetic reasons.

**Question 0**

In which century was the vowel mark added to the Qur'an?

**Question 1**

Where were copies of the Koran kept for those who could not afford their own?

**Question 2**

What is the name given to the 30 parts of the Qur'an?

**Question 3**

Which group of Koranic copyists produced the most sought-after manuscripts?

**Question 4**

In which century were the vowel markings taken from the Koran?

**Question 5**

Where were copies of the Koran kept for those who could afford their own?

**Question 6**

Where were copies of the Koran not kept for those who could not afford their own?

**Question 7**

What is the name given to the 33 parts of the Qur'an?

**Question 8**

Which group of Qur'anic copyists produced the least sought-after manuscripts?

**Text number 37**

According to Sahih al-Bukhari, the Qur'an was recited among the Levantines and Iraqis and discussed with Christians and Jews before it was standardized. Its language was similar to Syriac. The Qur'an tells stories about many of the characters and events narrated in Jewish and Christian holy books (Tanakh, Bible) and devotional literature (Apocrypha, Midrash), although it differs in many details. Adam, Enoch, Noah, Eber, Shelah, Abraham, Lot, Ishmael, Isaac, Jacob, Joseph, Job, Jethro, David, Solomon, Elijah, Elisha, Jonah, Aaron, Moses, Zechariah, John the Baptist and Jesus are mentioned in the Qur'an as prophets of God (see Prophets of Islam). In fact, Moses is mentioned more often in the Qur'an than any other person. Jesus is mentioned more often in the Qur'an than Muhammad, while Mary is mentioned more often in the Qur'an than in the New Testament. Muslims believe that the common elements or similarities between the Bible and other Jewish and Christian scriptures and Islamic scriptures are due to their common divine source and that the original Christian or Jewish texts were genuine divine revelations to the prophets.

**Question 0**

Which biblical character is the most frequently mentioned person in the Koran?

**Question 1**

Who has claimed that Christians and Jews heard and discussed the Koran before it was given its standard Arabic form?

**Question 2**

Which older language is believed to bear a strong resemblance to the language of the Koran?

**Question 3**

Which relative of Jesus appears more often in the Koran than in the New Testament?

**Question 4**

What do devout Muslims believe is the reason for the overlapping events and characters in the Bible and the Qur'an?

**Question 5**

Which biblical character is mentioned least often in the Qur'an?

**Question 6**

Who has not argued that Christians and Jews heard and discussed the Koran before it was given its standard Arabic form?

**Question 7**

Which older language is believed to bear a faint resemblance to the language of the Quran?

**Question 8**

Which relative of Jesus appears less often in the Koran than in the New Testament?

**Question 9**

What do devout Muslims believe is the reason why the events and characters in the Bible and the Qur'an do not overlap?

**Text number 38**

According to Tabatabaei, there are acceptable and unacceptable esoteric interpretations. Acceptable ta'wil refers to a meaning of a verse that is beyond its literal meaning; rather, an implicit meaning that is ultimately known only to God and cannot be understood directly through mere human reasoning. The verses in question here refer to human qualities such as coming, going, sitting, contentment, anger and sorrow, which are obviously associated with God. Unacceptable ta'wil means that the apparent meaning of a verse is "transferred" by means of testimony to another meaning; this method is not without obvious inconsistencies. Although this unacceptable ta'wil has gained considerable acceptance, it is incorrect and cannot be applied to Qur'anic verses. The correct interpretation is that of the reality the verse refers to. It is found in all verses, both decisive and ambiguous; it is not some meaning of a word; it is a fact too sublime for words. God has clothed them with words to bring them a little closer to our minds; in this respect they are like proverbs, used to create a picture in our minds and thus help the hearer to understand the clearly intended idea.

**Question 0**

What are the two types of ta'wil?

**Question 1**

What kind of esoteric interpretation involves conveying the meaning of a verse by proof?

**Question 2**

The implicit meaning of the Qur'anic verse, which only God knows fully, is what type of ta'wil?

**Question 3**

What are the three types of ta'wil?

**Question 4**

What are not two kinds of ta'wilei?

**Question 5**

What is the esoteric misinterpretation of a verse to transfer the meaning of a verse evidentially?

**Question 6**

What kind of non-soteric interpretation involves transferring the meaning of a verse by proof?

**Question 7**

What is the ta'wil of the specific meaning of a Qur'anic verse that only God fully knows?

**Text number 39**

The Koran probably existed in a fragmentary written form during Muhammad's lifetime. Several sources suggest that during Muhammad's lifetime, a large number of his followers had printed the revelations by heart. Early commentaries and Islamic historical sources support the above-mentioned view of the early development of the Qur'an. It is generally agreed by academic scholars that the Qur'an in its present form records the words uttered by Muhammad, since the search for variations has not yielded significant differences." University of Chicago professor Fred Donner states that "...very early attempts were made to create a single consonantal Qur'anic text from what was probably a larger and more diverse set of interrelated texts in the early transmission [...] After the creation of this single canonical text, the earlier authoritative texts were suppressed, and all surviving manuscripts - despite their numerous variants - appear to date from a period after the creation of this single consonantal text." Although most variant readings of the Quranic text are no longer transmitted, some still exist. No critical text on which to base a scientific reconstruction of the Qur'anic text has been produced. Historically, controversy over the content of the Qur'an has rarely arisen, although the subject is still debated.

**Question 0**

Who had begun to memorise the revelations of Muhammad during his lifetime?

**Question 1**

What was done to the text of the Koran in the early stages of its history, when few distinctly different variants remained?

**Question 2**

Which university does Fred Donner belong to?

**Question 3**

It is widely accepted by historians that the Koran contains a relatively accurate record of the words of whom?

**Question 4**

Who had begun to forget the revelations of Muhammad during his lifetime?

**Question 5**

What was done with the Qur'anic text at the end of its history, when only a few distinct variations remained?

**Question 6**

What was done to the text of the Koran early in its history, when few clearly identical variations remained?

**Question 7**

Which university does Fred Donner not belong to?

**Question 8**

Historians widely reject the Quran, which contains a relatively accurate record of the words of whom?

**Text number 40**

Sahih al-Bukhari reports that Muhammad described the revelations as follows, "Sometimes it (appears) like the ringing of a bell," and Aisha reported: "I saw when the Prophet received a divine inspiration on a very cold day, and I noticed that sweat dripped from his forehead (when the inspiration was over)." According to the Qur'an, Muhammad's first revelation was accompanied by a vision. The mediator of the revelation is mentioned as a "mighty power" who "shone forth in sight when he was on the upper horizon". Then he drew near and descended until he was (far away) two bows or even closer." Welch, a scholar of Islamic studies, states in the Encyclopaedia of Islam that he believes that the graphic descriptions of Muhammad's condition at these moments can be considered authentic because he was severely shaken after these revelations. According to Welch, those close to him would have regarded these scenes as convincing proof of the superhuman origin of Muhammad's inspirations. However, Muhammad's critics accused him of being a possessed man, a soothsayer or a magician, because his experiences were similar to the claims of such figures who were well known in ancient Arabia. Welch also notes that it is still uncertain whether these experiences occurred before or after Muhammad's initial proclamation as a prophet.

**Question 0**

What physical symptom was associated with Muhammad's revelations?

**Question 1**

Which distance measure described the proximity of the angel's approach to Muhammad?

**Question 2**

In which work did Welch express his belief that Mohammed's physical reaction to the revelation was historically accurate?

**Question 3**

What people would Muhammad's critics have compared him to in his day?

**Question 4**

What psychological symptom was associated with Muhammad's revelations?

**Question 5**

What measure of time described the proximity of the angel's approach to Muhammad?

**Question 6**

In which work did Welch express his belief that Mohammed's physical reaction to the revelation was historically inaccurate?

**Question 7**

What people would Muhammad's critics not have compared him to at the time?

**Question 8**

What people would Mohammed's critics not have compared him to in his day?

**Text number 41**

Muhammad Husayn Tabatabaei says that according to an explanation popular among later exegetes, ta'wil indicates the specific meaning to which the verse is directed. The meaning of the announcement (tanzil), unlike ta'wil, is clear because it corresponds to the apparent meaning of the words as they were announced. However, this explanation has become so widespread that today it has become the primary meaning of ta'wil, which originally meant "return" or "place of return". For Tabatabaei, what has rightly been called ta'wil, or hermeneutical interpretation of the Qur'an, is not simply a matter of the meaning of the words. Rather, it is concerned with certain truths and realities that are beyond the comprehension of ordinary people; yet it is from these truths and realities that the doctrinal principles and practical prescriptions of the Qur'an derive. Interpretation is not the meaning of a verse - rather, it is manifested through that meaning, a kind of special transpiracy. There is the spiritual reality - which is the main aim of the imposition of law or the basic aim of the description of a divine attribute - and then there is the actual meaning to which the Qur'anic narrative refers.

**Question 0**

What interpretation can be found behind the apparent events mentioned in the Qur'anic story?

**Question 1**

What was the original meaning of ta'wili?

**Question 2**

Which philosophical term corresponds to the ta'wil type of interpretation?

**Question 3**

What can misinterpretation find behind the apparent events mentioned in the Qur'anic story?

**Question 4**

What interpretation can be found behind the inexpressive events mentioned in the Qur'anic story?

**Question 5**

What was the ultimate meaning of ta'wil?

**Question 6**

What was not the original meaning of ta'wili?

**Question 7**

Which biographical term corresponds to the ta'wil type of interpretation?

**Text number 42**

According to Shia belief, those who are firmly rooted in knowledge, such as Muhammad and the Imams, know the secrets of the Qur'an. According to Tabatabaei, the statement "none but God knows its interpretation" is still valid without any contrary or clarifying clause. For this verse, therefore, the knowledge of the interpretation of the Qur'an is reserved for God. But Tabatabaei uses other verses and concludes that those who are purified by God know the interpretation of the Qur'an to a certain extent.

**Question 0**

Who else but Shia Muslims who believe in God and Muhammad can approach the truths of the Quran?

**Question 1**

According to Shia Muslims, who is the only one who can fully know the interpretation of the Koran?

**Question 2**

How must God have treated those who are qualified to know the sects of the Koran?

**Question 3**

Who else but Shia Muslims who believe in God and Muhammad can approach the lies of the Koran?

**Question 4**

Who else but Sunni Muslims who believe in God and Muhammad can approach the truths of the Quran?

**Question 5**

According to Sunni Muslims, who is the only one who can fully know the interpretation of the Koran?

**Question 6**

According to Shia Muslims, who is the only one who can never know the interpretation of the Koran?

**Question 7**

How must God have treated those who are not qualified to know the Qur'anic sects?

**Document number 362**

**Text number 0**

From 1989 to 1996, the total area of the United States was 9 372 610 km2 (3 618 780 sq mi) (land + inland waters only). The total listed area changed to 9 629 091 km2 in 1997 (Great Lakes and coastal waters added), 9 631 418 km2 in 2004, 9 631 420 km2 in 2006 and 9 826 630 km2 in 2007 (regional waters added). Currently, the CIA World Factbook reports 9 826 675 km2 (3 794 100 sq mi), the United Nations Statistics Division 9 629 091 km2 (3 717 813 sq mi) and the Encyclopædia Britannica 9 522 055 km2 (3 676 486 sq mi) (including the Great Lakes but excluding coastal waters). These sources only take into account the 50 states and federal territory and do not include overseas territories.

**Question 0**

What was the total area of the United States in kilometres between 1989 and 1996?

**Question 1**

According to the CIA World Factbook, what is the total area of the United States in miles?

**Question 2**

According to Encyclopedia Britannica, what is the total area of the United States in miles?

**Question 3**

During what period was the total square metre area of land in the United States alone 9 372 610 km²?

**Question 4**

What is the current benchmark for the US world cyclopedia?

**Question 5**

Which encyclopedia includes both Great Lakes and coastal waters in the square kilometres of the United States?

**Question 6**

These sources consider overseas territories all fifty states and what?

**Text number 1**

In total area (both land and water), the United States is either slightly larger or smaller than the People's Republic of China, making it the third or fourth largest country in the world. China and the United States are smaller in total area than Russia and Canada, but larger than Brazil. In terms of land area alone (excluding water areas), the United States is the third largest country in the world after Russia and China, with Canada in fourth place. Whether the United States or China is the third largest country by total land area depends on two factors: (1) the validity of China's claim to Aksai Chin and the Trans-Karakoram. Both areas are also claimed by India, so they are not counted, and (2) how the United States calculates its own area. Since the original publication of the World Factbook, the CIA has updated the total area of the United States several times.

**Question 0**

How big is the United States compared to other countries?

**Question 1**

Which country is the fourth largest in the world?

**Question 2**

Who can also be the third largest country?

**Question 3**

Is the United States slightly larger or smaller than any other country?

**Question 4**

China and the United States are larger in area than Russia and which other country?

**Question 5**

In terms of total land and water area, whether the United States is the third largest country depends on what?

**Question 6**

What has Guinness been doing since the first publication of the World Fact Book?

**Question 7**

Brazil is bigger than which other two countries?

**Text number 2**

The United States has land borders with Canada (to the north) and Mexico (to the south), a territorial sea border with Russia to the north-west and two territorial sea borders in the south-east between Florida and Cuba and Florida and the Bahamas. The other 48 states are bounded by the Pacific Ocean to the west, the Atlantic Ocean to the east and the Gulf of Mexico to the south-east. Alaska is bordered by the Pacific Ocean to the south, the Bering Strait to the west and the Arctic Ocean to the north, while Hawaii lies far southwest of the Mannerheim Strait in the Pacific Ocean.

**Question 0**

With whom does the United States share land borders?

**Question 1**

With whom does the US share a water border in the Northwest?

**Question 2**

How many unitary states are there?

**Question 3**

To which ocean does Alaska border in the south?

**Question 4**

The US has land borders with Russia, Canada and which other country?

**Question 5**

Forty-eight states border the Pacific Ocean to the east and which ocean to the west?

**Question 6**

Which state borders directly to the east?

**Question 7**

Hawaii is located in the far north-east, in which sea?

**Question 8**

The Gulf of Mexico is located southwest of which country?

**Text number 3**

The capital, Washington, District of Columbia, is a federal territory located on land donated by the state of Maryland (Virginia had also donated land, but it was returned in 1849.) The United States also has overseas territories with varying degrees of independence and organisation: in the Caribbean, Puerto Rico and the US Virgin Islands, and in the Pacific, the inhabited territories of Guam, American Samoa and the Northern Mariana Islands, as well as several uninhabited island territories.

**Question 0**

What is the capital of the United States?

**Question 1**

Which US state donated Washington?

**Question 2**

What are the overseas territories of the United States in the Pacific?

**Question 3**

Which US state also donated territory to Washington but got it back?

**Question 4**

What is the capital of the United States?

**Question 5**

Which two states donated land to the District of Columbia?

**Question 6**

What uninhabited areas does the United States have in the Pacific?

**Question 7**

Where are the US territories of Puerto Rico, the Virgin Islands and Cuba?

**Text number 4**

Five of the Great Lakes are located in the north-central part of the country, four of which form part of the Canadian border, and only Lake Michigan is located entirely within the United States. There are subtropical forests in the southeastern United States and mangrove wetlands near the Gulf coast, particularly in Florida. To the west of the Appalachians is the Mississippi River basin and two major eastern tributaries, the Ohio River and the Tennessee River. The Ohio and Tennessee valleys and the Midwest are largely composed of rolling hills and productive farmlands that extend south to the Gulf Coast.

**Question 0**

How many Great Lakes form the border with Canada?

**Question 1**

Which of the Great Lakes is located entirely within the United States?

**Question 2**

Which large river lies west of the Appalachians?

**Question 3**

What kind of land makes up the Ohio and Tennessee valleys?

**Question 4**

Which parts of the US have subtropical forests and mangrove wetlands?

**Question 5**

Five official borders of the Great Lakes with which country?

**Question 6**

Which Great Lake is located entirely outside the territory of the United States?

**Question 7**

Which large river lies east of the Appalachians?

**Question 8**

What are the two major western tributaries of the Mississippi River?

**Question 9**

Which parts of the US have tropical forests and mangroves?

**Text number 5**

The major plains are located west of the Mississippi River and east of the Rocky Mountains. Much of the country's agricultural products are grown on the Great Plains. Before the Great Plains became general farmland, it was known for its extensive grasslands, ranging from tall prairie on the eastern plains to shortgrass prairie on the western plains. The elevation of the land gradually rises from a few hundred feet near the Mississippi River to over a mile in the uplands. The generally low relief of the plains is broken in several places, notably in the Ozark and Ouachita Mountains, which form the Interior Plateau, the only major mountain range between the Rocky Mountains and the Appalachians.

**Question 0**

Which area is located between the Mississippi River and the Rocky Mountains?

**Question 1**

In which region are most of the country's agricultural products grown?

**Question 2**

How high does the altitude rise in the Great Plains?

**Question 3**

What is the only large mountain range between the Appalachians and the Rocky Mountains?

**Question 4**

Which area is located between the Mississippi River and the Appellation Mountains?

**Question 5**

A small part of the land that is farmed on the Great Plains?

**Question 6**

What elevation is more than a kilometre above sea level near the Mississippi River?

**Question 7**

What are the only mountains between the Rocky Mountains and the Appellation Mountains?

**Question 8**

Before the Great Plains were turned into grasslands, they were known as what?

**Text number 6**

The large plains end abruptly in the Rocky Mountains. The Rocky Mountains form a large part of the western United States, coming from Canada and extending almost as far as Mexico. The Rocky Mountain region is the highest in the United States in terms of average elevation. The Rocky Mountains generally have relatively gentle slopes and wider peaks compared to some of the other major mountain ranges, with a few exceptions (such as the Teton Mountains in Wyoming and the Sawatch Range in Colorado). The highest peaks in the Rocky Mountains are in Colorado, with the highest peak being Mount Elbert at 14 440 ft (4 400 m). The Rocky Mountains offer some of the most spectacular and iconic scenery in the world. Rather than being one single, unbroken mountain range, it is divided into a number of smaller, discontinuous ranges that form a large series of basins and valleys.

**Question 0**

From which northern country do the Rocky Mountains start?

**Question 1**

In which northern country do the Rocky Mountains end?

**Question 2**

What is the highest elevation region in the United States?

**Question 3**

Which state has the highest peaks in the Rocky Mountains?

**Question 4**

Where did the Great Plains come in stages and at?

**Question 5**

Which region has the highest elevation in the Appellation Mountains?

**Question 6**

Which mountains usually have steep slopes and narrow peaks?

**Question 7**

In which state is the Lowes Peak of the Rockies located?

**Question 8**

What is shallow talking about the Rocky Mountains?

**Text number 7**

To the west of the Rockies lies the Intermontane Plateau (also known as the Intermountain West), a vast, dry desert between the Rockies and the Cascades and Sierra Nevada. The large southern portion, known as the Great Basin, consists of salt ponds, drainage basins and several small north-south facing mountain ranges. The south-western part is mainly low desert area. The part of Colorado known as the Colorado Plateau, around the Four Corners area, is considered one of the most spectacular landscapes in the world. It is highlighted by such national parks as the Grand Canyon, Arches, Mesa Verde National Park and Bryce Canyon, among others. Other smaller intermontane areas include the Columbia Plateau, which covers eastern Washington, western Idaho and northeastern Oregon, and the Snake River Plain in southern Idaho.

**Question 0**

What is the name of the plateau west of the Rocky Mountains?

**Question 1**

What is the name of the large southern part of the Intermontane Plateau?

**Question 2**

What kind of plains are there in the Great Basin?

**Question 3**

Which area is located around Four Corners?

**Question 4**

What is the name of the plateau east of the Rocky Mountains?

**Question 5**

A large semi-dry desert lies between the Rocky Mountains and what?

**Question 6**

What is the Great North?

**Question 7**

What is the South-East mainly?

**Text number 8**

The Intermontane plains end in the Cascade Range and the Sierra Nevada. The Cascades are largely composed of volcanic mountains, many of which rise prominently from the surrounding landscape. Further south, the Sierra Nevada is a high, rugged and dense mountain range. It is home to the highest point in the 48 states, Mount Whitney (14,505 feet or 4,421 metres). It is located on the border of Inyo and Tulare counties in California, just 84.6 miles or 136.2 kilometres west-northwest of the lowest point in North America at Badwater Basin in Death Valley National Park, 279 feet or 85 metres below sea level.

**Question 0**

What is the name of the mountain range where the Intermontane plateau ends?

**Question 1**

What kind of mountains are the Cascades?

**Question 2**

In which mountain range is Mount Whitney located?

**Question 3**

What is the largest point in the Sierra Nevada?

**Question 4**

How tall is Mount Whitney?

**Question 5**

What is the name of the mountain range where the Intermontane plateau begins?

**Question 6**

Cascades are largely made up of overlapping what?

**Question 7**

What is the name of a high, gentle and dense mountain range?

**Question 8**

Which mountain range contains the lowest point in the contagious forty-eight states

**Question 9**

What is the highest point in North America and which pool?

**Text number 9**

These areas also have stunning landscapes, as national parks such as Yosemite and Mount Rainier show. To the west of the Cascades and Sierra Nevada are a series of valleys, such as the Central Valley in California and the Willamette Valley in Oregon. Along the coast is a series of low mountain ranges known as the Pacific Coast Ranges. Much of the Pacific Northwest coast has some of the densest vegetation outside the tropics, including some of the tallest trees (redwoods) in the world.

**Question 0**

Which two national parks are located in mountain areas?

**Question 1**

What is the name of a famous valley in California?

**Question 2**

What is the name of a famous valley in Oregon?

**Question 3**

What are the low mountain ranges along the Pacific coast called?

**Question 4**

What are the tallest trees in the world?

**Question 5**

Which two national parks are located in airplanes?

**Question 6**

East of the Cascades in the Sierra Nevada is a series of what?

**Question 7**

What is the name of a high mountain range on the coast?

**Question 8**

What are the world's skinniest trees?

**Text number 10**

With few exceptions, the Atlantic coast of the United States is shallow. The Appalachian Plateau is the result of the oblique north-east-south orientation of the crustal deformation that, in very early geological times, gave rise to what later became the Appalachian mountain system. The peak of deformation in this system occurred so long ago (probably in the Permian period) that it has very generally since then been reduced to moderate to low levels. Its present elevation is due either to new uplifts along past lines or to the fact that the most resistant rock types have survived as the remaining mountain ranges. The oblique orientation of the coast would be even more pronounced if the crust had not moved in relatively recent times, creating a depression in the north-east that has led to the intrusion of the sea. In addition, the south-eastern part has been uplifted, causing the land to advance over the sea.

**Question 0**

Why is the Appalachian Highlands the way it is?

**Question 1**

During which geological period did the Appalachian Mountains reach their highest point of formation?

**Question 2**

What is the name of a mountainous region on the Atlantic coast.

**Question 3**

Which country's Atlantic coastline is high, with a few exceptions?

**Question 4**

What made you see in advance on land in southeastern Appalachia?

**Question 5**

What kind of deformation created by the northwest-southeast trend of the Appalachians

**Question 6**

Which geological. that the Appalachian Mountains are at their lowest.

**Question 7**

The Appalachian Mountains are now low because of modern what?

**Text number 11**

The eastern coast of the Appalachians, which was originally forested, is relatively shallow and narrow, and is flanked by a significant coastal plain to the south and south. The Cordilleran mountain system on the western side of the continent is high, broad and complex, with two branches, the Rocky Mountains and the Pacific Mountain System. Between these mountain systems is the Intermontane Plain. Both the Columbia River and the Colorado River rise far inland near the easternmost parts of the Cordillera system and flow through plains and intermontane basins to the ocean. The northwest coast is covered with dense forests, but elsewhere trees are found only in the higher mountain areas below the Alps. The valleys, plains and basins between the mountains range from barren to desert, with the driest area in the south-west.

**Question 0**

What originally covered the east coast of the Appalachians?

**Question 1**

What are the two branches of the Kordillerian system?

**Question 2**

Which two major rivers are located in the Cordillera region?

**Question 3**

Which area of the Appalachians is the driest?

**Question 4**

Which system is relatively high and wide?

**Question 5**

What are the boundaries of the Appalachian region to the south-west and south?

**Question 6**

What is the Cordilleran system on the eastern side of the continent?

**Question 7**

What has three branches, including the Rocky Mountain system?

**Question 8**

The light forces cover which coast?

**Text number 12**

The Laurentian Highlands, the Interior Plains and the Interior Highlands lie between these two coasts and extend from the Gulf of Mexico northwards, far beyond the borders of the kingdom, to the Arctic Ocean. The Central Plains are divided by a barely perceptible elevation into a Canadian and an American section. On the US side, the great Mississippi River basin flows south into the Gulf of Mexico. The upper Mississippi and part of the Ohio basin is a semi-arid prairie, with trees originally found only along waterways. The Appalachian highlands were part of a large eastern forested area, while the western part of the plains is so arid that its native plant species are scarce, and the southern part is virtually barren.

**Question 0**

Which is one of the two great plateaus that stretch from the Gulf of Mexico to the Arctic Ocean?

**Question 1**

How far north does the Interior Highlands extend?

**Question 2**

Into which two nations is Central Plains divided?

**Question 3**

Where does the Mississippi erupt?

**Question 4**

What are the names of the three highlands that stretch from the Gulf of Mexico to the Arctic Ocean?

**Question 5**

What types of areas are the lower Mississippi River and part of the Ohio Basin?

**Question 6**

Originally the trees covered the whole area and what area?

**Question 7**

Which Highlands stop at the national border?

**Question 8**

Where does the Ohio River fall?

**Text number 13**

Because of its large size and diverse geography, the United States has examples of almost every climate in the world. The climate is temperate in most areas, subtropical in the southern United States, tropical in Hawaii and southern Florida, polar in Alaska, semi-arid in the Great Plains west of the 100th meridian, Mediterranean on the California coast, and dry in the Great Basin. The relatively favourable agricultural climate contributed (in part) to the country's rise to world status, with large agricultural areas rarely experiencing severe droughts, widespread flooding generally not occurring and the climate being mostly temperate with adequate rainfall.

**Question 0**

What is the climate like in the southern United States?

**Question 1**

What is the climate like in Hawaii?

**Question 2**

Which state is known for its Mediterranean climate?

**Question 3**

What contributed to the rise of the United States as a world power?

**Question 4**

What is the climate like in most areas of the United States?

**Question 5**

Which country is subtropical in the south-west?

**Question 6**

Hawaii and which other state or subtropical?

**Question 7**

The Great Plains lie to the west of which meridian?

**Question 8**

The favourable agricultural climate in the US prevented what?

**Question 9**

The United States often experiences drought and widespread what?

**Text number 14**

The Great Basin and the Columbia Plateau (Intermontane Plateau) are arid or semi-arid areas in the rain shadow of the Cascades and Sierra Nevada. Rainfall averages less than 38 cm (15 inches). The Southwest is a hot desert, with temperatures above 100°F (37.8°C) for several weeks at a time during the summer. The Southwest and the Great Basin are also affected by the monsoon from the Gulf of California from July to September, which brings localized but often intense thunderstorms to the region.

**Question 0**

Which areas are dry?

**Question 1**

What is the average rainfall in the Intermontane plains?

**Question 2**

How high do temperatures get in the south-west?

**Question 3**

During which months will the monsoon from the Gulf of California affect parts of the US?

**Question 4**

What kind of weather will the monsoons bring?

**Question 5**

The large pool and what other area is semiarid?

**Question 6**

How much rain do the cascades of the Sierra Nevada receive on average?

**Question 7**

The south-central US is a hot desert with temperatures exceeding what?

**Question 8**

What affects south-east Europe and the Great Basin?

**Question 9**

Monsoons bring widespread what?

**Text number 15**

Much of California has a Mediterranean climate, with occasional heavy rain in October and April and almost no rain for the rest of the year. In the Pacific Northwest, it rains all year round, but is much heavier in winter and spring. In the mountainous regions of the west, rainfall is heavy and snowfall is very heavy. The Cascades are one of the snowiest places in the world, with some places averaging more than 1 524 cm of snowfall per year, but the lower areas closer to the coast receive very little snowfall.

**Question 0**

What is the most common climate type in California?

**Question 1**

What time of year does it rain the most in California?

**Question 2**

In which region of the United States does it rain all year round?

**Question 3**

Which region of the USA is also one of the snowiest places in the world?

**Question 4**

How many inches of snow do the Cascades receive?

**Question 5**

California has little rain and what kind of climate?

**Question 6**

During which month does it rain the least in California?

**Question 7**

Which mountains get little rain and light snow?

**Question 8**

Which mountain region produces on average less than 600 inches of snow per year?

**Text number 16**

On average, mountain ranges in the western states receive the most snow on Earth. The highest annual snowfall is on Mount Rainier in Washington, 692 inches (1 758 cm); the record was 1 122 inches (2 850 cm) in the winter of 1971-72. This record was broken by Mt. Baker ski resort in western Washington, which reported 1 140 inches (2 896 cm) of snow in the 1998-99 snow season. Other places that have received heavy snowfall outside the Cascade Range include the Wasatch Mountains, near Great Salt Lake, the San Juan Mountains in Colorado, and the Sierra Nevada, near Lake Tahoe.

**Question 0**

Which mountain region on Earth gets the most snow?

**Question 1**

Which mountain in Washington gets the most snow?

**Question 2**

What is Mount Rainer's snow record?

**Question 3**

What year did Mount Rainer receive a record amount of snow?

**Question 4**

Which lake is near Sierra Nevadas?

**Question 5**

What do the mountains of the western states receive the least on average?

**Question 6**

Which mountain has the lowest annual snowfall?

**Question 7**

Mount Baker had the largest recorded snowfall and how many inches?

**Question 8**

In what year did Mount Baker receive the highest recorded snowfall?

**Question 9**

Other places with significant snowfall in the Cascade Range or what?

**Text number 17**

In the east, snowfall is below that of the west, but the highest snowfall is in the Great Lakes and the north-eastern mountains. The Pacific Northwest receives more rain than anywhere else in the continental US, and the Quinault Rainforest in Washington averages 137 inches (348 cm). Hawaii receives even more rainfall, with Mount Waialeale in Kauai recording 460 inches (1 168 cm) annually. The Mojave Desert in the southwest has the driest area in the US. In Yuma, Arizona, it averages 6.7 cm (2.5 inches) of rain per year.

**Question 0**

Which regions in the East get the most snow?

**Question 1**

Which region of the US gets the most rain?

**Question 2**

What is the average amount of precipitation that the Quinault Rainforest in Washington receives?

**Question 3**

In which state does it rain an average of 460 inches a year?

**Question 4**

What is the name of the desert in the driest region of the United States?

**Question 5**

Which region in the East gets the least snow?

**Question 6**

Which region of the United States gets the least rain?

**Question 7**

Was there a named rain power in Oregon?

**Question 8**

In which state does it rain an average of 400 inches a year?

**Question 9**

What is the name of the desert of the world's pleasures?

**Text number 18**

Tornadoes are more common in the central United States than anywhere else on Earth, and they strike most frequently in spring and summer. Deadly and destructive hurricanes occur almost every year along the Atlantic coast and in the Gulf of Mexico. The worst flooding is experienced in the Appalachian region and the Midwest, but virtually no region of the United States is immune to flooding. The Southwest has the worst droughts, one of which is believed to have lasted more than 500 years and to have damaged the Puebloan ancestral peoples. In the West, there are major wildfires every year.

**Question 0**

Where are tornadoes most common on Earth?

**Question 1**

What seasons are tornadoes most common?

**Question 2**

Which areas of the US are the worst flooded?

**Question 3**

Which region of the United States has the worst droughts?

**Question 4**

What types of disasters affect the western United States each year?

**Question 5**

Where are tornadoes least common on Earth?

**Question 6**

What are the most common in summer and autumn?

**Question 7**

Devastating hurricanes occur on the West Coast and where else?

**Question 8**

The Northwest and what other region experienced the worst floods in the US?

**Question 9**

What disaster strikes the South West every year?

**Text number 19**

Severe flooding occurs from time to time. Examples include the Great Mississippi River Flood of 1927, the Great Flood of 1993 and the major floods and mudslides in the western United States caused by the 1982-1983 El Niño. However, localised flooding can occur anywhere, and mudslides caused by heavy rainfall can cause problems in any mountainous area, especially in the south-west. Large areas of desert scrub in the west can contribute to the spread of wildfires. The narrow canyons of many mountainous areas in the west and the strong thunderstorms that occur during the summer sometimes cause devastating flash floods, and Nor'Easter snowstorms can halt activity throughout the northeast (although strong snowstorms can occur almost anywhere).

**Question 0**

What year did the Great Mississippi happen?

**Question 1**

What feeds wildfires and causes them to spread in the West?

**Question 2**

What kind of storms can cause most activities to stop?

**Question 3**

What is the name of the event that caused major flooding in the western United States?

**Question 4**

What is the name of the major event that caused flooding in the eastern United States?

**Question 5**

In what year did the Mississippi not flood?

**Question 6**

Where can the narrow canyons of many mounds lead?

**Question 7**

What kind of storms occur all along the east coast?

**Text number 20**

The west coast of the United States and the Alaskan territories (including the Aleutian Islands, Alaska Peninsula and the south coast of Alaska) form part of the Pacific Ring of Fire, an area of intense tectonic and volcanic activity that causes 90% of the world's earthquakes.The north-western US has the most active volcanoes in the United States, Washington, Oregon and northern California along the Cascade Mountains. The Hawaiian Islands are home to several active volcanoes, including Kilauea, which has been erupting continuously since 1983, but they generally do not adversely affect islanders. There have been no major life-threatening eruptions in the Hawaiian Islands since the 1600s. Volcanic eruptions can occasionally be devastating, such as the 1980 eruption of Mount St. Helens in Washington.

**Question 0**

What is the Pacific region known for its intense volcanic activity?

**Question 1**

What percentage of earthquakes on Earth occur in the Pacific Ring of Fire?

**Question 2**

Which Hawaiian volcano has erupted since 1983?

**Question 3**

When was the last time a life-threatening volcanic eruption occurred in the Hawaiian Islands?

**Question 4**

What year did Mount St Helens erupt, causing devastating destruction?

**Question 5**

Which volcano erupted in 1990?

**Question 6**

What causes 80% of the world's earthquakes?

**Question 7**

Which Hawaiian volcano has erupted since 1985?

**Question 8**

When was the first life-threatening volcanic eruption in the Hawaiian Islands?

**Question 9**

What is most prevalent in the American Southwest?

**Document number 363**

**Text number 0**

A compact disc (CD) is a digital optical disc used to store data. It was originally developed to record and play only audio recordings, but was later adapted to store data (CD-ROM). Several other formats have been derived from them, such as the single-use audio and data recording (CD-R), rewritable media (CD-RW), Video Compact Disc (VCD), Super Video Compact Disc (SVCD), Photo CD, PictureCD, CD-i and Enhanced Music CD. Audio CDs and audio CD players have been commercially available since October 1982.

**Question 0**

When did audio CDs start to be bought?

**Question 1**

What does CD stand for?

**Question 2**

What were CDs originally created to record?

**Question 3**

What is SVCD?

**Question 4**

In what year did CDs start to be bought?

**Question 5**

What was the original format of CDs?

**Question 6**

In what year were CDs modified to allow data to be stored on them?

**Question 7**

What does the word ROM mean on CD-ROMs?

**Question 8**

Which was released first; CD-R or CD-RW?

**Question 9**

Who created the CD?

**Question 10**

What does CD-i stand for?

**Text number 1**

In 2004, around 30 billion audio CDs, CD-ROMs and CD-Rs were sold worldwide. By 2007, 200 billion CDs had been sold worldwide. CDs are increasingly being replaced by other digital storage and distribution formats, resulting in a decline of around 50% in US sales of audio CDs from their peak level. In 2014, for the first time, revenues from digital music services equaled revenues from sales of physical formats.

**Question 0**

What year were digital and physical music sales the same?

**Question 1**

How many CDs had been distributed worldwide by 2007?

**Question 2**

How many percent did audio CD sales fall?

**Question 3**

How many CDs had been distributed worldwide by 2007?

**Question 4**

How many CDs were sold worldwide in 2004?

**Question 5**

In what year did digital media start to replace CDs?

**Question 6**

How many CDs had been sold in the US by 2007?

**Question 7**

What year did CD sales peak?

**Question 8**

Why do CDs sell better than digital storage services?

**Question 9**

How has CD sales changed internationally?

**Text number 2**

Compact Disc is an evolution of LaserDisc technology, which uses a refined laser beam to enable the high information density required for high-quality digital audio signals. Philips and Sony independently developed prototypes in the late 1970s. In 1979, Sony and Philips set up a joint engineering team to design a new digital audio disc. After a year of experimentation and discussion, the Red Book CD-DA standard was published in 1980. After its commercial release in 1982, CDs and their players became very popular. Although CD players cost up to $1 000, more than 400 000 CD players were sold in the United States between 1983 and 1984. The success of the CD was due to the collaboration between Philips and Sony, who jointly agreed on and developed compatible hardware. The uniform design of the CD enabled consumers to buy any disc or player from any company and, as a result, the CD undeniably dominated the home music market.

**Question 0**

Who created the Compact Disc prototypes in the 1970s?

**Question 1**

How long did it take to create the Red Book CD-DA standard?

**Question 2**

How many CD players were sold in the US in the first year?

**Question 3**

Where did CD evolve from?

**Question 4**

What made it possible for CDs to be played on any company's CD player?

**Question 5**

Where did the CD flourish?

**Question 6**

In what year did CD players start to be bought?

**Question 7**

Which company was the first to create a CD?

**Question 8**

How many CD players were sold in 1984?

**Question 9**

What year was LaserDisc created?

**Question 10**

How long was the Red Book CD-DA in print?

**Question 11**

How did the merger between Philips and Sony hurt customers?

**Text number 3**

In 1974, L. Ottens, head of Philips' audio department, set up a small team to develop an analogue optical record with a diameter of 20 cm and better sound quality than vinyl. However, because of the unsatisfactory performance of the analogue format, two Philips research engineers recommended a digital format in March 1974. In 1977, Philips set up a laboratory to create a digital record. The diameter of the Philips prototype CD was specified as 11.5 cm, the diameter of a sound cartridge.

**Question 0**

In what year did Philips set up a laboratory to create a digital audio record?

**Question 1**

What was the proposed diameter of the original CD?

**Question 2**

In what year did Philips introduce the idea of a digital audio format?

**Question 3**

Who was the head of Philips' audio division in 1974?

**Question 4**

Which Philips engineer recommended the digital format?

**Question 5**

What is the diameter of 20 cm based on?

**Question 6**

What year was the digital record released?

**Question 7**

How many engineers recommended a diameter of 11.5 cm?

**Question 8**

Who was the head of Philips by 1977?

**Text number 4**

Heitaro Nakajima, who developed the early digital audio recorder for Japan's national broadcaster NHK in 1970, became the head of Sony's audio division in 1971. His team developed a digital audio recorder with PCM converter using the Betamax video recorder in 1973. After that, in 1974, it was easy to move to digital audio recording on optical disc. Sony first publicly introduced optical digital audio disc in September 1976. A year later, in September 1977, Sony presented to the press a 30 cm disc capable of reproducing 60 minutes of digital audio (44 100 Hz sampling rate and 16-bit resolution) using MFM modulation. In September 1978, Sony introduced an optical digital audio disc with a playback time of 150 minutes, a sampling rate of 44 056 Hz, linear 16-bit resolution and cross-interleaved error correction code - the same requirements as were later agreed in 1980 for a standard compact disc. The technical details of Sony's digital audio disc were presented at the 62nd International Conference on Digital Audio Disc held in Brussels from 13 to 16 March 1979. AES Congress. Sony's AES technical document was published on 1 March 1979. One week later, on 8 March, Philips publicly presented the prototype of the optical digital audio disc at a press conference "Philips Introduce Compact Disc" in Eindhoven, the Netherlands.

**Question 0**

Where 62. Where was the 62nd AES Congress held?

**Question 1**

Who was the head of Sony's audio division in 1971?

**Question 2**

What year did Sony first introduce the use of optical digital audio?

**Question 3**

Where was the Philips Introduce Compact disc conference held?

**Question 4**

What did the Nakajima team use to create the digital PCM converter audio recorder?

**Question 5**

When did Sony publish the AES technical document?

**Question 6**

In which Japanese city is NHK located?

**Question 7**

Who was the CEO of Sony in 1970?

**Question 8**

When was the Betamax video recorder developed?

**Question 9**

How many minutes could a 1976 Sony optical digital disc play?

**Question 10**

What was the sampling rate of the Philips optical digital dic manufactured in 1979?

**Text number 5**

As a result, Sony and Philips set up a joint engineering team in 1979 to design a new digital record. The research, led by engineers Kees Schouhamer Immink and Toshitada Doi, advanced laser and optical disc technology. After a year of experimentation and discussion, the team produced the Red Book CD-DA standard. First published in 1980, the standard was formally adopted by the IEC as an international standard in 1987, with various amendments becoming part of the standard in 1996.

**Question 0**

What year did Sony and Philips jointly design the new digital record player?

**Question 1**

What year was the Red Book CD-DA standard published?

**Question 2**

When did the IEC adopt Red Book CD-DA as an international standard?

**Question 3**

Who led the Sony/Philips digital record working group in 1979?

**Question 4**

Which company did Kees Schouhamer Immink work for?

**Question 5**

What did the team create five years after joining?

**Question 6**

What does IEC mean?

**Question 7**

Who wrote the amendments in 1996?

**Question 8**

What did CD-DA mean?

**Text number 6**

The Japanese launch was followed in March 1983 by the introduction of CD players and discs in Europe and North America (where CBS Records released sixteen titles). This event is often regarded as the "big bang" of the digital audio revolution. The new record was enthusiastically received, especially by classical music and audiophiles, and its processing quality was particularly praised. As the price of musical instruments gradually fell and the portable Walkman came onto the market, the CD began to gain popularity in the wider popular and rock music market. The first artist to sell a million CDs was Dire Straits with their 1985 album Brothers in Arms. The first major artist to have his entire catalogue converted to CD was David Bowie, whose 15 studio albums and four greatest hits albums were released by RCA Records in February 1985. In 1988, 400 million CDs were produced in 50 pressing plants around the world.

**Question 0**

Who was the first to sell a million CDs?

**Question 1**

Which artist's entire catalogue was the first to be converted to CD?

**Question 2**

What year was the Dire Straits album Brothers in Arms released?

**Question 3**

How many CDs were mass produced in 1988?

**Question 4**

How many studio albums did David Bowie release in February 1985?

**Text number 7**

The CD was designed as a successor to the gramophone record for playing music, not primarily as a medium for storing information. The CD was originally a music format, but it has evolved into other applications. In 1983, after the introduction of the CD, Immink and Braat introduced the 73rd CD. AES conference, the first experiments with erasable CDs were presented. In June 1985, a computer-readable CD-ROM (read-only memory) and in 1990 a CD-Recordable (CD-Recordable) were introduced, also developed by Sony and Philips. CD-Recordable discs were a new alternative to tape for storing music and copying music albums without the shortcomings of the packaging used in other digital storage methods. Other newer video formats such as DVD and Blu-ray use the same physical geometry as CD, and most DVD and Blu-ray players are backwards compatible with audio CD.

**Question 0**

What is ROM?

**Question 1**

What year did Sony and Philips release the CD-R?

**Question 2**

My year was 73. AES conference?

**Question 3**

What was the predecessor of the CD?

**Question 4**

When was the gramophone released?

**Question 5**

What was the problem with recordable CDs?

**Question 6**

When was the DVD first released?

**Question 7**

Who created DVDs and Blu-ray discs?

**Question 8**

Who created the gramophone?

**Text number 8**

At the same time, CD sales started to decline in the 2000s, as the distribution of losslessly compressed audio formats such as MP3 on the Internet became more widespread. For example, between 2000 and 2008, CD sales by the major labels fell by 20%, despite an overall increase in music sales, which grew for one exceptional year. However, according to figures published on 30 March 2009, sales of independent labels and DIY CDs have improved and CD sales continue to be buoyant. In 2012, CDs and DVDs accounted for only 34% of music sales in the US. In Japan, however, more than 80% of music was purchased on CDs and other physical formats in 2015.

**Question 0**

What percentage of music sales were CDs and DVDs in the US in 2012?

**Question 1**

In which country do more than 80% of music sales take place in physical formats?

**Question 2**

How are MP3 files compressed?

**Question 3**

When did CD sales return to their original decline?

**Question 4**

What has caused the decline in CD sales?

**Question 5**

What year did CD sales reach an unusually high level?

**Question 6**

What is the share of MP3 music sales?

**Question 7**

How are CDs packaged?

**Question 8**

By what percentage have DIY and independent CDs increased?

**Question 9**

When did MP3 sales start in Japan?

**Text number 9**

Duplicated CDs are initially mass-produced using a hydraulic press. Small raw polycarbonate plastic particles are fed into the press. A screw forces the liquefied plastic into the mould cavity. The mould is closed by a metal tamper, which is in contact with the surface of the sheet. The plastic is allowed to cool and cure. Once the plate tray is opened, a robotic arm removes it from the mould and a 15 mm diameter central hole (called a stacking ring) is created. It usually takes between two and three seconds to "stamp" a single CD.

**Question 0**

How are CDs mass produced?

**Question 1**

What kind of material is used to make CDs?

**Question 2**

What is the diameter of the centre hole of a CD?

**Question 3**

How long does it take to stamp one CD?

**Question 4**

What is the term for the centre track of a CD?

**Question 5**

How big is the screw that forces the plastic into the cavity?

**Question 6**

How long does it take for plastic to cool?

**Question 7**

What is the name of the robot hand?

**Question 8**

What is a hydraulic clamp made of?

**Question 9**

What closes the mould?

**Text number 10**

This method is used to produce a clear plastic blank part of the sheet. After a reflective metal layer (usually aluminium, but sometimes gold or other metal) is applied to the clear blank, the plate is cured under UV light and is ready for the printing press. For CD pressing, a glass master disc is made using a high-powered laser on a device similar to a CD writer. The glass master is a positive image of the desired CD surface (with the desired microscopic pits and dimples). After testing, it is used to make a mould by pressing it against a metal disc.

**Question 0**

What materials can be used to make a reflective layer on a CD?

**Question 1**

What kind of light is used to cure CDs?

**Question 2**

What is a glassmaker?

**Question 3**

How are glassmakers created?

**Question 4**

What is the bright blank side made of?

**Question 5**

What is used to attach a reflective layer to a clear layer?

**Question 6**

How is a CD writer made?

**Question 7**

How do you make a positive image of a CD?

**Question 8**

How are pits and soils made?

**Text number 11**

A mould is the negative image of a glass master: usually several are made, depending on how many presses are to be made for a CD. The matrix then goes into the press and the physical image is transferred to the blank CD, leaving the final positive image on the disc. A small amount of varnish is applied as a ring to the centre of the disc, and a rapid rotation spreads it evenly over the surface of the disc. The edge protection varnish is applied before the disc is finished. The plate can then be printed and packaged.

**Question 0**

What is the term for the negative image of a glass master?

**Question 1**

How is the positive image on a CD protected?

**Question 2**

How do I apply the varnish to the CD?

**Question 3**

What is the name of a positive image?

**Question 4**

What liquid is used for a blank CD?

**Question 5**

How much edge sealer is needed for the finished panel?

**Question 6**

How to place a physical image on a blank CD?

**Text number 12**

The most expensive part of a CD is the jewel case. In 1995, the cost of materials was 30 cents for a jewel case and 10-15 cents for a CD. The wholesale price of CDs was between $0.75 and $1.15 and the retail price was $16.98. On average, the retailer received 35% of the retail price, the record company 27%, the artist 16%, the manufacturer 13% and the distributor 9%. When 8-track tapes, cassette tapes and CDs were introduced, each was marketed at a higher price than its successor format, even though its production costs had fallen. This was done because the apparent value increased. This continued from vinyl to CDs, but was interrupted when Apple marketed MP3s at $0.99 and albums at $9.99. However, the additional cost of producing an MP3 is very small.

**Question 0**

What is the most expensive part of a CD?

**Question 1**

Why did the price of sound music rise when production costs fell?

**Question 2**

What was the retail price of CDs in 1995?

**Question 3**

Who made the most profit from CD sales?

**Question 4**

How much did a jewellery box cost in 1995?

**Question 5**

Why were successive formats cheaper than their predecessors?

**Question 6**

When did Apple launch MP3s?

**Question 7**

What was the wholesale price of the cassette tape?

**Question 8**

What was the most expensive part of the MP3?

**Question 9**

What percentage does Apple get from MP3s?

**Text number 13**

CD-Rs are designed to be permanent. Over time, the physical properties of the toner can change, causing read errors and data loss until the reader cannot correct them with error correction techniques. The design life is between 20 and 100 years depending on the quality of the discs, the quality of the writing drive and the storage conditions. However, tests have shown that the quality of some discs deteriorates under normal storage conditions in as little as 18 months. This failure is known as disc rot and has several causes, mainly environmental.

**Question 0**

How long are CDs expected to last?

**Question 1**

What can cause sudden disc breakage?

**Question 2**

Are CDs for permanent or temporary use?

**Question 3**

Which part of the aluminium plate can cause reading errors?

**Question 4**

Why do CD-Rs last for years when they rot?

**Question 5**

Why are CD-Rs considered temporary?

**Question 6**

Which company found the disk failure?

**Question 7**

What is the best environment for a CD-R?

**Text number 14**

ReWritable Audio CD is designed for use in a consumer audio CD recorder that does not accept (without modification) standard CD-RW discs. These consumer audio CD recorders use the Serial Copy Management System (SCMS), an early form of Digital Rights Management (DRM), to comply with the US Audio Home Recording Act (AHRA). A rewritable audio CD is generally slightly more expensive than a CD-RW disc because of a) the smaller volume of the disc and b) the 3% royalty under the AHRA, which is used to compensate the music industry for making a copy.

**Question 0**

What does SCMS stand for?

**Question 1**

What is DRM?

**Question 2**

What does AHRA stand for?

**Question 3**

What type of CD is intended for use in a consumer audio CD recorder?

**Question 4**

Which is cheaper, a rewritable audio CD or a CD-RW?

**Question 5**

What plays normal CD-RW discs without modification?

**Question 6**

What are the royalties on a CD-RW disc?

**Question 7**

In what year was digital rights management published?

**Question 8**

What is the international standard for home recordings?

**Question 9**

Why is a CD-RW more expensive than a rewritable CD?

**Text number 15**

Due to technical limitations, the original rewritable CD could only be written to at a maximum speed of 4x. The High Speed ReWritable CD is structured differently, allowing 4x to 12x writing speed. Original CD-RW drives can only write to original ReWritable CDs. High-speed CD-RW drives can usually write to both original rewritable CDs and high-speed rewritable CDs. Both types of CD-RW discs can be read by most CD drives. Faster CD-RW discs are now available, Ultra Speed (16x-24x write speed) and Ultra Speed+ (32x write speed).

**Question 0**

How quickly could the first rewritable CD be written?

**Question 1**

Which CD has a write speed of 4x and 12x?

**Question 2**

How fast do Ultra Speed+ CDs write?

**Question 3**

How fast do Ultra Speed CDs write?

**Question 4**

Which write speed is only 1x?

**Question 5**

What type of CD-RW disc cannot be read by a CD drive?

**Question 6**

Does a fast CD-RW drive write faster to rewritable CDs or to fast rewritable CDs?

**Question 7**

Which rewritable CD is the most common?

**Question 8**

Why was the original rewritable CD only written at more than 4x speed?

**Text number 16**

The CD is read by focusing a 780 nm wavelength (near-infrared) semiconductor laser placed in the CD player through the bottom of the polycarbonate layer. The difference in height between the pits and the ground layers causes a difference in the way the light is reflected. By measuring the change in intensity with a photodiode, the data can be read from the plate. To record the spiral data, a semiconductor laser is placed on a pendulum arm in the disc tray of any CD player. This pendulum arm allows the laser to read data from the centre to the edges of the disc without interrupting the rotation of the disc.

**Question 0**

Which CD player has a semiconductor laser?

**Question 1**

What wavelength is used to extract data from a CD?

**Question 2**

How is the data stored on the CD?

**Question 3**

What distinguishes the change in light intensity on a CD?

**Question 4**

What causes a change in the light reflected from a CD?

**Question 5**

How long is the swing arm?

**Question 6**

How many layers of polycarbonate are there?

**Question 7**

Why is the data arranged in a spiral?

**Question 8**

Where is the photodiode?

**Question 9**

What does the width of the hole tell you?

**Text number 17**

The wells and countries themselves do not directly represent the zeros and ones in binary data. Instead, a reverse encoding is used, where zero to zero is not reverted: a change from a pit to a country or from a country to a pit represents a one, while a change that does not occur represents a set of zeros. There must be at least two and at most ten zeros between each one, determined by the length of the hole. This in turn is decoded by inverting the eight-to-fourteen modulation used to master the disc, followed by a cross-connected Reed-Solomon encoding to reveal the raw data stored on the disc. These encoding techniques (as defined in the Red Book) were originally designed for CD Digital Audio CDs, but later became the standard for almost all CD formats (including CD-ROMs).

**Question 0**

What kind of encoding is used on CDs?

**Question 1**

Where can I find CD encoding techniques?

**Question 2**

Which result from the CD will return a one?

**Question 3**

What kind of modulation is done when mastering an album?

**Question 4**

How many ones are between each zero?

**Question 5**

What decodes the eight to fourteen modulation?

**Question 6**

What is Reed-Solomon coding?

**Question 7**

Who designed the digital audio encoding technology for CDs?

**Question 8**

What does the country stand for?

**Text number 18**

CDs are susceptible to damage from handling and environmental exposure. The pits are much closer to the label side of the disc, so defects and contaminants on the clear side are not visible during playback. CDs are therefore more likely to be damaged on the label side of the disc. Scratches on the clear side can be repaired by refilling with a similar folding plastic or by careful polishing. The edges of CDs are sometimes inadequately sealed, allowing gases and liquids to corrode the reflective metal layer and interfere with the laser's ability to focus on the pits. The fungus Geotrichum candidum, found in Belize, has been found to corrode the polycarbonate plastic and aluminium in CDs.

**Question 0**

Where can you expect to find damage to the board?

**Question 1**

How do I repair scratches on a CD?

**Question 2**

What eats the plastic and aluminium in CDs?

**Question 3**

Where does Geotrichum candidum fungus come from?

**Question 4**

Where is polycarbonate plastic made?

**Question 5**

Which countries are closer?

**Question 6**

How are scratches on the marked side of the plate repaired?

**Question 7**

What causes the edges of CDs to be sealed incorrectly?

**Question 8**

Where is the metal reflective layer located?

**Text number 19**

The digital data on a CD starts in the middle of the disc and progresses towards the edges, allowing adaptation to different sizes of formats. Standard CDs are available in two sizes. By far the most common is 120 mm (4.7 inches) in diameter, with an audio capacity of 74 or 80 minutes and a data capacity of 650 or 700 MiB (737 280 000 bytes). This capacity was set by Sony's Norio Ohga in May 1980 to accommodate on a single disc the entire recording of Beethoven's Ninth Symphony by the London Philharmonic Orchestra. According to Kees Immink, this is a myth, because in May 1980 the format of the codec had not yet been decided. The EFM adopted a month later would have allowed 97 minutes of playing time on 120 mm discs and 74 minutes on 100 mm discs. The 120 mm diameter disc was adopted in later formats such as Super Audio CD, DVD, HD DVD and Blu-ray Disc. The 80 mm disc ("Mini-CD") was originally designed for CD singles, with a maximum capacity of 24 minutes of music or 210 MiB of data, but it never became popular. Today, 120 mm CDs are used for almost all singles, known as Maxi singles.

**Question 0**

Where does the information on the CD start?

**Question 1**

What size of CD is most often used?

**Question 2**

What is the size of a Mini-CD?

**Question 3**

What size is the Maxi Single?

**Question 4**

Who was the head of Sony in 1980?

**Question 5**

Who named the Maxi single?

**Question 6**

How many minutes can you fit on a Super Audio CD?

**Question 7**

When were the Mini-CDs released?

**Question 8**

Why are CDs limited to one size?

**Question 9**

When was the London Philharmonic Orchestra's recording of the Ninth Symphony made?

**Text number 20**

The logical format of an audio CD (officially Compact Disc Digital Audio or CD-DA) is described in a document created by Sony and Philips in 1980. The document is colloquially known as the Red Book CD-DA, after the colour of its cover. The format is a two-channel 16-bit PCM encoding at a sampling rate of 44.1 kHz per channel. Four-channel audio was intended to be included in the Red Book format, but was never implemented. There is no existing standard for mono sound on Red Book CDs, so mono source material is usually presented as two identical channels on the Red Book standard stereo track (i.e. mirrored mono). However, MP3 CDs may contain audio file formats with mono sound.

**Question 0**

What is the name of the Red Book?

**Question 1**

What is the official name of the CD?

**Question 2**

Do CDs have a two- or four-channel format?

**Question 3**

What format has never been adopted for CDs?

**Question 4**

What was the sampling frequency of the four-channel sound?

**Question 5**

When was four-channel sound introduced?

**Question 6**

What is the Red Book format for monaural audio?

**Question 7**

What is the official name of the Red Book?

**Question 8**

What is the PCM of an MP3 mono audio channel?

**Text number 21**

Compact Disc + Graphics is a special audio CD that contains graphics data in addition to the audio data on the disc. The disc can be played on a standard audio CD player, but when played on a special CD+G player, it can provide a graphics signal (usually the CD+G player is connected to a television or computer screen); these graphics are used almost exclusively to display the lyrics on television so that karaoke performers can sing along. The CD+G format uses channels R-W. These six bits store the graphics data.

**Question 0**

What is the primary purpose of Compact Disc + Graphics?

**Question 1**

How to read graphics data from a CD+ Graphics disc?

**Question 2**

What channels does CD+G use to store graphics data?

**Question 3**

Why can't a CD+G disc be played on an audio CD player?

**Question 4**

How many bits does a standard CD use?

**Question 5**

Why are CD-G players not useful for karaoke?

**Question 6**

What channels does a normal CD use?

**Text number 22**

SVCD has two-thirds the resolution of DVD and more than 2.7 times the resolution of VCD. One CD-R disc can hold up to 60 minutes of standard quality SVCD video. Although the length of SVCD video is not limited by the specification, the video bit rate and thus the quality must be reduced to accommodate very long videos. It is generally difficult to fit much more than 100 minutes of video on a single SVCD without significant degradation in quality, and many hardware players are unable to play back video with an instantaneous bit rate of less than 300-600 kilobits per second.

**Question 0**

How much video can a CD-R contain?

**Question 1**

Which resolution is better, VCD or SVCD?

**Question 2**

How long can videos fit on SVCDs?

**Question 3**

What is the maximum number of videos allowed on an SVCD?

**Question 4**

How much can you fit on a VCD?

**Question 5**

Why do SVCDs have a video length limit?

**Question 6**

What is the kilobit speed of a DVD?

**Question 7**

How does VCN compare to a DVD?

**Question 8**

Why is it difficult to put more than 60 minutes on a DVD?

**Text number 23**

Photo CD is a system designed by Kodak to digitise and store photos on a CD. Launched in 1992, the discs hold nearly 100 high-quality images, scanned prints and slides, encoded with a special coding scheme. Photo CDs are defined in the Beige Book and also conform to the specifications of CD-ROM XA and CD-i Bridge. They are intended for playback on CD-i players, Photo CD players and any computer with the appropriate software, regardless of the operating system. The images can also be printed on photo paper using Kodak's special machine. This format should not be confused with Kodak Picture CD, which is a consumer product in CD-ROM format.

**Question 0**

Who created the Photo CDs?

**Question 1**

When were photo CDs originally released?

**Question 2**

How many images can photo CDs originally contain?

**Question 3**

What kind of paper can Photo CD images be produced on?

**Question 4**

Which book defines the Photo CD standards?

**Question 5**

When was the Beige Book published?

**Question 6**

How many photos can be stored on a CD-ROM XA?

**Question 7**

Who invented CD-i players?

**Question 8**

Why don't Photo CDs work on any computer?

**Question 9**

When was the Kodak Picture CD released?

**Text number 24**

The Red Book audio file specification does not include a copy protection mechanism, except for a simple "anti-copy" clause in the subcode. Since at least 2001, record companies tried to market "copy-protected", non-standard CDs that could not be copied to hard disks or easily converted to MP3s. One of the main drawbacks of these copy-protected discs is that most of them will not play on computer CD-ROM drives or on some stand-alone CD players using CD-ROM mechanisms. Philips has stated that such discs must not bear the trademarked Compact Disc Digital Audio logo because they violate the Red Book specifications. Numerous copy protection schemes have been countered by readily available, often free, software.

**Question 0**

When did record companies first try to protect their CDs against copying?

**Question 1**

Who said that protected CDs cannot have a CDDA logo?

**Question 2**

Where does the Red Book mention copy protection?

**Question 3**

When was the "anti-copying" subcode written into the Red Book?

**Question 4**

Who created the software for the anti-virus protection system?

**Question 5**

When was the Compact Disc Digital Audio logo copyrighted?

**Question 6**

Which devices cannot play normal CDs?

**Question 7**

Why does Philips want non-standard discs to have a trademarked logo?

**Document number 364**

**Text number 0**

A transistor is a semiconductor component used to amplify or switch electronic signals and electric current. It consists of a semiconductor material with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of poles in a transistor changes the current through another pair of poles. Since the (output) power to be controlled can be greater than the (input) power to be controlled, the transistor can amplify the signal. Today, some transistors are packaged individually, but many others are in integrated circuits.

**Question 0**

What is a transistor used for?

**Question 1**

What is the transistor made of?

**Question 2**

What is the minimum number of external terminals for an object to be called a transistor?

**Question 3**

Why does a transistor increase the signal?

**Question 4**

Where can you find most transistors?

**Question 5**

What is the integrated circuit used for?

**Question 6**

Where can most semiconductor components be found?

**Question 7**

What are integrated circuits made of?

**Question 8**

How many transistors are in most integrated circuits?

**Question 9**

What controls the strength of the signal?

**Text number 1**

The transistor is the basic building block of modern electronic devices and is present in all modern electronic systems. Julius Lilienfeld invented the transistor in 1926 and American physicists John Bardeen, Walter Brattain and William Shockley put it into practice in 1947. The transistor revolutionised the electronics industry, paving the way for smaller and cheaper radios, calculators and computers, among other things. The transistor is on the IEEE's list of milestones in electronics, and Bardeen, Brattain and Shockley shared the 1956 Nobel Prize in Physics for their achievement.

**Question 0**

When was the first transistor created?

**Question 1**

Who invented the first transistor?

**Question 2**

When was the first transistor introduced in practice?

**Question 3**

When did the implementers win the Nobel Prize for making a transistor?

**Question 4**

Which list is the transistor on?

**Question 5**

When were smaller and cheaper radios introduced?

**Question 6**

What else is on the IEEE's list of milestones in electronics other than the transistor?

**Question 7**

What did Julius Lilienfeld get for inventing the transistor?

**Question 8**

Who was the first to use transistors in calculators?

**Question 9**

Why were transistors in 1947 easier to implement in practice than transistors in 1926?

**Text number 2**

The vacuum tube, the thermionic triode, invented in 1907, enabled enhanced radio technology and long-distance telephony. However, the triode was a fragile device that consumed a lot of power. In 1925, physicist Julius Edgar Lilienfeld filed a patent in Canada for a field-effect transistor (FET) to replace the triode with a solid state. Lilienfeld also filed similar patents in the United States in 1926 and 1928, but he did not publish research papers on his devices and his patents did not mention any concrete examples of a working prototype. Since the production of high-quality semiconductor materials was still decades away, Lilienfeld's semiconductor amplifier ideas would not have found practical application in the 1920s and 1930s, even if such a device had been built. In 1934, German inventor Oskar Heil patented a similar device.

**Question 0**

When was the termite triode invented?

**Question 1**

What was the purpose of the thermionitriod?

**Question 2**

Who applied for a patent on the field-effect transistor?

**Question 3**

Where did Lilienfeld leave his patent?

**Question 4**

What year did Lilienfeld file his patent?

**Question 5**

Where did Oskar Heil leave his patent?

**Question 6**

How long would it take to build a practical field-effect transistor?

**Question 7**

Why did Oskar Heil invent a device like the Lilienfeld device?

**Question 8**

Why were field-effect transistors impractical without high-quality semiconductor materials?

**Question 9**

Where was the termite triode invented?

**Text number 3**

From 17 November 1947 to 23 December 1947, John Bardeen and Walter Brattain conducted experiments at AT&T's Bell Labs in the United States and found that when two gold point contacts were connected to germanium crystal, a signal with an output power greater than the input power was produced. William Shockley, head of the Solid State Physics group, saw this potential and worked over the next few months to greatly expand our knowledge of semiconductors. John R. Pierce coined the term transistor as an acronym for transresistance. According to Lillian Hoddeson and Vicki Daitch, who wrote a biography of John Bardeen, Shockley had proposed that Bell Labs' first transistor patent be based on the field effect and that he be named as the inventor. After Bell Labs' lawyers discovered Lilienfeld's patents, which had gone unreported years earlier, they objected to Shockley's proposal because the idea of a field-effect transistor using an electric field as a "network" was not new. Instead, Bardeen, Brattain and Shockley invented the first point-contact transistor in 1947. In recognition of this achievement, Shockley, Bardeen and Brattain were jointly awarded the 1956 Nobel Prize in Physics "for their research on semiconductors and the discovery of the transistor effect".

**Question 0**

At what time did Bardeen and Brattain conduct an experiment to increase signal power?

**Question 1**

Where were the gold contacts attached to increase the signal output?

**Question 2**

Who was the leader of the solid state physics group?

**Question 3**

Who invented the term transistor?

**Question 4**

Why was the term transistor used?

**Question 5**

When did Bell Labs lawyers discover the Lilienfeld patents?

**Question 6**

Who invented the term semiconductor?

**Question 7**

How many patents did Lilienfeld file?

**Question 8**

When was the term transistor first used?

**Question 9**

Where was John Bardeen's biography written?

**Text number 4**

In 1948, German physicists Herbert Mataré and Heinrich Welker independently invented the point-contact transistor while working at the Compagnie des Freins et Signaux, a subsidiary of Westinghouse in Paris. Mataré had previous experience of developing crystalline rectifiers made of silicon and germanium during the Second World War in the German radar industry. Using this knowledge, he began to study the "interference" phenomenon in 1947. By June 1948, Mataré was detecting currents through point contacts and, using germanium samples prepared by Welker, obtained consistent results similar to those obtained by Bardeen and Brattain earlier in December 1947. Since Bell Labs scientists had already invented the transistor before them, the company rushed to get its 'transistor' into production for enhanced use in the French telephone network.

**Question 0**

In what year was the point-contact transistor invented?

**Question 1**

Who invented the point-contact transistor?

**Question 2**

Where were Matare and Welker working when they invented the point-contact transistor?

**Question 3**

What was the name of Matare and Welker's transistor?

**Question 4**

What was the transistron used for?

**Question 5**

Where were the Matare and Welker transistors made?

**Question 6**

When did Heinrich Welker start researching electronics?

**Question 7**

When did Matare and Welker realise that Bell Labs had invented the transistor?

**Question 8**

Where were the "transistrons" produced?

**Question 9**

Who was in charge of the French telephone network?

**Text number 5**

Although several companies produce more than a billion individually packaged (discrete) transistors each year, the vast majority of transistors are now produced in integrated circuits (often abbreviated IC, microchip or simply chip) together with diodes, resistors, capacitors and other electronic components to produce complete electronic circuits. A logic chip consists of no more than about twenty transistors, while an advanced microprocessor can have up to 3 billion transistors (MOSFETs) as of 2009. "In 2002, about 60 million transistors were built... for every man, woman and child on earth. "

**Question 0**

How many transistors make up a logic gate?

**Question 1**

How many transistors does a microprocessor contain?

**Question 2**

How many transistors were manufactured in 2002?

**Question 3**

How many individually packaged transistors are produced each year?

**Question 4**

What are some abbreviations for integrated circuits?

**Question 5**

How many integrated circuits are produced each year?

**Question 6**

How many men, women and children are there on the planet?

**Question 7**

How many logic ports are there in the chip?

**Question 8**

What produces electronic components?

**Question 9**

Where are transistors made?

**Text number 6**

The essential benefit of a transistor lies in its ability to use a small signal connected between its one pair of terminals to control a much larger signal on another pair of terminals. This property is called gain. It can produce a stronger output signal, voltage or current proportional to a weaker input signal; in other words, it can act as an amplifier. Alternatively, a transistor can be used to switch current on or off in a circuit as an electrically controlled switch, where the amount of current is determined by other circuit elements.

**Question 0**

Why is the transistor so useful?

**Question 1**

What is a win?

**Question 2**

What is the additional use of a transistor?

**Question 3**

What determines the amount of current in an electrically controlled switch?

**Question 4**

What controls the strength of the output signal?

**Question 5**

Where are the transistors located?

**Question 6**

How big is the transistor compared to the terminal?

**Question 7**

What happens to the signal when the transistor does not work properly?

**Question 8**

Where would the electrically controlled switch be located?

**Text number 7**

There are two different types of transistors, with slight differences in how they are used in a circuit. Bipolar transistor terminals are labelled base, collector and emitter. A small current at the base terminal (i.e. the current flowing between the base and emitter) can control or switch a much larger current between the collector and emitter terminals. The terminals of a field-effect transistor are labeled gate, source, and drain, and the voltage at the gate can control the current between the source and drain.

**Question 0**

How many types of transistors are there?

**Question 1**

What are the components of a bipolar transistor?

**Question 2**

What drives the high current between the collector and the emitter?

**Question 3**

What are the components of a field-effect transistor?

**Question 4**

What in a field-effect transistor controls the current between source and drain?

**Question 5**

Why would someone use a bipolar transistor instead of a field-effect transistor?

**Question 6**

What is the most common type of transistor?

**Question 7**

What controls the gate voltage of a field-effect transistor?

**Question 8**

Where is the collection point located?

**Question 9**

Where is the gate terminal located?

**Text number 8**

In a grounded emitter transistor circuit, such as the photo switch circuit shown in the figure, the emitter and collector currents increase exponentially as the base voltage increases. The collector voltage decreases as the resistance between the collector and the emitter decreases. If the voltage difference between collector and emitter were zero (or close to zero), the collector current would be limited only by the load resistance (filament) and the supply voltage. This is called saturation, because the current flows freely from the collector to the emitter. When the switch is saturated, it is said to be on.

**Question 0**

Why does the collector voltage drop in the circuits of a grounded emitter transistor?

**Question 1**

What would happen if the voltage difference between the collector and the emitter was zero?

**Question 2**

What is the term for zero difference between the collector and the emitter?

**Question 3**

Why is the term saturation so named?

**Question 4**

What position is the switch in when it is saturated?

**Question 5**

What causes the reduced resistance from the collector to the emitter?

**Question 6**

Why is "current" so named?

**Question 7**

What changes most in the circuit of a grounded emitter transistor?

**Question 8**

What is the load resistance of an incandescent lamp?

**Question 9**

What changes the amount of supply voltage?

**Text number 9**

Providing sufficient base current is a key problem when using bipolar transistors as switches. The transistor provides current amplification, allowing a relatively high current in the collector to be switched at a much lower current to the base terminal. The ratio of these currents varies with the type of transistor and even for a given type varies with the collector current. In the example photocoupler circuit, the resistor is selected to provide sufficient base current to ensure transistor saturation.

**Question 0**

What is the main problem with using bipolar transistors as switches?

**Question 1**

What does a transistor offer?

**Question 2**

What determines the current ratio of transistors?

**Question 3**

If the type of transistor is the same, what determines the current ratio?

**Question 4**

What controls the gain produced by a transistor?

**Question 5**

How much power is needed to saturate a light switch?

**Question 6**

What determines how much collector current there is?

**Question 7**

What varies most in a transistor?

**Text number 10**

The idea of a switching circuit is to simulate as closely as possible an ideal switch with the characteristics: open circuit when off, short circuit when on, and instantaneous transition between the two states. The parameters are chosen so that the "off" output is limited to leakage currents small enough not to affect the switched circuits; the resistance of the transistor in the "on" state is small enough not to affect the circuits; and the transition between the two states is fast enough not to have adverse effects.

**Question 0**

How are the parameters selected in a switching circuit?

**Question 1**

What is the switching circuit trying to simulate when it is on?

**Question 2**

What is the switching circuit trying to simulate when it is off?

**Question 3**

How quickly does the change from open to short circuit occur?

**Question 4**

What can prevent the exchange from moving quickly?

**Question 5**

What can help the switch to work more efficiently?

**Question 6**

Which district has the least resistance?

**Question 7**

Which district is most resistant?

**Question 8**

When is the circuit most likely to fail?

**Text number 11**

Bipolar transistors get their name from the fact that they conduct using both majority and minority carriers. The bipolar junction transistor, the first mass-produced transistor type, is a combination of two junction diodes and consists of either a thin p-type semiconductor layer between two n-type semiconductors (n-p-n transistor) or a thin n-type semiconductor layer between two p-type semiconductors (p-n-p transistor). This structure produces two p-n junctions: an emitter junction and a collector junction, separated by a thin semiconductor region called the base region (two junction diodes connected together without a common semiconductor region do not form a transistor).

**Question 0**

Where did bipolar transistors get their name?

**Question 1**

What was the first mass-produced transistor?

**Question 2**

What is a bipolar junction transistor combination?

**Question 3**

What is the name of the p-type semiconductor layer between two n-type semiconductors?

**Question 4**

What is the name of the n-type semiconductor layer between two p-type semiconductors?

**Question 5**

What type of transistor is most commonly used?

**Question 6**

Where did the compound diodes get their name?

**Question 7**

What is the most common type of bipolar transistor?

**Question 8**

How are bipolar transistors mass produced?

**Text number 12**

A BJT has three terminals corresponding to three semiconductor layers - the emitter, base and collector. They are useful in amplifiers because the emitter and collector currents can be controlled by a relatively low base current. In an active-region n-p-n transistor, the junction between the emitter and the base is forward-facing (electrons and holes merge at the junction), and electrons are injected into the base region. Because the base is narrow, most of these electrons diffuse into the reverse-tuned (electrons and holes form at the junction and move away from the junction) base-collector junction and are swept into the collector; perhaps one hundredth of the electrons recombine with the base, which is the dominant mechanism in the base current. By controlling the number of electrons that can leave the base, the number of electrons entering the collector can also be controlled. The collector current is about β (common emitter current gain) times the base current. It is typically above 100 in low signal transistors, but can be lower in transistors designed for high power applications.

**Question 0**

How many pins are there on the BJT?

**Question 1**

How many semiconductor layers are there in a BJT?

**Question 2**

What are the semiconductor layers of a BJT?

**Question 3**

How can the collector current be determined?

**Question 4**

What is the normal collector current in small signal transistors?

**Question 5**

Why is the bottom of a BJT narrow?

**Question 6**

Where are BJT amplifiers most commonly used?

**Question 7**

What controls how many electrons are injected into the base region?

**Question 8**

How many electrons are injected into the base region?

**Text number 13**

In an FET, the source and drainage flow passes through a conducting channel that connects the source area to the drainage area. The conductance is modified by an electric field created when a voltage is applied between the gate and source terminals; thus, the voltage applied between the gate and source controls the current flowing between the drain and source. As the gate-to-source voltage (VGS) is increased, the drain-to-source current (IDS) increases exponentially with VGS below the threshold and then at an approximately quadratic rate (IGS ∝ (VGS - VT)2) (where VT is the threshold voltage at which the drain current begins) in the "state-load-limited" region above the threshold. No quadratic behaviour is observed in modern devices, for example in the 65 nm technology node.

**Question 0**

What determines the conductivity in an FET?

**Question 1**

What controls the flow of current between the drain and the source?

**Question 2**

At what rate does the drain-source current increase as the gate-source current increases?

**Question 3**

Where is quadratic behaviour not observed?

**Question 4**

What controls the voltage between the gate and source connectors?

**Question 5**

Why is quadratic behaviour not observed in modern devices?

**Question 6**

Where does the current fluctuate most?

**Question 7**

How fast does the voltage increase?

**Text number 14**

FETs are divided into two families: junction FETs (JFETs) and insulated gate FETs (IGFETs). IGFETs are more commonly known as metal-oxide-semiconductor FETs (MOSFETs), reflecting their original structure of metal (gate), oxide (insulator) and semiconductor layers. Unlike an IGFET, a JFET gate forms a p-n diode with a channel located between the source and drain. Functionally, this makes the n-channel JFET a solid-state counterpart to the vacuum tube triode, which similarly forms a diode between the grid and the cathode. Both devices also operate in depletion mode, both have high input impedance and both conduct current driven by the input voltage.

**Question 0**

How many groups are FETs divided into?

**Question 1**

What are the names of the FET groups?

**Question 2**

What is the general term for IFGET?

**Question 3**

How is a JFET different from an IGFET?

**Question 4**

In which mode do both JFETs and IGFETs operate?

**Question 5**

What is the vacuum tube triode made of?

**Question 6**

What controls the amount of supply voltage?

**Question 7**

How many metal layers are in the IGFET gate?

**Question 8**

What is FET like in mass production?

**Text number 15**

FETs are further divided into depletion-mode and enhancement-mode types depending on whether the channel is switched on or off with a zero-gate supply voltage. In enhancement mode, the channel is turned off at zero voltage, and the gate potential can "enhance" conduction. In consumption mode, the channel is on at zero polarity, and the gate potential (at the opposite polarity) can "drain" the channel, thereby reducing conduction. In either mode, a more positive gate voltage corresponds to higher current in n-channel devices and lower current in p-channel devices. Almost all JFETs are depletion-mode devices because the diode junctions would be forward biased and conductive if they were enhancement-mode devices; most IGFETs are enhancement-mode devices.

**Question 0**

How are FETs distinguished from each other?

**Question 1**

At what point is the channel switched off in enhancement mode?

**Question 2**

At what point is the channel switched on in drain mode?

**Question 3**

Which channel corresponds to the high flow?

**Question 4**

Which channel corresponds to low power?

**Question 5**

Which type of FET is more common?

**Question 6**

What controls how positive the gate voltage is?

**Question 7**

What controls the gate potential of the FET?

**Question 8**

What type of FET usually has a higher voltage?

**Text number 16**

The bipolar junction transistor (BJT) was the most commonly used transistor in the 1960s and 70s. Even after MOSFETs became widely available, the BJT remained the transistor of choice in many analog circuits, such as amplifiers, due to their greater linearity and ease of fabrication. In integrated circuits, the desirable characteristics of MOSFETs enabled them to capture almost all market share in digital circuits. Discrete MOSFETs can be used in transistor applications such as analog circuits, voltage regulators, amplifiers, power supplies and motor controllers.

**Question 0**

What was the most widely used transistor in the 1960s and 70s?

**Question 1**

Why were BJTs so popular?

**Question 2**

What are the applications of discrete MOSFETs?

**Question 3**

What were the most popular digital circuits of their time?

**Question 4**

When did MOSFETs become widely available?

**Question 5**

What are the desirable characteristics of MOSFETs?

**Question 6**

What was the most common use of MOSFETs?

**Question 7**

Which type of circuit is older?

**Question 8**

Which type of circuit is more commonly used today?

**Text number 17**

The Pro Electron standard, the part numbering system of the European Electronic Component Manufacturers' Association, starts with two letters: the first letter indicates the type of semiconductor (A for germanium, B for silicon and C for materials such as GaAs); the second letter indicates the intended use (A for diode, C for general purpose transistor, etc.). This is followed by a three-digit sequential number (or one letter and two digits for an industrial type). In early devices, this indicated the type of enclosure. Suffixes can be used with a letter (e.g. "C" often indicates high hFE, such as BC549C) or other codes to indicate gain (e.g. BC327-25) or rated voltage (e.g. BUK854-800A). More common suffixes include:

**Question 0**

What is the Pro Electron standard?

**Question 1**

How many letters begin the part numbering?

**Question 2**

What is the first letter in the part numbering system?

**Question 3**

What is the second letter in the part numbering system?

**Question 4**

What follows the 2 letters in the part numbering?

**Question 5**

What is the most common type of semiconductor?

**Question 6**

What is the most common use of transistors?

**Question 7**

Which transistors are more likely to use suffixes?

**Question 8**

Which devices are most likely to have a code with a voltage rating?

**Question 9**

What is the most common reason for having a suffix in the device number?

**Text number 18**

JEDEC EIA370 transistor device numbers usually start with the word "2N", indicating a three-terminal device (dual-gate field-effect transistors are four-terminal devices, so they start with the word 3N), followed by a two-, three- or four-digit sequential number that has no bearing on device characteristics (although early devices with low numbers are usually germanium). For example, 2N3055 is a silicon n-p-n power transistor, 2N1301 is a p-n-p germanium switching transistor. Sometimes a letter suffix (such as "A") is used to indicate a newer variant, but rarely groupings.

**Question 0**

Where does the JEDEC EIA370 transistor number start?

**Question 1**

what does 2N stand for in JEDEC EIA370?

**Question 2**

What comes after 2N in JEDEC EIA370?

**Question 3**

What does the letter at the end of the device number mean?

**Question 4**

What does the number 2N1301 stand for?

**Question 5**

What were most early appliances made of?

**Question 6**

What is the most common number of extra digits in a device number?

**Question 7**

Which devices usually have the shortest transistor device numbers?

**Question 8**

What are modern appliances made of?

**Question 9**

What is the most common letter suffix?

**Text number 19**

Device manufacturers may have their own numbering system, for example CK722. Because devices are manufactured from a different source, the manufacturer's prefix (such as "MPF" for MPF102, which originally stood for Motorola FET) is now an unreliable indicator of who manufactured the device. Some proprietary naming schemes adopt parts from other naming schemes, for example PN2222A is a (possibly Fairchild Semiconductor) 2N2222A in a plastic package (but PN108 is the plastic version of BC108, not 2N108, while PN100 is not associated with other xx100 devices).

**Question 0**

What was once the indicator of the equipment creator?

**Question 1**

What makes a manufacturer's prefix less reliable?

**Question 2**

What is the marking of the 2N2222A in the plastic case?

**Question 3**

What is the plastic version of BC108?

**Question 4**

Which manufacturer makes the most equipment?

**Question 5**

What is the marking of the 2N108 in the plastic case?

**Question 6**

What is the most common case?

**Question 7**

How many naming systems use an exact manufacturer's prefix?

**Question 8**

Who decided which letters were in the manufacturer's prefixes?

**Text number 20**

The junction voltage is the voltage across the junction between the BJT emitter and the base, which causes the base to conduct a certain current. The current increases exponentially as the forward voltage of the junction is increased. The values given in the table are typical for a current of 1 mA (the same values apply to semiconductor diodes). The lower the junction bias voltage, the better, since this means that less current is needed to "drive" the transistor. The junction bias voltage for a given current decreases as the temperature rises. In a typical silicon junction, the change is -2.1 mV/°C. In some circuits, special compensating elements (sensors) must be used to compensate for such changes.

**Question 0**

What is the front voltage at the connection point?

**Question 1**

What is the purpose of the access point?

**Question 2**

What is the ideal connection voltage?

**Question 3**

Why is the ideal connection with a lower forward voltage?

**Question 4**

What happens to the junction bias voltage when the temperature is increased?

**Question 5**

What supplies the voltage at the junction between the emitter and the base?

**Question 6**

What are most BJTs made of?

**Question 7**

What are the sensors made of?

**Question 8**

Which circuit needs the most specific compensating elements?

**Text number 21**

Because electron mobility is greater than hole mobility in all semiconductor materials, a bipolar n-p-n transistor is generally faster than the corresponding p-n-p transistor. GaAs has the highest electron mobility of the three semiconductors. For this reason, GaAs is used in high frequency applications. A relatively recent development in FETs, the High Electron Mobility Transistor (HEMT), features an aluminium-gallium arsenide (AlGaAs)-gallium arsenide (GaAs) heterostructure (a junction between different semiconductor materials) with an electron mobility twice that of the GaAs-metal junction. Due to its high speed and low noise, HEMT is used in satellite receivers operating at frequencies of around 12 GHz. HEMTs based on gallium nitride and aluminium gallium nitride (AlGaN/GaN HEMT) have even higher electron mobility and are currently being developed for various applications.

**Question 0**

Which is faster, the bipolar n-p-n transistor or the p-n-p transistor?

**Question 1**

Which semiconductor has the highest electron mobility?

**Question 2**

What is a common application for GaAs?

**Question 3**

What does HEMT stand for?

**Question 4**

What are the general applications of HEMT?

**Question 5**

What is the most common semiconductor?

**Question 6**

What causes the high speed and low noise of HEMTs?

**Question 7**

Which material has the highest electron mobility?

**Question 8**

Where are HEMTs most commonly used?

**Text number 22**

Discrete transistors are individually packaged transistors. Transistors are available in many different semiconductor packages (see figure). The two main classes are through-hole (or leaded) and surface-mount, also known as SMD (surface-mount device). Ball grid array (BGA) is the latest surface-mount package (currently only for large integrated circuits). It has solder balls underneath instead of wires. Because they are smaller and have shorter connections, SMD packages have better high-frequency performance but lower power.

**Question 0**

What is a discrete transistor?

**Question 1**

What are the two most common types of transistors?

**Question 2**

What is another name for a surface mount transistor?

**Question 3**

What is the latest surface mount transistor?

**Question 4**

What is a grid of spheres made of?

**Question 5**

What is the most common type of transistor?

**Question 6**

How many solder balls are in the Ball Grid Array?

**Question 7**

What is the most common type of semiconductor package?

**Question 8**

What is the most important property of a transistor?

**Question 9**

What is the oldest type of semiconductor package?

**Document number 365**

**Text number 0**

In the pre-modern era, the self-esteem and purpose of many people was often expressed by a belief in some kind of deity, whether one or more. However, pre-modern cultures are not thought to have created a sense of separate individuality. Religious officials, often in positions of power, were the spiritual intermediaries of the common man. Only through these intermediaries did ordinary people have access to the divine. Tradition was sacred and immutable in ancient cultures, and the ceremonial and moral order of the culture could be strictly enforced.

**Question 0**

How did many people express their faith before modern times?

**Question 1**

How were religious officials perceived in the pre-modern period?

**Question 2**

Through whom did large numbers of people have access to the divine?

**Question 3**

What beliefs were considered sacred by ancient cultures?

**Question 4**

How were the moral standards of ancient cultures enforced?

**Question 5**

How was the sense of dignity of peoples expressed in the pre-modern era?

**Question 6**

Who were the spiritual intermediaries?

**Question 7**

Through whom did the masses gain access to the divine?

**Question 8**

What beliefs did ancient civilisations hold sacred?

**Question 9**

What did the social order impose strict control over?

**Text number 1**

The term "modern" was coined in the 16th century to describe the present or recent time (ultimately derived from the Latin adverb modo, meaning "right now"). The European Renaissance (around 1420-1630), which marked the transition between the late Middle Ages and the early modern period, originated in Italy and was fuelled in part by the rediscovery of classical art and literature, as well as new perspectives from the age of exploration and the invention of the telescope and microscope, which pushed the boundaries of thought and knowledge.

**Question 0**

What term was invented in the 1500s to express the present?

**Question 1**

The term "modern" is derived from what Latin adverb?

**Question 2**

What caused the transition between the medieval and early modern periods?

**Question 3**

Which country started the European Renaissance?

**Question 4**

Which two musical instruments were invented during the European Renaissance?

**Question 5**

Which expression was invented in the 1500s to refer to the last days?

**Question 6**

Where does the modern expression come from?

**Question 7**

What did the European Renaissance mean?

**Question 8**

How long did the European Renaissance last?

**Question 9**

Which country started the European Renaissance?

**Text number 2**

The term 'early modern' was introduced into the English language in the 1930s to distinguish the period between the so-called medieval period and the late Enlightenment (1800) (when the term 'modern' was evolving into its current form). It is important to note that these terms have their origins in European history. In other parts of the world, such as Asia and Muslim countries, the terms are used very differently, but often in the context of their association with European culture in the Age of Discovery.

**Question 0**

What term was created in the 1930s to distinguish the Middle Ages from the 19th century?

**Question 1**

The 1800s are called?

**Question 2**

Where do the terms "early modern" and "modern" come from?

**Question 3**

What are the terms "early modern" and "modern" used for in other countries?

**Question 4**

When was the term "Early Modern" introduced into the English language?

**Question 5**

What does the term "early modern" mean?

**Question 6**

What period is called the late Enlightenment?

**Question 7**

Where do the terms "medieval" and "modern" come from?

**Question 8**

What are the terms "medieval" and "modern" used in other countries?

**Text number 3**

In the 21st century and in the late modern world, the information age and computers were at the forefront, not quite everywhere, but often present in everyday life. Of note was the development of the major powers of the East, with China and India gaining strength. In the Eurasian region, the European Union and the Russian Federation were two newly emerging powers. The concern of the Western world, if not the whole world, was the late modern form of terrorism and the warfare that is a consequence of modern terrorist acts.

**Question 0**

In which era were there many socio-technological trends?

**Question 1**

What is the 21st century?

**Question 2**

Which device was most used in the information age?

**Question 3**

What was the greatest concern of Western civilisation in the 21st century?

**Question 4**

At what time were there many socio-technological trends?

**Question 5**

What is the 2000s known as?

**Question 6**

Which device was most used in the 2000s?

**Question 7**

What was considered a threat to Western civilisation?

**Text number 4**

In Asia, the Asian region was ruled by several Chinese dynasties and Japanese shogunates. In Japan, the Edo period from 1600 to 1868 is also known as the Early Modern period. In Korea, the period from the rise of the Joseon dynasty to the accession of King Gojong is called the Early Modern period. In the Americas, the Indians had built a vast and diverse civilisation, including the Aztec empire and confederacy, the Incan civilisation, the Mayan empire and cities, and the Chibcha confederacy. In the West, European empires and movements were in the throes of reformation and expansion. Russia reached the Pacific coast in 1647 and consolidated its control of the Russian Far East in the 19th century.

**Question 0**

Who ruled Asia between 1600 and 1868?

**Question 1**

What is the period 1600-1868?

**Question 2**

What is the Edo period known as?

**Question 3**

What is the period considered the "modern period" in Korea?

**Question 4**

Name one of the tribes established by Native Americans in the Americas.

**Question 5**

Which two groups dominated the Asian sphere?

**Question 6**

What period is called the Edo period?

**Question 7**

What is the early modern period called in Japan?

**Question 8**

Name one of the Native American tribes?

**Text number 5**

In China, urbanisation increased as the population grew and the division of labour became more complex. Large urban centres such as Nanjing and Beijing also fostered the growth of private industry. In particular, small-scale industry emerged, often specialising in paper, silk, cotton and porcelain products. For the most part, however, relatively small urban centres with markets proliferated across the country. Urban markets traded mainly in foodstuffs and some necessities such as pins or oil. Despite the xenophobia and intellectual introspection that characterised the increasingly popular New Neo-Confucianism, early Ming China was not isolated. Foreign trade and other contacts with the outside world, especially Japan, increased dramatically. Chinese merchants explored the entire Indian Ocean and reached East Africa on Zheng He's treasure voyages.

**Question 0**

Name one reason for the growth of urbanisation in China.

**Question 1**

What did Nanjing and Beijing participate in?

**Question 2**

What are Nanjing and Beijing?

**Question 3**

Under which regime was China not isolated?

**Question 4**

In the early part of the Ming dynasty, Chinese merchants explored all the what?

**Question 5**

What caused the rise of urbanisation in China?

**Question 6**

Where did Chinese traders make expeditions?

**Text number 6**

The Qing Dynasty (1644-1911) was founded by the Manchus after the fall of the Ming Dynasty, the last Han Chinese dynasty. The Manchus were formerly known as the Jurchens. When Li Zicheng's peasant rebels occupied Beijing in 1644, the Chongzhen Emperor, the last Ming emperor, committed suicide. The Manchus then allied with the former Ming general Wu Sangui and conquered Beijing, which became the new capital of the Qing dynasty. The Manchus adopted the Confucian norms of traditional Chinese governance when they ruled China proper. Schoppa, editor of The Columbia Guide to Modern Chinese History, argues: 'The date around 1780 as the beginning of modern China is thus closer to what we know today as historical 'reality'. It also gives us a better starting point for understanding the sharp decline of Chinese state power in the 19th and 20th centuries."

**Question 0**

What was established after the fall of the Ming Empire?

**Question 1**

How long did the Qing Dynasty last?

**Question 2**

What was the name by which the mantus was originally known?

**Question 3**

Why did the last Ming emperor commit suicide?

**Question 4**

Who allied with the mantus to take control of Beijing?

**Question 5**

After which event was the Qing dynasty formed?

**Question 6**

During which period did the Qing dynasty rule?

**Question 7**

What were the original names of the Manchus?

**Question 8**

Who conquered Beijing in 1644?

**Question 9**

Who did the Manchus ally with to take control of Beijing?

**Text number 7**

The society of Japan's "Tokugawa" (Edo society) was based on the strict class hierarchy originally established by Toyotomi Hideyoshi, unlike the shogunates that preceded it. The daimyo, or lords, were at the top, followed by a warrior caste of samurai, and below them were farmers, craftsmen and merchants. In some parts of the country, especially in smaller areas, daimyo and samurai were more or less identical, as a daimyo could train as a samurai and a samurai could serve as a local lord. Otherwise, the largely inflexible nature of this system of social stratification unleashed divisive forces over time. Peasant taxes were set at fixed amounts that did not take account of inflation or other changes in the value of money. As a result, the value of the tax revenues collected by samurai landowners declined over time. This often led to numerous clashes between noble but impoverished samurai and wealthy peasants, ranging from simple local disturbances to much larger rebellions. However, none of these proved convincing enough to challenge the established order before the arrival of foreign powers.

**Question 0**

What was society based on during the Tukugawa period?

**Question 1**

Who created the strict class hierarchy?

**Question 2**

Which group was considered to be at the top of a strict class hierarchy?

**Question 3**

How were taxes collected during the Tukugawa period?

**Question 4**

How did the collection of flat-rate taxes affect its revenue?

**Question 5**

What is the Tokugawa period known as?

**Question 6**

What was Tokugawa society based on?

**Question 7**

Which group was considered to be at the top of the strict class society?

**Question 8**

How were taxes collected during the Tokugawa period?

**Question 9**

How the way taxes were collected affected its income.

**Text number 8**

On the Indian subcontinent, the Mughal Empire ruled most of India in the early 1700s. "The 'classical period' ended with the death of Emperor Aurangzeb and the defeat in 1707 of the rising Hindu Maratha Empire, although the dynasty continued for another 150 years. During this period, the empire was characterised by a highly centralised administration that united the various regions. All the important monuments of the Mughals, their most visible legacy, date from this period, which was characterised by the expansion of Persian cultural influence in the Indian subcontinent and by brilliant literary, artistic and architectural achievements. The Maratha Empire was located in the south-west of present-day India and expanded greatly during the reign of the Maratha Empire's chief ministers, the Peshwas. In 1761, the Maratha army lost the Third Battle of Panipat, which halted the expansion of the empire, and the kingdom was then divided into the Maratha Confederacy.

**Question 0**

Who ruled most of India in the early 1700s?

**Question 1**

How did the "classic season" end?

**Question 2**

Who was behind the death of Emperor Aurangzeb?

**Question 3**

Where was the Maratha Empire centralised?

**Question 4**

What happened when the Maratha army lost the third battle of Panipat?

**Question 5**

Who ruled most of India in the 18th century?

**Question 6**

Which event ended the "classical period"?

**Question 7**

What caused the death of Emperor Auranzebi?

**Question 8**

Where was the Maratha Empire concentrated?

**Question 9**

What caused the division of the Maratha Empire in 1761?

**Text number 9**

With the development of new imperialism, colonial powers conquered almost all the territories of the Eastern Hemisphere. The commercial colonisation of India began in 1757, after the Battle of Plassey, when the Bengal Nawab handed over control to the British East India Company, in 1765, when the Company was granted the diwani, the right to collect revenue in Bengal and Bihar, or in 1772, when the Company established its capital in Calcutta, appointed its first governor-general, Warren Hastings, and became directly involved in the administration.

**Question 0**

What did the development of the new imperialism cause?

**Question 1**

When did the commercial colonisation of India begin?

**Question 2**

What happened at the Battle of Plassey?

**Question 3**

When did the British East Company get the right to collect revenue?

**Question 4**

What term is used to describe the "right to collect revenue"?

**Text number 10**

After the Anglo-Maratha Wars, the Maratha states were finally defeated by the British East India Company in 1818 in the Third Anglo-Maratha War. The administration lasted until 1858, when, following the Indian Mutiny of 1857 and the subsequent Government of India Act 1858, the British government took over direct administration of India in the new British Raj. In 1819, Stamford Raffles established Singapore as an important trading centre for Britain in its competition with the Dutch. However, the competition subsided in 1824 when an Anglo-Dutch treaty defined the interests of both sides in South East Asia. From 1850 onwards, the pace of colonisation accelerated considerably.

**Question 0**

In what year did the Maratha States lose to the British East Company?

**Question 1**

What was the name of the war lost by the Maratha states in 1818?

**Question 2**

How long did the British East India Company last after the war?

**Question 3**

What caused the end of the rule of the British East India Company?

**Question 4**

What was Britain founded in 1824?

**Text number 11**

The governments of the Dutch East India Company (1800) and the British East India Company (1858) each abolished their own governments, which took over the direct administration of the colonies. Only Thailand was spared the experience of foreign rule, although the power politics of the Western powers also had a major impact on Thailand. Colonial rule had a profound impact on Southeast Asia. While the colonial powers benefited greatly from the region's vast natural resources and large markets, the colonial powers developed the region to varying degrees.

**Question 0**

What was sent from the Dutch East India Company and the British East India Company?

**Question 1**

Which country did not have to submit to foreign rule?

**Question 2**

Who also benefited from the resources of South East Asia?

**Text number 12**

Many major events in Europe caused changes in the early 1500s, from the fall of Constantinople in 1453, the fall of Muslim Spain and the discovery of America in 1492, to Martin Luther's Reformation in 1517. In England, the modern era is often dated to the beginning of the Tudor period, when Henry VII defeated Richard III at the Battle of Bosworth in 1485. The early modern history of Europe is generally considered to stretch from the early 15th century, through the Age of Reason and the Enlightenment of the 17th and 1700s, to the beginning of the Industrial Revolution in the late 1700s.

**Question 0**

In what year did the fall of Constantinople take place?

**Question 1**

When did England date back to modern times?

**Question 2**

Who did Henry Vll defeat at the Battle of Bosworth?

**Text number 13**

Russia grew regionally in the 17th century, the era of the Cossacks. The Cossacks were warriors organised into military communities, reminiscent of the pirates and pioneers of the New World. In 1648, Ukrainian peasants joined the Cossacks of Zaporozhye and rebelled against Poland-Lithuania during the Hmelnytsky Rebellion, because they were suffering social and religious oppression under Polish rule. In 1654, Ukrainian leader Bohdan Khmelnitsky offered to place Ukraine under the protection of Russian Tsar Alexei I. Alexey's acceptance led to a new Russo-Polish war (1654-1667), and eventually Ukraine was divided along the Dnieper River, leaving the western part (i.e. the right-hand side of Ukraine) under Polish rule and the eastern part (the left-hand side of Ukraine and Kiev) under Russian rule. Later, in 1670-71, the Don Cossacks led by Stenka Razin launched a major rebellion in the Volga region, but the Tsar's troops managed to defeat the rebels. In the east, rapid Russian exploration and colonisation of the vast Siberian territories was led mainly by Cossacks hunting for valuable furs and ivory. Russian explorers moved eastwards mainly along Siberian river routes, and by the mid-16th century Russian colonies were established in eastern Siberia, the Chukchi peninsula, along the Amur River and on the Pacific coast. In 1648, the Bering Strait between Asia and North America was first crossed by Fedot Popov and Semyon Dehnyov.

**Question 0**

When did Russia experience regional growth?

**Question 1**

The 17th century is also known as?

**Question 2**

Who are the Cossacks?

**Question 3**

Who joined the Cossacks in 1648?

**Question 4**

Why did Ukrainian peasants join the Cossacks?

**Text number 14**

Traditionally, the intellectual transformation of Europe during and after the Renaissance has been a bridge between the Middle Ages and the modern age. In the West, the Age of Reason is generally regarded as the beginning of modern philosophy and a departure from the medieval approach, especially scholasticism. The philosophy of the early 17th century is often referred to as the Age of Rationalism, and is considered to have followed the philosophy of the Renaissance and preceded the Age of Enlightenment, but some consider it to be the earliest part of the Enlightenment era of philosophy, spanning two centuries. The 17th century saw the beginning of the secularisation process in Europe, which rose to prominence with the French Revolution.

**Question 0**

What formed the bridge from the Middle Ages to the present?

**Question 1**

What is considered the beginning of modern philosophy?

**Question 2**

What is the name given to the philosophy of the 17th century?

**Question 3**

What works in the age of rationalism?

**Question 4**

What marked the beginning of the 1700s in Europe?

**Text number 15**

The Age of Enlightenment is a period of Western philosophy and cultural life, centred on the 1700s, in which reason was seen as the primary source of authority and justification. The Enlightenment gained momentum more or less simultaneously in many parts of Europe and America. Renaissance humanism, as an intellectual movement, developed during the Enlightenment and spread throughout Europe. The basic training of a humanist included good speaking and writing (typically in the form of letters). The term umanista dates from the late 15th century. Humans joined the studia humanitatis, a new type of curriculum that competed with the quadrivium and scholastic logic.

**Question 0**

What did the Enlightenment focus on?

**Question 1**

Where did the Enlightenment gain momentum?

**Question 2**

What is the basic training of a humanist?

**Question 3**

Where does the term humanist come from?

**Question 4**

What was studia humanitatis competing against?

**Text number 16**

Renaissance humanism closely studied Latin and Greek classical texts, and contrasted with the values of scholasticism, which focused on collected commentaries. Humanists were involved in the sciences, philosophies, arts and poetry of classical antiquity. They self-consciously imitated classical Latin and condemned the use of medieval Latin. In response to the perceived decline of Latin, they applied the principle of ad fontes - a return to the sources - to a wide range of fields of learning.

**Question 0**

What did Renaissance humanism refer to?

**Question 1**

Renaissance humanism was the opposite of what?

**Question 2**

What was the emphasis of Renaissance humanism?

**Text number 17**

The ancient vs. modern dispute was a literary vs. artistic dispute that escalated in the early 1690s and shook the Académie française. Two sides were at odds: the Anciens, who limited their choice of subjects to those drawn from ancient literature, and the Modernes, who championed the merits of Louis XIV's century of writers. Fontenelle quickly followed with his Digression sur les anciens et les modernes (1688), in which he sided with the moderns and argued that modern scholarship enabled modern man to surpass the ancients in knowledge.

**Question 0**

What was the basis of the dispute between ancient and modern times?

**Question 1**

In which period did the dispute between the ancients and the moderns reach its peak?

**Question 2**

Moderns support whose merits?

**Question 3**

What did Louis XIV believe about modern man?

**Text number 18**

The Scientific Revolution was a period when European ideas of classical physics, astronomy, biology, human anatomy, chemistry and other classical sciences were abandoned, leading to the supersession of the doctrines that had prevailed from ancient Greece to the Middle Ages and which led to the transition to modern science. This period saw a fundamental change in the scientific concepts of physics, astronomy and biology, in the institutions that supported scientific research and in the wider picture of the universe. Individuals began to question all sorts of things, and it was this questioning that led to the scientific revolution, which in turn laid the foundations for the modern sciences and the establishment of many modern disciplines.

**Question 0**

What is the scientific revolution?

**Question 1**

What caused the scientific revolution?

**Question 2**

What did the scientific revolution force people to do?

**Question 3**

What did the scientific revolution look like?

**Text number 19**

The changes were accompanied by violent turmoil, including the trial and execution of the king, massive bloodshed and oppression during the Reign of Terror, and warfare involving all the other major European powers. Post-revolutionary events include the Napoleonic Wars, two separate restorations of the monarchy and two further revolutions as modern France took shape. Over the next century, France was ruled at one point by a republic, a constitutional monarchy and two separate empires.

**Question 0**

What happened to the king after the trial?

**Question 1**

Who else was involved in the war?

**Question 2**

name an event that may have been involved in the revolution.

**Text number 20**

The campaigns of the French Emperor and General Napoleon Bonaparte marked the Napoleonic era. This brilliant warlord, who was born in Corsica after the French invasion and died suspiciously on the tiny British island of St Helena, ruled a French empire that at its peak controlled much of Europe directly from Paris, while many of his friends and family ruled Spain, Poland, many parts of Italy and many other kingdoms, republics and dependencies. Napoleon's time changed the face of Europe forever, and the old empires and kingdoms disintegrated as a result of the mighty and 'glorious' rise of republicanism.

**Question 0**

What characterised the Napoleonic era?

**Question 1**

Where was Napoleon Bonaparte born?

**Question 2**

Where did Napoleon Bonaparte die?

**Question 3**

From where did the French Empire rule much of Europe?

**Question 4**

Why were the European empires and kingdoms sent?

**Text number 21**

Italian unification was a political and social movement that united the different states of the Italian peninsula into a single state in the 19th century. There is no consensus on the exact dates of the beginning and end of the period, but many scholars agree that the process began with the end of Napoleonic rule and the Congress of Vienna in 1815 and ended roughly with the Franco-Prussian War in 1871, although the last città irredente did not join the Kingdom of Italy until after the First World War.

**Question 0**

What is Italian unification?

**Question 1**

When did Italian unification take place?

**Question 2**

What year do most researchers think the unification of Italy began?

**Question 3**

In what year did Italian unification end, according to most researchers?

**Question 4**

After which event did the last citta irredente join Italy?

**Text number 22**

At the dawn of the revolutionary era, the American Revolution and the ensuing political upheaval in the last half of the 1700s led to the thirteen North American colonies overthrowing the British Parliament and then abandoning the British monarchy itself to become the sovereign United States of America. During this period, the colonies first rejected the power of Parliament to govern them without representation and formed self-governing independent states. The Second Continental Congress then joined together against the British to defend this self-government in an armed conflict between 1775 and 1783, known as the American Revolutionary War (also called the American War of Independence).

**Question 0**

What event caused the American Revolution?

**Question 1**

How did the thirteen colonies become the United States of America?

**Question 2**

Why did the United States form independent states?

**Question 3**

Who was the Second Continental Congress allied against?

**Question 4**

What is the armed conflict of 1775-1783 known as?

**Text number 23**

The American Revolution began with the battles of Lexington and Concord. On 4 July 1776, they issued the Declaration of Independence, declaring their independence from Great Britain and establishing a league of co-operation. In June 1776, Benjamin Franklin was appointed a member of the five-man committee that drafted the Declaration of Independence. Although Franklin was temporarily disabled and unable to attend most of the committee meetings, he made several minor changes to the draft sent to him by Thomas Jefferson.

**Question 0**

Where did the American Revolution begin?

**Question 1**

What was issued on 4 July 1776?

**Question 2**

What did the Declaration of Independence proclaim?

**Question 3**

To which office was Ben Franklin appointed in 1776?

**Question 4**

What crippled Ben Franklin?

**Text number 24**

The decolonisation of the Americas was a process of independence of the American countries from European rule. Decolonisation began with a series of revolutions in the late 1700s and early to mid-1800s. The Spanish American Wars of Independence were the numerous wars against Spanish rule in the Spanish Americas fought in the early 19th century, from 1808 to 1829, and were directly linked to the French Napoleonic invasion of Spain. The conflict began with the establishment of short-lived administrations in Chuquisaca and Quito to oppose the composition of the supreme central junta in Seville.

**Question 0**

What is American decolonisation?

**Question 1**

When did American decolonisation begin?

**Question 2**

When did the wars against Spanish rule break out?

**Question 3**

What were the Spanish wars directly linked to?

**Question 4**

How did the Spanish conflict start?

**Text number 25**

When the central junta fell to the French, numerous new republics sprang up across the Americas, eventually creating a chain of newly independent countries stretching from Argentina and Chile in the south to Mexico in the north. After the death of King Ferdinand VII in 1833, only Cuba and Puerto Rico remained under Spanish rule until the Spanish-American War broke out in 1898. Unlike the Spanish, the Portuguese did not share their colonial territory in the Americas. The captaincies they established were subordinated to a central administration in Salvador (later moved to Rio de Janeiro), which reported directly to the Portuguese crown until it became independent in 1822 and became the Brazilian Empire.

**Question 0**

Who did the central junta fall to?

**Question 1**

Which king died in 1833?

**Question 2**

Who remained under Spanish rule after the death of King Ferdinand?

**Question 3**

When was the Spanish-American War fought?

**Question 4**

Where was Portugal's capacity concentrated?

**Text number 26**

The first industrial revolution merged with the second industrial revolution around 1850, when technological and economic development gained momentum with the development of steam-powered ships and railways, and later in the 19th century with the development of the internal combustion engine and electric power. The second industrial revolution was a phase of the industrial revolution; it is referred to as a separate technological revolution. From a technological and social point of view, there is no clear difference between the two revolutions. Major innovations took place during this period in the chemical, electrical, oil and steel industries. Particular advances included the introduction of oil-powered steam turbine ships and internal combustion engine-driven steel ships, the development of the aeroplane, the practical commercialisation of the car, the mass production of consumer goods, the perfection of canning, mechanical refrigeration and other food preservation techniques, and the invention of the telephone.

**Question 0**

When did the first industrial revolution merge with the second?

**Question 1**

What caused the technological and economic development?

**Question 2**

The 1800s were also known as the?

**Question 3**

What was the name of the second industrial revolution?

**Text number 27**

Industrialisation is a process of social and economic change in which a group of people is transformed from a pre-industrial society into an industrial society. It is part of a more general process of modernisation in which social change and economic development are closely linked to technological innovation, in particular the development of large-scale energy and metallurgical production. It is the large-scale organisation of the economy for manufacturing. Industrialisation also brings with it a kind of philosophical change in which people acquire a different attitude to their conception of nature.

**Question 0**

What is industrialisation?

**Question 1**

During industrialisation, the group of people changes - why?

**Question 2**

industrialisation is part of which general process?

**Text number 28**

The modern oil industry began in 1846, when Abraham Pineo Gesner of Nova Scotia discovered a process for refining kerosene from coal. Ignacy Łukasiewicz improved on Gesner's process and in 1852 developed a method for refining kerosene from more readily available rock oil ('petroleum'), and the first rock oil mine was built the following year in Bóbrka, near Krosno in Galicia. In 1854, Benjamin Silliman, a professor of natural sciences at Yale University in New Haven, was the first to extract the oil by distillation. These discoveries quickly spread around the world.

**Question 0**

When did the modern oil industry begin?

**Question 1**

Where did the modern oil industry start?

**Question 2**

Who invented the process to turn coal into kerosene?

**Question 3**

Who improved Gesner's method of refining kerosene from coal?

**Question 4**

Where was the first Rock Oil mine built?

**Text number 29**

The technological achievements of the revolution ranged from electrification to advances in materials science. These advances had a major impact on the quality of life. In the first revolution, Lewis Paul was the original inventor of the roller spinning mill, the basis of the water wheel used to spin cotton in the cotton mill. Matthew Boulton's and James Watt's improvements to the steam engine were fundamental to the changes brought about by the Industrial Revolution, both in the UK and worldwide.

**Question 0**

In which areas were achievements made during the revolution?

**Question 1**

What did the advances made during the revolution do to improve people's lives?

**Question 2**

What did Lewis Paul come up with?

**Question 3**

When did James Lewis invent "Roller Spinning"?

**Question 4**

Who developed the steam engine?

**Text number 30**

Towards the end of the Second Revolution, Thomas Alva Edison developed many devices that greatly influenced life around the world, and is often credited with creating the first industrial research laboratory. In 1882, Edison started the world's first large-scale electrical grid, providing 110 volts DC power to fifty-nine customers in lower Manhattan. Also towards the end of the second industrial revolution, Nikola Tesla did much work on electricity and magnetism in the late 19th and early 20th centuries.

**Question 0**

Thomas Edison is credited with?

**Question 1**

Where did Thomas Edison move to in 1882?

**Question 2**

How many volts did Thomas Edison's electricity grid provide?

**Question 3**

How many customers did Thomas Edison's electricity network supply?

**Question 4**

Where was Thomas Edison's electricity grid located?

**Text number 31**

The European revolutions of 1848, known in some countries as the Spring of Nations or the Year of the Revolution, were a series of political upheavals across the European continent. The unrest, known as the revolutionary wave, began in France and, boosted by the French Revolution of 1848, soon spread to the rest of Europe. Although most revolutions were quickly put down, there was considerable violence in many regions, and tens of thousands of people were tortured and killed. While the immediate political effects of the revolutions were reversible, the long-term repercussions of the events were far-reaching.

**Question 0**

When did the European revolutions take place?

**Question 1**

What are European revolutions known as in other countries?

**Question 2**

Which country started the revolutions?

**Question 3**

How many people were estimated to have died in the revolutions?

**Text number 32**

Following the ideas of the Enlightenment, the reformers sought a solution to the social problems created by the industrial revolution through the scientific revolution and industrial development. Newton's philosophy of nature combined the mathematics of axiomatic proof with the mechanics of physical observation to produce a coherent system of verifiable predictions, replacing the previous reliance on revelation and inspired truth. Applied to public life, this approach led to a number of successful campaigns to change social policy.

**Question 0**

Where do reformers seek to solve social problems?

**Question 1**

What is Newton's natural philosophy?

**Question 2**

What replaced Newton's Nataural philosophy?

**Question 3**

What Newton's philosophy did when applied to life,

**Text number 33**

Under Peter I (the Great), Russia declared itself an empire in 1721 and became a world power. Peter ruled from 1682-1725 and defeated Sweden in the Great Northern War, forcing Sweden to cede West Karelia and Inca (two territories Russia lost during the wars), Estonia and Livonia, thus securing Russia's access to the sea and maritime trade. St Petersburg established a new capital on the shores of the Baltic Sea called St Petersburg, later known as Russia's window to Europe. Peter the Great's reforms brought significant Western European cultural influences to Russia. Catherine II (the Great), who ruled from 1762-96, extended Russian political power into the Polish-Lithuanian Commonwealth and annexed most of its territories to Russia during the Partitions of Poland, pushing Russia's frontier westwards into central Europe. In the south, Catherine pushed Russia's frontier as far as the Black Sea after successful Russo-Turkish wars against the Ottoman Empire and defeated the Crimean Khanate.

**Question 0**

Under whose authority was Russia declared an empire?

**Question 1**

In what year was Russia declared an empire?

**Question 2**

When did Peter I rule?

**Question 3**

Who did Peter I defeat in the Great Northern War?

**Question 4**

What did Peter I find in the Baltic Sea?

**Text number 34**

The Victorian era in the United Kingdom was the reign of Queen Victoria from June 1837 to January 1901. This was a long period of prosperity for the British people, as the gains from the overseas British Empire and improvements in domestic industry enabled the development of a large, educated middle class. Some scholars would extend the beginning of this period - defined by the various emotions and political games that have come to be associated with the Victorians - back five years to the passage of the 1832 Reform Act.

**Question 0**

What was the Victorian era in the United Kingdom?

**Question 1**

During which period did Queen Victoria reign?

**Question 2**

What did the people think of Queen Victoria's reign?

**Question 3**

How far back would some researchers extend the Victorian reign?

**Text number 35**

In the British "imperial century", Britain's victory over Napoleon left it with no serious international rival except Russia in Central Asia. Since Britain was not defeated at sea, it assumed the role of a global policeman, later known as Pax Britannica, and pursued a foreign policy of 'splendid isolationism'. In addition to formal control of its own colonies, Britain's dominant position in world trade meant that it effectively controlled the economies of many nominally independent countries, such as China, Argentina and Siam, in what has generally been described as an 'informal empire'. The Anglo-Zulu War, fought in 1879 between the British Empire and the Zulus, was a significant event during this period.

**Question 0**

What did the defeat of Napoleon leave Britain without?

**Question 1**

Why did Britain take on the role of global police?

**Question 2**

Britain's embrace of the role of global policing is known as

**Question 3**

What was the name of Britain's foreign policy?

**Question 4**

Britain's dominant position in world trade allowed it to do what?

**Text number 36**

Britain's imperial power was underpinned by the steamship and the telegraph, new technologies invented in the second half of the 19th century to control and defend the empire. By 1902, the British Empire was connected by a network of telegraph cables, the All Red Line. By 1922, some 13 000 000 square miles (34 000 000 km2) of territory and some 458 million people had been added to the British Empire. The British established colonies in Australia in 1788, New Zealand in 1840 and Fiji in 1872, and most of Oceania became part of the British Empire.

**Question 0**

What replaced Britain's imperial power?

**Question 1**

When were the steamship and the telegraph invented?

**Question 2**

What united the British Empire in 1982?

**Question 3**

How many people were added to the British Empire by 1922?

**Question 4**

When did the British establish settlements in Australia?

**Text number 37**

The Bourbon Restoration followed the ousting of Napoleon I from France in 1814. The Allies restored the Bourbon dynasty to the French throne. The period that followed is known as the French Restoration, and is characterised by a strong conservative backlash and the restoration of the Roman Catholic Church to the dominance of French politics. The July Monarchy was a period of liberal constitutional monarchy in France under King Louis Philippe, beginning with the July Revolution (or the Three Glorious Days) in 1830 and ending with the Revolution of 1848. The Second Empire was the imperial Bonapartist regime of Napoleon III in France from 1852 to 1870, between the Second Republic and the Third Republic.

**Question 0**

What event followed the Bourbon Restoration?

**Question 1**

What is the Bourbon Restoration?

**Question 2**

What is the July Monarchy?

**Question 3**

What is the second empire?

**Question 4**

How long did the second empire last?

**Text number 38**

The Franco-Prussian War was a conflict between France and Prussia, in which Prussia was supported by the North German Confederation, of which it was a member, and the southern German states of Baden, Württemberg and Bavaria. The complete victory of Prussia and Germany led to the final unification of Germany under King William I of Prussia. It also marked the fall of Napoleon III and the end of the French Second Empire, which was replaced by the Third Republic. As part of the settlement, Prussia took almost all of Alsace-Lorraine as part of Germany, which it retained until the end of the First World War.

**Question 0**

Which countries took part in the Franco-Russian war?

**Question 1**

Name one of the groups that supported Prussia in the Franco-Russian war?

**Question 2**

What did the victory of Prussia and Germany mean?

**Question 3**

Which area was almost completely claimed by Preussi?

**Question 4**

Until which event did Prussia retain most of Alsace-Lorraine?

**Text number 39**

The European powers claimed those parts of Africa where they could influence the region. These claims did not need to have significant land holdings or treaties to be legitimate. The European power that demonstrated its control over a region accepted the authority to rule that region as a national colony. The claiming European state developed and benefited from the commercial advantages of its colony without fear of competing European rivalry. The colonial claim came with the basic assumption that the controlling European power would use its mandate to provide protection and welfare for its colonised peoples, but this principle remained more in theory than in practice. In many documented cases, the material and moral conditions of indigenous Africans deteriorated in the late 19th and early 20th centuries under European colonial rule to the point where their colonial experience has been described as 'hell on earth'. "

**Question 0**

Why do European powers claim African territories?

**Question 1**

What did the European powers need to justify their claim to these territories?

**Question 2**

What do the European powers accept when they insist that they control a territory?

**Question 3**

How did the European powers benefit from the demands for African territories?

**Question 4**

How was the African colonial experience described?

**Text number 40**

At the time of the Berlin Conference, Africa had a fifth of the world's population living on a quarter of the world's land area. From a European perspective, however, Europe was sharing an unknown continent. By the mid-19th century, European countries had established a few coastal colonies in Africa, including the Cape Colony (Britain), Angola (Portugal) and Algeria (France), but until the late 19th century, Europe largely traded with free African states without feeling the need for regional ownership. Until the 1880s, most of Africa was uncharted, and Western maps generally showed the interior of the continent as empty territory.

**Question 0**

What percentage of the world's population was in Africa at the Berlin conference?

**Question 1**

What was Europe's view that Africa was home to a fifth of the world's population?

**Question 2**

When did European countries establish colonies in Africa?

**Question 3**

Europe did not feel the need to own territory in Africa until?

**Question 4**

How did maps show Africa before 1880?

**Text number 41**

From the 1880s to 1914, the great European powers expanded their power across the African continent, competing with each other for African land and resources. In East Africa, Britain controlled various colonial territories stretching along the African continent from Egypt to northern South Africa. The French gained significant power in West Africa, and the Portuguese had colonies in southern Africa. Germany, Italy and Spain established a small number of colonies across the continent, including German East Africa (Tanganyika) and German Southwest Africa, Eritrea and Libya for Germany, and the Canary Islands and Rio de Oro in Northwest Africa for Spain. King Leopold (reigned 1865-1909) also had a large 'piece of the great cake of Africa', the Congo, which unfortunately for the Congolese became his personal fiefdom to use as he saw fit in Central Africa. By 1914, almost the entire continent was under European control. Liberia, where freed American slaves had settled in the 1820s, and Abyssinia (Ethiopia) in East Africa were the last remaining independent African states (John Merriman, A History of Modern Europe, Volume Two: From the French Revolution to the Present, Third Edition (New York: W. W. Norton & Company, 2010), pp. 819-859).

**Question 0**

During which period did the European powers extend their control in Africa?

**Question 1**

What was Europe competing for?

**Question 2**

What did Britain rule?

**Question 3**

Where in Africa did the French have control?

**Question 4**

Where in Africa did the Portuguese have control?

**Text number 42**

The Meiji period was marked by the reign of the Meiji Emperor in the late 19th and 20th centuries. It was during this period that Japan began its modernisation and became a world power. The name of this era means 'enlightened government'. In Japan, the Meiji Restoration began in the 1860s, marking the rapid modernisation of the Japanese themselves along European lines. Much research has focused on questions of discontinuity and continuity with the previous Tokugawa period. In the 1960s, younger Japanese scholars, led by Irokawa Daikichi, reacted against the bureaucratic superstate and began to search for the historical role of the common people. They shunned the elite and focused on social forces and attitudes rather than political events. They rejected both Marxism and modernisation theory as alien and limiting. They stressed the importance of popular forces in the development of modern Japan. They extended history by using the methods of social history. It was only at the beginning of the Meiji period that the Japanese government began to take modernisation seriously. Japan expanded its military production base by opening arsenals in various locations. The Hyobusho (War Office) was replaced by the War Ministry and the Navy Department. The samurai class experienced a great disappointment in the following years.

**Question 0**

What marked the Meiji era?

**Question 1**

How did Japan become a world power in the Meiji era?

**Question 2**

What is "Meija era"

**Question 3**

When did the restoration of the Meiji begin?

**Question 4**

What was Irokawa Daikichi working against?

**Text number 43**

Laws were introduced requiring every able-bodied male Japanese citizen, regardless of class, to serve three years in the first reserve and two years in the second reserve as a compulsory service. This measure, which killed samurai warriors and their daimyo lords, initially met with opposition from both peasants and warriors. The peasant class interpreted the term ketsu-eki (blood tax) literally and sought to avoid service at all costs. The Japanese government began to model its land forces on the French army. The French government was heavily involved in the training of Japanese officers. Many of them worked at the military academy in Kyoto, and many more were feverishly translating French field manuals for the Japanese.

**Question 0**

What did the law require every able-bodied Japanese citizen to do?

**Question 1**

Who originally rejected Japan's conscription laws?

**Question 2**

What did the peasant class call the conscription law?

**Question 3**

According to whom did the Japanese form their armed forces?

**Question 4**

Where was the military academy located?

**Text number 44**

The antebellum period was a period of increasing division in the country due to the growth of slavery in the American South and the western regions of Kansas and Nebraska, which eventually led to the Civil War in 1861. The antebellum period is often considered to have begun with the Kansas-Nebraska Act of 1854,[citation needed] although it may have begun as early as 1812. The period is also significant because it marked the transition of American industry to the Industrial Revolution.

**Question 0**

What is the antebellum period?

**Question 1**

When did the civil war start?

**Question 2**

When was the Antebellum period considered to have begun?

**Question 3**

What did the age of The Antebellum mean?

**Text number 45**

The Northern leaders agreed that victory would require more than an end to the fighting. Secession and Confederate nationalism had to be completely rejected, and all forms of slavery, or slavery like it, had to be abolished. Lincoln proved effective in mobilizing support for the war aims, in raising and supplying large armies, in avoiding foreign interference, and in making the end of slavery the goal of the war. The Confederacy had more territory than it could defend and failed to keep its ports open and its rivers clean. The North continued to press on, as the South could barely feed and clothe its soldiers. Its soldiers, especially those in the East under General Robert E. Lee, proved to be highly resourceful until they were finally defeated by Generals Ulysses S. Grant and William T. Sherman in 1864-65. The Reconstruction era (1863-77) began with the Emancipation Proclamation in 1863 and included freedom, full citizenship and suffrage for blacks in the South. This was followed by a reaction that left blacks in a second-class position legally, politically, socially and economically until the 1960s.

**Question 0**

What did the northern leaders agree on about slavery?

**Question 1**

What did Lincoln do well in the war?

**Question 2**

Why couldn't the federal government defend its ports?

**Question 3**

The South was barely able to do what their souldiers?

**Question 4**

General Robert E. Lee ruled what federal sect?

**Text number 46**

During the Gilded Age, the population of the United States grew substantially, and the American upper class lavishly displayed wealth and luxury in the post-Civil War and post-Reconstruction period of the late 19th century. The polarisation of wealth was primarily due to industrial and population growth. The businessmen of the Second Industrial Revolution created industrial towns and cities in the Northeast with new factories, contributing to the emergence of an ethnically diverse industrial working class that produced wealth owned by rising super-rich industrialists and financiers, known as "robber barons." An example is John D. Rockefeller's company, a major figure in the formation of the new oil industry. Using highly effective tactics and aggressive practices that were later widely criticised, Standard Oil merged or destroyed most of its competitors.

**Question 0**

What happened to the Glided Age/

**Question 1**

During which period did the rolling period take place?

**Question 2**

Where did the riches of the Glided Age come from?

**Question 3**

What did the financiers call the rich industrialists?

**Question 4**

What kind of practices did John D. Rockefeller follow in the oil industry?

**Text number 47**

The creation of the modern industrial economy began. With the creation of transport and communications infrastructure, corporations became the dominant form of business organisation, and the management revolution transformed business. In 1890, Congress passed the Sherman Antitrust Act - the source of all American antitrust laws. The Act prohibited any agreement, arrangement, understanding or conspiracy to restrain trade, although the term 'restraint of trade' remained subjective. By the early 20th century, the United States had more per capita income and industrial output than any other country except the United Kingdom. Long working hours and dangerous working conditions led many workers to attempt to form unions, despite strong opposition from industrial leaders and the courts. However, the courts protected the market and declared Standard Oil an 'unfair' monopoly under the Sherman Competition Act of 1911. The court ordered Standard to break up into 34 independent companies with different boards of directors.

**Question 0**

Which creations gave rise to the modern industrial economy?

**Question 1**

What became the dominant form of business organisation?

**Question 2**

What changed the way business was organised in 1890?

**Question 3**

What is the Sherman Antitrust Act based on?

**Question 4**

On the basis of which lawsuit was the Standard Oil Group the Standard Oil Group?

**Text number 48**

Modern physics, which replaced classical physics from the end of the scientific revolution, was born in the early 20th century with quantum physics, replacing experimental studies with mathematical investigations and the consideration of equations to build a theoretical structure.The old quantum theory was a collection of results that preceded modern quantum mechanics, but were never complete or self-consistent. The collection of heuristic prescriptions in quantum mechanics was the first corrections to classical mechanics. Outside quantum physics, the various aether theories of classical physics, which assumed a 'fifth element' such as a luminiferous aether, were invalidated by the Michelson-Morley experiment - an attempt to detect the motion of the earth through the aether. In biology, Darwinism gained support and promoted the concept of adaptation in the theory of natural selection. Geology, astronomy and psychology also made progress and provided new insights. In medicine, advances were made in medical theory and treatments.

**Question 0**

When was modern physics born?

**Question 1**

What is the old quantum theory?

**Question 2**

What abolished the "fifth element"?

**Question 3**

What is the Michelson-Morley test?

**Question 4**

What does Darwinism promote?

**Text number 49**

Chinese philosophy began to incorporate concepts from Western philosophy into its arguments, a step towards modernisation. At the time of the Xinhai Revolution in 1911, many demands were made, such as the Fourth of May movement, for the complete abolition of China's old imperial institutions and practices. Attempts were made to incorporate democracy, republicanism and industrialisation into Chinese philosophy, notably by Sun Yat-Sen (Sūn yì xiān, the Mandarin form of the name) in the early 20th century. Mao Zedong (Máo zé dōng) added Marxist-Leninist thinking. When the Chinese Communist Party took power, the earlier schools, especially with the exception of legalism, were condemned as backward and later even purged during the Cultural Revolution.

**Question 0**

Why did Chinese philosophy start to get mixed up with Western concepts?

**Question 1**

When did the Xinhai revolution start?

**Question 2**

What is the May Forth movement?

**Question 3**

What did Marxist-Leninist philosophy add to Chinese philosophy?

**Question 4**

During which event was legalism abolished?

**Text number 50**

The spiritual philosophy of the Enlightenment, which began a hundred years before the 20th century, was questioned in various quarters around the 20th century. Modern humanist ethical philosophies, developed from earlier secular traditions, affirmed the dignity and worth of all human beings, based on the ability to determine right and wrong by appealing to universal human qualities, especially rationality, without recourse to the supernatural or to supposed divine authority derived from religious texts. For liberal humanists like Rousseau and Kant, the universal law of reason pointed the way towards total liberation from tyranny of any kind. These ideas were challenged, for example, by the young Karl Marx, who criticised the project of political emancipation (which took the form of human rights) and claimed that it was a symptom of the very dehumanisation it was intended to oppose. For Friedrich Nietzsche, humanism was nothing more than a secular version of theism. In his Genealogy of Morality, he argues that human rights exist as a means by which the weak can collectively restrain the strong. According to this view, such rights do not facilitate the emancipation of life but rather deny it. In the 20th century, the notion that humans are rationally autonomous was challenged by the notion that humans are driven by unconscious irrational desires.

**Question 0**

When was the enlightenment of spiritual philosophy questioned?

**Question 1**

Where did humanist ethical philosophy develop from?

**Question 2**

Why did Kari Marx criticise humanist philosophy?

**Question 3**

What did Friedrinch Netzsche consider humanism?

**Question 4**

Why does Friedrinch Netzsche believe in the existence of human rights?

**Text number 51**

Albert Einstein is known for special relativity and general relativity. He also made important contributions to statistical mechanics, in particular to the mathematical treatment of Brownian motion, the solution of the paradox of specific temperatures, and the unification of variation and dispersion. Although Einstein had reservations about its interpretation, he also made contributions to quantum mechanics and, indirectly, to quantum field theory, mainly through his theoretical studies of the photon.

**Question 0**

What is Albert Einstein known for?

**Question 1**

What did Einstein add to Brownman's movement?

**Question 2**

What did Einstein find the solution to?

**Question 3**

Which theory did Einstein have reservations about?

**Text number 52**

In 1901, Australian federalism was a process whereby six separate British self-governing colonies - New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia - formed a single nation. They would retain the systems of government they had developed as separate colonies, but would also have a federal government responsible for matters affecting the nation as a whole. When the Australian Constitution came into force, the colonies collectively became states of the Commonwealth of Australia.

**Question 0**

What is the Australian federal government?

**Question 1**

What was the federal government responsible for?

**Question 2**

When did the colonies collectively become part of the Australian Commonwealth?

**Text number 53**

The last days of the Qing dynasty were marked by civil unrest and foreign invasions. The Qing imperial court tried to respond to these civil failures and discontent by reforming the administration in various ways, such as deciding to draft a constitution in 1906, establishing provincial legislatures in 1909 and preparing for a national parliament in 1910. However, many of these measures were opposed by the conservatives in the Qing court, and many reformers were either imprisoned or executed. The failure of the imperial court to implement such reform measures of political liberalisation and modernisation led reformers to steer towards the path of revolution.

**Question 0**

What marked the last days of the Qing Dynasty?

**Question 1**

What did the Qing dynasty try to do in the face of civil unrest?

**Question 2**

What happened to the reformers of the Qing dynasty?

**Question 3**

What caused the revolution against the Qing dynasty?

**Text number 54**

In 1912, the Republic of China was established and Sun Yat-sen was inaugurated as the first interim president in Nanjing. However, power in Beijing had already passed into the hands of Yuan Shikai, who had de facto control of the Beiyang Army, the most powerful military force in China at the time. To prevent civil war and possible foreign intervention from weakening the nascent republic, the leaders agreed to the army's demand that China be unified under the Beijing government. On 10 March in Beijing, Shikai was sworn in as the second interim president of the Republic of China.

**Question 0**

When was the Republic of China founded?

**Question 1**

Who was inaugurated as the first interim president in Nanjing?

**Question 2**

Who ruled Beiyang's army?

**Question 3**

What did China agree to avoid destabilising the republic?

**Question 4**

Who was sworn in as the second interim president of the Republic of China?

**Text number 55**

After the revolutions of the early 20th century, shifting alliances of Chinese regional warlords fought a war for control of the Beijing government. Despite the fact that various warlords gained control of the Beijing government during the warlord era, this did not mark a new era of control or governance, as other warlords did not recognise transitional governments during this period, but had their own laws. These military-ruled governments were collectively known as the Beiyang government. The era of the warlords ended around 1927.

**Question 0**

What happened to China after the revolutions of the 20th century?

**Question 1**

Who finally got control of the Beijing government?

**Question 2**

Why was there no new era of governance in Beijing?

**Question 3**

What were military governments known as?

**Question 4**

When did the era of warlords end?

**Text number 56**

Four years into the 20th century, a war was fought between Russia and Japan, and the Battle of Port Arthur made the Empire of Japan a world power. The Russians were constantly seeking a warm-water port in the Pacific for both their fleet and their maritime trade. The Russian Empire's Manchurian Campaign was waged against the Japanese from Manchuria and Korea. The main areas of operation were southern Manchuria, particularly the Liaodong Peninsula and the Mukden region, and the maritime areas around Korea, Japan and the Yellow Sea. The resulting military campaigns, in which the young Japanese army consistently achieved victory over the opposing Russian forces, were unexpected by world observers. Over time, these victories dramatically changed the balance of power in East Asia, leading to a reassessment of Japan's recent entry onto the world stage. The embarrassing series of defeats fuelled popular discontent in Russia with the ineffective and corrupt tsarist government.

**Question 0**

When was the Russo-Japanese War fought?

**Question 1**

What did the Battle of Port Arthur reveal?

**Question 2**

What did the Russians hope to find in the Pacific?

**Question 3**

Why the Manchurian campaign fought the Russians.

**Question 4**

How did the Japanese victory over the Russians affect the world?

**Text number 57**

The Edwardian period in the United Kingdom is the period from the reign of King Edward VII to the end of the First World War, including the years surrounding the sinking of the RMS Titanic. In the early years of the period, South Africa's Second Boer War divided the country into anti-war and pro-war factions. The imperialist policies of the Conservatives eventually proved unpopular, and in the 1906 general election the Liberals won a landslide victory. The Liberal government was unable to implement all its radical programmes without the support of a largely Conservative House of Lords. The conflict between the two Houses of Parliament over the People's Budget led to a reduction in the powers of the Members of Parliament in 1910. In the general election held in January of that year, Parliament was divided, with the balance of power in the hands of Labour and the Irish Nationalists.

**Question 0**

What is the Edwardian era?

**Question 1**

Which event divided the UK into two groups?

**Question 2**

What year did the Liberals win by a huge margin in the general election?

**Question 3**

What led to a decline in the power of peers?

**Question 4**

Who had the balance of power in the 1910 elections?

**Text number 58**

The causes of the First World War included many factors, such as the conflicts and confrontations of the four decades preceding the war. The Triple Entente was the name given to the loose alliance between the United Kingdom, France and Russia following the signing of the Anglo-Russian Treaty of Alliance in 1907. The alliance of these three powers, supplemented by various treaties with Japan, the United States and Spain, formed a powerful counterweight to the Triple Entente of Germany, Austria-Hungary and Italy, which had concluded a secret treaty with France that effectively nullified its alliance commitments. Militarism, alliances, imperialism and nationalism played a major role in the conflict. The immediate causes of the war were the decisions taken by statesmen and generals during the July Crisis of 1914, which were sparked off (or casus belli) by the assassination of the Austrian Archduke Franz Ferdinand.

**Question 0**

What is Triple Entente?

**Question 1**

When was the Anglo-Russian alliance signed?

**Question 2**

What deal was the Triple Entente in exchange for?

**Question 3**

Where did the war start?

**Question 4**

Who was murdered in Austria?

**Text number 59**

However, the crisis did not come out of nowhere, but was the result of a long series of diplomatic clashes between the great powers in the decade before 1914 over European and colonial issues, which had caused tensions. These diplomatic clashes were the result of changes in the balance of power in Europe since 1870. An example is the Baghdad railway, which was intended to link the Ottoman cities of Konya and Baghdad on a line through present-day Turkey, Syria and Iraq. The railway became a source of international controversy in the years immediately preceding the First World War. Although it has been argued that they were settled in 1914 before the war began, it has also been argued that the railway was the cause of the First World War. In essence, the war was sparked by tensions over the Balkans. Austria-Hungary competed with Serbia and Russia for territory and influence in the region, and they drew other major powers into the conflict through their various alliances and treaties. The Balkan Wars were two wars fought in south-eastern Europe between 1912 and 1913, during which the Balkan League (Bulgaria, Montenegro, Greece and Serbia) first conquered Ottoman-held Thessaly, Macedonia, Epirus, Albania and most of Thrace, and then disputed over the distribution of the spoils, with Romania joining in this time.

**Question 0**

What was the Baghdad railway supposed to be connected to?

**Question 1**

What was the root cause of the war in 1914?

**Question 2**

With whom was Austria-Hungary at war over territory?

**Question 3**

Where were the Balkan wars fought?

**Question 4**

Why did Albania quarrel with Thessaly, Macedonia and Epirus?

**Text number 60**

The First World War began in 1914 and lasted until the armistice of 1918. The Allied Powers, led by the British Empire, France, Russia until March 1918, Japan and the United States after 1917, defeated the Central Powers, led by the German Empire, the Austro-Hungarian Empire and the Ottoman Empire. The war caused the break-up of the four empires - Austria-Hungary, Germany, the Ottomans and Russia - and a radical change in the maps of Europe and West Asia. Before 1917, the allied powers were known as the Triple Alliance and the central powers as the Triple Alliance.

**Question 0**

When did the First World War start?

**Question 1**

Who led the Allies?

**Question 2**

Who defeated the central powers of the German Empire, the Austro-Hungarian Empire and the Ottoman Empire??

**Question 3**

Which Allied powers were referred to before 1917?

**Question 4**

How many countries were devastated by the war?

**Text number 61**

Much of the fighting in the First World War took place on the Western Front, where a system of opposing occupied trenches and fortifications (separated by a 'no-man's-land') stretched from the North Sea to the Swiss border. On the Eastern Front, the vast eastern plains and limited railway network prevented the stalemate of trench warfare, even though the scale of the conflict was equal. Hostilities were also fought at sea and under the sea and - for the first time - from the air. More than 9 million soldiers died on the various battlefields and almost as many on the home fronts of the participating countries due to food shortages and genocide under the guise of civil wars and internal conflicts. It is noteworthy that the global influenza epidemic that broke out at the end of the war and shortly afterwards killed more people than the war effort. The unhygienic conditions caused by the war, severe overcrowding in barracks, wartime propaganda that distracted from public health warnings, and the movement of so many soldiers around the world helped to turn the outbreak into a pandemic.

**Question 0**

Where were most of the battles of the First World War fought?

**Question 1**

What is the Western Front?

**Question 2**

What prevented a stalemate in the trenches?

**Question 3**

How many soldiers died in the First World War?

**Question 4**

Where did the enemies first appear during the war?

**Text number 62**

Ultimately, the First World War marked a decisive break with the old world order that had emerged after the Napoleonic Wars and had been transformed by the nationalist revolutions of the mid-19th century. The results of the First World War would play an important role in the development of the Second World War some 20 years later. The partition of the Ottoman Empire was a political event that redrew the political boundaries of West Asia. The vast conglomerate of regions and peoples previously ruled by the Sultan of the Ottoman Empire was divided into several new nations. The partition gave birth to the modern Arab world and the Republic of Turkey. The League of Nations granted France mandates for Syria and Lebanon, and the United Kingdom mandates for Mesopotamia and Palestine (later divided into two regions: Palestine and the Transjordan). Parts of the Ottoman Empire in the Arabian Peninsula became parts of what are now Saudi Arabia and Yemen.

**Question 0**

In which century did the nationalist revolutions take place?

**Question 1**

How many years after the First World War did the Second World War start?

**Question 2**

What abolished the political borders of West Asia?

**Question 3**

What did the partition of the Ottoman Empire entail?

**Question 4**

To whom did the League of Nations grant mandates for France?

**Text number 63**

The Russian Revolution is the series of revolutions that took place in Russia in 1917, destroying the Tsar's autocracy and leading to the creation of the Soviet Union. After the abdication of Nicholas II of Russia, a Russian provisional government was established. In October 1917, the Red Guards, armed groups of workers and deserters led by the Bolshevik Party, seized power in St Petersburg (then Petrograd) and immediately launched an armed coup in towns and villages throughout the former Russian Empire.

**Question 0**

What is the Russian Revolution?

**Question 1**

What happened when Nicholas II was deposed?

**Question 2**

Which event took place in October 1917?

**Question 3**

What happened during the Red Revolution?

**Text number 64**

Another significant event in 1917 was the Brest-Litovsk armistice between Russia and the Central Powers. As a condition of peace, the Central Powers ceded huge parts of the former Russian Empire to Imperial Germany and the Ottoman Empire, which greatly angered nationalists and conservatives. The Bolsheviks made peace with the German Empire and the Central Powers, as they had promised the Russian people before the revolution. Vladimir Lenin's decision has been attributed to the sponsorship of the German Emperor Wilhelm II's foreign ministry, which he had offered in the hope that the revolution would lead to Russia's withdrawal from the First World War. This suspicion was confirmed by the German Foreign Ministry's sponsorship of Lenin's return to Petrograd. The Western Allies expressed their dismay at the Bolsheviks, who were shocked:

**Question 0**

When was the armistice signed between Russia and the Central Powers?

**Question 1**

What did the central powers give in return for peace?

**Question 2**

With whom did the Bolsheviks make peace?

**Question 3**

What were Vladimir Lenin's decisions based on?

**Question 4**

Who was angry about Lenin's sponsorship of Petrograd in Germany?

**Text number 65**

The Russian Civil War was a multi-party war fought in the territory of the former Russian Empire after the collapse of the Russian Provisional Government and the Bolshevik-led Soviets took power first in St Petersburg and then elsewhere. As a result of the October Revolution, the old Russian imperial army had been demobilised; the volunteer Red Guard was the main military force of the Bolsheviks, supplemented by the armed military component of the Cheka, the Bolshevik state security apparatus. Compulsory conscription of rural peasants into the Red Army was introduced. The resistance of rural Russians to the conscription units of the Red Army was overcome by taking hostages and shooting them if necessary to force them to comply. Former Tsarist officers were used as 'military experts' (voenspetsy) and their families were taken hostage to ensure loyalty. At the beginning of the war, three quarters of the Red Army officer corps consisted of former Tsarist officers. At the end of the war, 83% of all Red Army division and unit commanders were former Tsarist soldiers.

**Question 0**

Where did the Bolshevik-ruled Soviets first take power during the Russian Civil War?

**Question 1**

What happened to the Russian Imperial Army after the October Resolution?

**Question 2**

What was the main military force of the Bolsheviks?

**Question 3**

How did the Red Army defeat its enemies?

**Question 4**

How were former Tsarist officers used?

**Text number 66**

The main battles were fought between the Bolshevik Red Army and the White Army. The Red Army was fought by many foreign armies, especially the Allied forces, but many volunteer foreigners fought on both sides of the Russian Civil War. Other nationalist and regional political groups also took part in the war, such as the nationalist Green Army of Ukraine, the anarchist Black Army of Ukraine and the Black Guards, and warlords such as Ungern von Sternberg. The fiercest fighting took place between 1918 and 1920, with the major military action ending on 25 October 1922 when the Red Army occupied Vladivostok, previously under the control of the provisional Priamur government. The last enclave of the White forces was the Ayano-Maysk district on the Pacific coast. Most of the fighting ended in 1920 with the defeat of General Pyotr Wrangel in the Crimea, but considerable resistance in certain areas continued until 1923 (e.g. the Kronstadt Rebellion, the Tambov Rebellion, the Basmach Rebellion and the last resistance of the White movement in the Far East).

**Question 0**

Who was the main battle between?

**Question 1**

During which period were the fiercest battles fought?

**Question 2**

When did the great military operation end?

**Question 3**

Which general was overthrown in 1920?

**Question 4**

Where was the latest resistance from the white movement?

**Text number 67**

The Fourth of May movement helped revive the then fading idea of the Republican Revolution. By 1917, Sun Yat-sen had become the commander-in-chief of a rival military government in Guangzhou in collaboration with southern warlords. However, Sun's efforts to obtain help from the Western democracies were ignored and in 1920 he turned to the Soviet Union, which had recently staged its own revolution. The Soviets sought to befriend the Chinese revolutionaries by offering sharp attacks on Western imperialism. However, for political expediency, the Soviet leadership embarked on a policy of dual support for both the Sun and the newly formed Chinese Communist Party (CCP).

**Question 0**

What did the Fourth of May movement help to do?

**Question 1**

Sun Yat-Sen became the leader of which military group.

**Question 2**

What did Sun Yat-Sen hope to get from Western democracies?

**Question 3**

Who did Sun Yet-Sen ask for help from in 1930?

**Question 4**

How did the Soviet Union try to make friends with the Chinese revolutionary?

**Text number 68**

In North America, especially in the first half of this period, people experienced considerable prosperity during the Roaring Twenties. The social and societal upheaval known as the Roaring Twenties began in North America and spread to Europe after the First World War. The Roaring Twenties, often referred to as the "Jazz Age", was a period of social, artistic and cultural dynamism. 'Normalcy' returned to politics, jazz music flourished, flappers redefined modern womanhood and art deco reached its peak. The spirit of the Roaring Twenties was characterised by a general sense of discontinuity, associated with modernity and a break with tradition. Everything seemed possible with modern technology. New technologies, especially cars, films and radio, spread 'modernity' to a large part of the population. In the 1920s, practicality became commonplace in architecture as well as in everyday life. The 1920s were also characterised by numerous inventions and inventions, widespread industrial growth and an increase in consumer demand and aspirations, as well as significant changes in lifestyles.

**Question 0**

What is the "Roaring Twenties"?

**Question 1**

Where did the "Roaring Twenties" begin?

**Question 2**

Where did the "Roaring Twenties" spread after the war?

**Question 3**

What are the "Roaring Twenties" known as?

**Question 4**

what did the "jazz age" bring?

**Text number 69**

Europe spent these years rebuilding and dealing with the huge human cost of the conflict. The US economy became increasingly intertwined with the European economy. In Germany, the Weimar Republic gave way to political and economic turmoil, culminating in German hyperinflation in 1923 and the failed Beer Hall Putsch of the same year. When Germany could no longer afford the war dues, Wall Street invested heavily in European debt to keep the European economy afloat as a large consumer market for American mass-produced goods. By the middle of the decade, economic growth in Europe skyrocketed, and the Roaring Twenties broke out in Germany, Britain and France, with the second half of the decade known as the 'Golden Twenties'. In France and French-speaking Canada they were also known as the 'années folles' ('crazy years').

**Question 0**

When did the hyperinflation of 1923 occur?

**Question 1**

Who invested in European debt?

**Question 2**

What is the big market for Europe?

**Text number 70**

Global prosperity changed dramatically when the Great Depression broke out in 1929. The Wall Street crash of 1929 marked the end of the previous era, when the Great Depression began. The Great Depression was a global economic recession that began in most places in 1929 and ended in different countries at different times in the 1930s or early 1940s. It was the largest and most significant economic depression of the 20th century and is used in the 21st century as an example of how far the world economy can fall.

**Question 0**

What dramatically changed global wealth?

**Question 1**

What year did the Wall Street crash happen?

**Question 2**

What is the Great Recession?

**Question 3**

When did the Great Recession end?

**Question 4**

The Great Recession is the worst economic downturn of what century?

**Text number 71**

The recession had a devastating impact on almost all countries, rich and poor alike. International trade collapsed by half or two-thirds, as did personal incomes, tax revenues, prices and profits. Cities around the world were hit hard, especially those that depended on heavy industry. Construction came to a virtual standstill in many countries. Agriculture and rural areas suffered as crop prices fell by around 60%. Regions dependent on basic industry were hardest hit, with demand collapsing and few alternative jobs.

**Question 0**

Where did depression have a negative impact?

**Question 1**

How much did international trade fall?

**Question 2**

What happened to construction during the recession?

**Question 3**

How much did crop prices fall?

**Text number 72**

The Great Recession ended at different times in different countries, and its effects continued into the next era. The American Great Depression ended in 1941, when the United States entered the Second World War. Most countries set up emergency aid programmes, and most experienced some form of political upheaval that pushed them to the left or right. In some countries of the world, desperate citizens turned to nationalist demagogues - the most notorious being Adolf Hitler - and set the stage for the next era of war. The shock of the global depression led to the rise of Nazism. In Asia, Japan became an increasingly assertive superpower, particularly in relation to China.

**Question 0**

When did the Great Recession in America end?

**Question 1**

To whom did the people in some countries of the world turn?

**Question 2**

Who was the most prominent nationalist demagogue to whom the people turned?

**Question 3**

Where did the convulsion caused by the global recession lead?

**Text number 73**

The inter-war period was also marked by a radical change in the international order, away from the pre-World War I balance of power in Europe. One of the most important stabilising institutions was the League of Nations, which was established after the First World War to maintain world security and peace and to promote economic growth between member states. Weakened by the belligerence of Nazi Germany, Imperial Japan, the Soviet Union and Mussolini's Italy, and the non-participation of the United States, many questioned its effectiveness and legitimacy.

**Question 0**

What marked the period between the wars?

**Question 1**

Which institution was supposed to bring stability?

**Question 2**

When was the League of Nations founded?

**Question 3**

Who undermined the League of Nations?

**Question 4**

How did the destabilisation of the League of Nations affect the people?

**Text number 74**

Several international crises pushed the League to its limits, the earliest being the Japanese invasion of Manchuria and the Abyssinian crisis of 1935/36, when Italy invaded Abyssinia, then one of the only free African states. The League tried to implement economic sanctions against Italy, but to no avail. The incident highlighted the weakness of France and Britain, exemplified by their reluctance to alienate Italy and lose it as an ally. In any case, the little action taken by the Western powers drove Mussolini's Italy to ally itself with Hitler's Germany. The Abyssinian War showed Hitler how weak the League was and encouraged the remilitarisation of the Rhineland in flagrant violation of the Versailles Treaty. This was the first in a series of provocative acts that culminated in the invasion of Poland in September 1939 and the start of the Second World War.

**Question 0**

Who was the first to attack Manchuria?

**Question 1**

What is the Abyssinian crisis?

**Question 2**

What is Abyssinia?

**Question 3**

When did the Abyssinian crisis happen?

**Question 4**

Who did the Union try to force into economic sanctions?

**Text number 75**

Few Chinese had any illusions about Japan's plans for China. Starved of raw materials and under pressure from a growing population, Japan began its invasion of Manchuria in September 1931 and installed former Quing emperor Puyin Manchukuo as head of the puppet state in 1932. During the Sino-Japanese War (1937-1945), the loss of Manchuria and its huge industrial development and military-industrial potential was a blow to the Kuomintang economy. The League of Nations, established at the end of the First World War, was unable to act in the face of Japanese defiance. After 1940, conflicts between the Kuomintang and the Communists became more frequent in areas not under Japanese control. The Communists expanded their influence whenever they had the opportunity through mass organisations, administrative reforms and pro-peasant land and tax reforms, while the Kuomintang tried to neutralise the spread of Communist influence.

**Question 0**

When was Manchuria conquered?

**Question 1**

Who was appointed leader of the puppet state after the invasion of Manchuria?

**Question 2**

What caused the blow to the Kuomintang economy?

**Question 3**

In what year did the conflict between the Kuomintang and the communists escalate?

**Question 4**

What was Kuomintang's main objective with regard to the communists?

**Text number 76**

During the Second Sino-Japanese War, tensions between Imperial Japan and the United States had risen; events such as the Panay incident and the Nanking massacre turned American public opinion against Japan. The French occupation of Indochina in 1940-41 and the continuing war with China led the US to impose an embargo on Japan's exports of strategic materials such as scrap metal and oil, which were vital to the war effort. The Japanese were forced either to withdraw from China and lose face, or to seize and secure new sources of raw materials in the resource-rich, European-dominated colonies of Southeast Asia - notably British Malaya and the Dutch East Indies (now Indonesia). In 1940, Imperial Japan signed a tripartite agreement with Nazi Germany and fascist Italy.

**Question 0**

In which war did tensions arise between Imperial Japan and the United States?

**Question 1**

What did the United States set for Japan's military action?

**Question 2**

What did the American embargoes prevent Japan from acquiring?

**Question 3**

With whom did Imperial Japan sign the Tripartite Treaty?

**Text number 77**

On 7 December 1941, Japan attacked the United States at Pearl Harbor, which also brought Japan into the war on the Allied side. China also joined the Allies, as did eventually most of the rest of the world. China was in turmoil at the time, and attacked the Japanese armies with guerrilla warfare. By early 1942, the main parties to the battle were grouped as follows: the British Commonwealth, the United States and the Soviet Union fighting Germany and Italy, and the British Commonwealth, China and the United States fighting Japan. The United Kingdom, the United States, the Soviet Union and China were referred to during World War II as the "powerful interests" and were recognised by the United Nations as the "four great countries" of the Allies in the United Nations Declaration. These four countries were considered the "four policemen" or "four sheriffs" of Allied power and the primary victors of World War II. From then until August 1945, fighting raged throughout Europe, the North Atlantic, North Africa, South East Asia, China, the Pacific and the skies above Japan.

**Question 0**

Where did Japan attack the United States?

**Question 1**

When was Pearl Harbor attacked?

**Question 2**

Which countries were referred to as "lobbying the powerful"?

**Question 3**

What did the United Nations call "Advocacy for the Powerful"?

**Question 4**

Who were the winners of the Second World War?

**Text number 78**

It is possible that some 62 million people died in the war; estimates vary widely. Around 60% of all casualties were civilians, killed by disease, famine, genocide (especially the Holocaust) and aerial bombardment. The former Soviet Union and China suffered the highest number of victims. It is estimated that around 23 million people died in the Soviet Union and around 10 million in China. No country lost a greater proportion of its population than Poland: some 5.6 million people, or 16% of its pre-war population of 34.8 million, died.

**Question 0**

What was the estimated death toll during the war?

**Question 1**

What percentage of those killed during the war were civilians?

**Question 2**

Which countries suffer the most losses in war?

**Question 3**

How much of its population did Poland lose in the war?

**Question 4**

How many deaths did the Soviet Union suffer in the war?

**Text number 79**

The Holocaust (which roughly means "burnt whole") was the deliberate and systematic murder of millions of Jews and other "undesirables" by the German Nazi regime during World War II. There are many differing views as to whether this was intended from the outset of the war or whether the plans came later. However, the persecution of Jews extended well before the start of the war, as on Kristallnacht (Night of Broken Glass). The Nazis used propaganda effectively to stir up anti-Semitic feelings in ordinary Germans.

**Question 0**

What is the Holocaust?

**Question 1**

During which word did the Holocaust take place?

**Question 2**

Who is responsible for the Holocaust?

**Question 3**

How did the Nazis create anti-Semitic feelings among civilians?

**Question 4**

When did the suffering of the Jews begin?

**Text number 80**

After the Second World War, Europe was informally divided into a Western and a Soviet sphere of influence. Western Europe was later united into the North Atlantic Treaty Organisation (NATO) and Eastern Europe into the Warsaw Pact. Power shifted from Western Europe and the British Empire to two new superpowers, the United States and the Soviet Union. These two rivals later faced off in the Cold War. In Asia, Japan's defeat led to its democratisation. China's civil war continued during and after the war, eventually leading to the establishment of the People's Republic of China. The former colonies of the great European powers began their journey towards independence.

**Question 0**

How was Europe divided after the Second World War?

**Question 1**

What does the term NATO mean?

**Question 2**

Who fought in the Cold War?

**Question 3**

What did Japan's defeat mean for Asia?

**Question 4**

What name did China give itself after the war?

**Text number 81**

World GDP per capita grew fivefold during the 20th century, far more than all previous centuries combined (including the 19th century and its industrial revolution). Many economists argue that this underestimates the size of the increase, since many of the goods and services consumed in the late 20th century, such as improved medicine (which increased world life expectancy by more than two decades) and communications technology, were not available at any price in the early 20th century. However, the gap between the world's rich and poor grew ever wider, and most of the world's population remained on the poor side of the divide.

**Question 0**

By what percentage did world GDP per capita grow in the 20th century?

**Question 1**

How much has modern medicine extended average life expectancy?

**Question 2**

What happened to the income gap between rich and poor?

**Text number 82**

However, advances in technology and medicine have also had a major impact on the global South. In the mid-century, big industry and more centralised media enabled unprecedentedly brutal dictatorships, which also led to unprecedented wars. However, increased communication contributed to democratisation. Technological developments included the development of aircraft and space exploration, nuclear technology, the development of genetics and the dawn of the information age.

**Question 0**

What did the media industry make possible in the mid-century?

**Question 1**

Where did the brutal dictatorships caused by the media lead?

**Question 2**

What was the impact of increased communication leadership?

**Question 3**

What period did technological developments lead to?

**Text number 83**

The Soviet Union created the Eastern Bloc from the countries it occupied, some of which were annexed as Soviet Socialist Republics and others retained as satellite states that later formed the Warsaw Pact. The United States and several Western European countries embarked on a policy of 'containment' of communism, and to this end entered into countless alliances, including NATO. Several of these Western countries also coordinated efforts to reconstruct Western Europe, including West Germany, which was opposed by the Soviet Union. In other regions of the world, such as Latin America and South-East Asia, the Soviet Union promoted communist revolutionary movements, which the United States and many of its allies opposed and in some cases tried to 'turn back'. Many countries were urged to ally themselves with the nations that later formed either NATO or the Warsaw Pact, although other movements also emerged.

**Question 0**

What did the Soviet Union annex part of its territory to?

**Question 1**

What was the name later given to the territories maintained by the Soviet Union as satellite states?

**Question 2**

What policies did the United States and many Western countries adopt to fight communism?

**Question 3**

What were the Soviets' objections to reconstruction?

**Question 4**

What Soviet actions did the United States oppose?

**Text number 84**

The Cold War was a period of both tension and relative peace. International crises arose, such as the Berlin Blockade (1948-1949), the Korean War (1950-1953), the Berlin Crisis of 1961, the Vietnam War (1959-1975), the Cuban Missile Crisis (1962), the Soviet war in Afghanistan (1979-1989) and the NATO exercises of November 1983. There were also periods of de-escalation as both sides sought conciliation. Direct military attacks against adversaries were prevented by the prospect of mutually assured destruction by means of portable nuclear weapons. In the Cold War era, the generation of love and the rise of computers transformed society in very different and complex ways, such as increasing social and local mobility.

**Question 0**

What were the periods of the Cold War like?

**Question 1**

How long did the Berlin blockade last?

**Question 2**

How long did the Korean War last?

**Question 3**

How long did the Vietnam War last?

**Question 4**

When did the Cuban Missile Crisis happen?

**Text number 85**

The Cold War ended in the late 1980s and early 1990s. Under the leadership of President Ronald Reagan, the United States increased diplomatic, military and economic pressure on the Soviet Union, which was already suffering from severe economic stagnation. In the second half of the 1980s, the newly appointed Soviet leader Mikhail Gorbachev introduced the perestroika and glasnost reforms. The Soviet Union collapsed in 1991, leaving the United States as the dominant military power, although Russia retained much of the Soviet Union's massive nuclear arsenal.

**Question 0**

At what time was the Cold War imminent?

**Question 1**

What did the Reagan administration add to the relationship with the Soviet Union?

**Question 2**

What did the Soviet Union suffer in the 1980s?

**Question 3**

What did Mikhail Gorbachev introduce?

**Question 4**

What year did the Soviet Union collapse?

**Text number 86**

In Latin America in the 1970s, leftists gained significant political influence, leading the right, church authorities and much of the upper class in individual countries to support coups to avoid what they perceived as a threat from the communists. The intervention of Cuba and the United States, which led to political polarisation, added to this. Most South American countries were ruled at one time or another by military dictatorships supported by the United States. In the 1970s, the governments of the southern peninsula cooperated in Operation Condor, in which many left-wing dissidents were killed, including some urban guerrillas. However, all countries had restored democracy by the early 1990s.

**Question 0**

What made the right-wing authorities in Latin America support coups?

**Question 1**

Why did the Latin American upper class support the coups?

**Question 2**

Whose killing did the governments in the Southern Cone take part in?

**Question 3**

What did all countries return in the 1990s?

**Question 4**

Where did the US support dictatorships in the 1970s?

**Text number 87**

The space age is a period of time that covers the activities related to the space race, space exploration and space technology, as well as the cultural developments that have taken place as a result of these events. The Space Age began with the development of a number of technologies, culminating in the launch of the Soviet Union's Sputnik 1. This was the world's first artificial satellite, which orbited the Earth in 98.1 minutes and weighed 83 kilograms. The launch of Sputnik 1 ushered in a new era of political, scientific and technological achievement known as the Space Age. The Space Age was characterised by the rapid development of new technologies, mainly in the context of fierce competition between the United States and the Soviet Union. The space age saw the first human spaceflights during the Vostok programme and reached its peak with the Apollo programme, which captured the imagination of a large part of the world's population. The landing of Apollo 11 was watched by more than 500 million people around the world and is widely recognised as one of the defining moments of the 20th century. Since then, and with the end of the space race following the collapse of the Soviet Union, public attention has largely shifted to other areas.

**Question 0**

What is a space age?

**Question 1**

Who launched Sputnik 1?

**Question 2**

How long did it take Sputnik 1 to orbit the Earth?

**Question 3**

What did Sputnik 1 bring?

**Question 4**

How many people watched the Apollo 11 landing?

**Document number 366**

**Text number 0**

The phrase "51st state" can be used in a positive sense, meaning that a region or area is so aligned, supportive, and favorable to the United States that it is like a state of the United States. It can also be used in a derogatory sense, where a region or area is considered to be under excessive American cultural or military influence or control. Around the world, people who feel that their local or national culture has become too Americanized sometimes use the term "51st state" to refer to their own country.

**Question 0**

What controls are taken into account when a country is derogatorily referred to as the "51st state"?

**Question 1**

Sometimes, when a country calls itself the 51st state, what has happened to its culture?

**Question 2**

What is the argument for calling a country the "51st state" in a positive way?

**Question 3**

What is the positive connotation of the name "51st state"?

**Question 4**

What is the reason for the negative connotation of the term?

**Question 5**

If a country calls itself the "51st state" after cultural changes, what can we assume has changed?

**Question 6**

What kind of scrutiny is taken into account when a country is derogatorily labelled "American"?

**Question 7**

Sometimes, when a city calls itself the "51st state", what has happened to their culture?

**Question 8**

What is the argument for positively referring to a country as an "American country"?

**Question 9**

What is the positive connotation of the term "American state"?

**Question 10**

What is the reason for one negative connotation of "American state"?

**Text number 1**

Under Article IV, Section 3 of the US Constitution, which defines the relations between the states, Congress has the power to admit new states into the Union. States must give "full faith and credit" to each other's legislatures and courts, which is generally understood to include recognition of legal contracts, marriages and criminal convictions. The federal government guarantees the states military and civil defense, and Article IV, Section 4 of the Covenant also requires the federal government to "guarantee to each state in this union a republican form of government."

**Question 0**

What does the third article of Article IV of the US Constitution outline?

**Question 1**

Article IV, Section 3 of the US Constitution gives Congress the power to do what?

**Question 2**

What does the states' requirement to give "full faith and credit" help to recognise?

**Question 3**

What are all states federally guaranteed?

**Question 4**

What is guaranteed in Article 4(4)?

**Question 5**

Which part of the US Constitution outlines the relationship between the states?

**Question 6**

Under Article IV, Section 3, Congress can do what?

**Question 7**

What does the concept of "full faith and credit" protect?

**Question 8**

What does the federal government guarantee to the states?

**Question 9**

What does the third section of Article V of the US Constitution outline?

**Question 10**

What does the third section of Article V of the US Constitution give Congress the power to do?

**Question 11**

What does the requirement for states to provide a "full state guarantee" help identify?

**Question 12**

What do all states guarantee in the form of a republic?

**Question 13**

What does Article V Section 4 guarantee?

**Text number 2**

Puerto Rico has been discussed as a possible 51st US state. In a 2012 referendum, a majority of voters, 54%, expressed dissatisfaction with the current political relationship. In a separate question, 61% of voters favoured statehood (excluding 26% of voters who left the question blank). On 11 December 2012, the Puerto Rico legislature decided to request that the President and the US Congress act on the results, end the current form of territorial status and begin the process to admit Puerto Rico to the Union as a state.

**Question 0**

Which country has been considered as a possible new addition to the United States?

**Question 1**

What percentage of voters expressed dissatisfaction with their current political relationship?

**Question 2**

What percentage of voters supported independence?

**Question 3**

When did Puerto Rico decide to ask the US to act on these findings?

**Question 4**

What would Puerto Rico think would be the ideal response from the United States?

**Question 5**

What area has been proposed as a new annex to the United States?

**Question 6**

What percentage of voters expressed dissatisfaction with the current political relationship between the United States and Puerto Rico?

**Question 7**

When did Puerto Rico's legislature ask to be granted independence?

**Question 8**

What percentage of voters expressed dissatisfaction with their current territorial relationship?

**Question 9**

What percentage of voters supported Congress?

**Question 10**

When did Puerto Rico decide to ask voters to act on these results?

**Question 11**

What would be the ideal reaction of voters, according to Peurto Rico?

**Question 12**

What area has been proposed as a new addition to Canada?

**Text number 3**

Since 1898, Puerto Rico has had limited representation in Congress in the form of a non-voting representative, the Resident Commissioner. The 110th session of Congress restored the commissioner's right to vote in the plenary, but not on matters where his vote would be decisive. In Puerto Rico, elections are held in US presidential primaries or Democratic Party and Republican Party caucuses, which elect delegates to the national party conventions of the respective parties, although no presidential candidates are constituency-allocated. As American citizens, Puerto Ricans may vote in US presidential elections provided they reside in one of the 50 states or the District of Columbia and not in Puerto Rico.

**Question 0**

How long has Puerto Rico been represented in Congress?

**Question 1**

Who represents Puerto Rico in Congress?

**Question 2**

Which Congress gave the Commissioner the right to vote?

**Question 3**

What is a Commissioner not allowed to vote on?

**Question 4**

How long has Puerto Rico been represented by a Commissioner?

**Question 5**

Who represents the Democratic Party in Congress?

**Question 6**

Which Congress gave Democrats the right to vote?

**Question 7**

What should Democrats not be allowed to vote on?

**Question 8**

Who holds elections in the Electoral Commission?

**Text number 4**

Puerto Rico residents pay US federal taxes: import and export taxes, federal commodity taxes and social security taxes, so they contribute to the US government. Most Puerto Rico residents do not pay federal income taxes, but do pay federal payroll taxes (Social Security and Medicare). However, federal employees, persons doing business with the federal government, businesses operating in Puerto Rico that intend to send funds to the United States, and others pay federal income taxes. Puerto Ricans can enlist in the US military. Puerto Ricans have participated in every US war since 1898; 52 Puerto Ricans had died in the Iraq and Afghanistan wars as of November 2012.

**Question 0**

What taxes do Puerto Ricans pay?

**Question 1**

Where do Puerto Ricans pay federal taxes?

**Question 2**

How else could they serve the United States?

**Question 3**

How many Puerto Ricans have died in the war in Iraq and Afghanistan?

**Question 4**

What taxes does Afghanistan pay?

**Question 5**

Where do Afghan citizens pay their federal taxes?

**Question 6**

How else can Afghanistan serve the United States?

**Question 7**

How many Afghans have died in the war in Iraq and Afghanistan?

**Question 8**

What do most people in Afghanistan pay?

**Text number 5**

Puerto Rico has been under US sovereignty for more than a century, having been ceded to the US by Spain at the end of the Spanish-American War, and Puerto Ricans have been US citizens since 1917. The island's final status has not been determined as of 2012[update], and its residents do not have voting representation in the federal government. Puerto Rico has limited representation in the US Congress in the form of a Resident Commissioner, a non-voting delegate. Like the states, Puerto Rico has self-government, a republican form of government based on a constitution adopted by its people, and a bill of rights.

**Question 0**

In the aftermath of which war did the United States get Puerto Rico?

**Question 1**

Which country handed Puerto Rico over to the United States?

**Question 2**

How long have Puerto Ricans been US citizens?

**Question 3**

What form of government do Puerto Ricans have?

**Question 4**

In the aftermath of which war was the United States granted Congress?

**Question 5**

Which country handed over Congress to the United States?

**Question 6**

How long has Congress been a US citizen?

**Question 7**

What form of government does Spain have?

**Question 8**

How long has Spain been under US sovereignty?

**Text number 6**

This constitution was created when the US Congress ordered the local government to hold a constitutional convention to draft the Puerto Rico Constitution in 1951. The Constitution was approved by the voters of Puerto Rico, the US Congress and the US President in 1952. Furthermore, the rights, privileges and immunities of US citizens 'shall be respected in Puerto Rico to the same extent as if Puerto Rico were a State of the Union', since the US Congress explicitly extended the Privileges and Immunities Clause of the US Constitution in 1948.

**Question 0**

How was Puerto Rico's Constitution drafted?

**Question 1**

When was Puerto Rico's Constitution written?

**Question 2**

When did the voters, the US Congress and the President approve the Constitution?

**Question 3**

Under which clause do Puerto Rican citizens have the same rights as US citizens?

**Question 4**

How was the Puerto Rican Congress achieved?

**Question 5**

When was the Congress of Puerto Rico created?

**Question 6**

When did the voters, the Puerto Rican Congress and the President of the United States approve the Constitution?

**Question 7**

Which clause gives Congress the same rights as the citizens of Puerto Rico?

**Question 8**

When were the fast citizens created?

**Text number 7**

The Constitution of Puerto Rico refers to Puerto Rico as the "Commonwealth of Puerto Rico". The 1952 Constitution of Puerto Rico gave its political structure the name Estado Libre Asociado (literally translated as "Free Associated State"), which is officially translated into English as Commonwealth. The island is covered by the territorial clause of the US Constitution, which has led to doubts about the finality of Puerto Rico's Commonwealth status. In addition, all persons born in Puerto Rico become US citizens at birth (under the provisions of the Jones-Shafroth Act of 1917), but citizens of Puerto Rico cannot vote for President or for ordinary members of either house of Congress. Statehood would give islanders full voting rights at the federal level. The Puerto Rico Democracy Act (H.R. 2499) was passed by the US House of Representatives on 29 April 2010 by a vote of 223-169, but was not passed by the Senate before the end of the 111th Congress. It would have provided for the federally approved sovereignty of the people of Puerto Rico. The Act would provide for referendums in Puerto Rico to determine the final political status of the island. It was also proposed in 2007.

**Question 0**

How is Puerto Rico named in its constitution?

**Question 1**

What is the name of the country?

**Question 2**

Which jurisdiction does the island fall under?

**Question 3**

Which law was adopted on 29 April 2010?

**Question 4**

How are Puerto Rico's representatives appointed?

**Question 5**

What is the title at federal level?

**Question 6**

Which jurisdiction is responsible for the determination process?

**Question 7**

Which law was adopted on 29 April 2007?

**Question 8**

What will become of all the English?

**Text number 8**

In a referendum held in November 2012, 54% of respondents voted to reject the current status under the territorial clause of the US Constitution, while in another question 61% of voters said that statehood would be a better alternative to the current territorial status. The 2012 referendum was by far the most successful referendum for statehood supporters, with support for statehood rising in each successive referendum. However, more than one in four voters failed to answer the question on preferred alternative status. Opponents of statehood have argued that the statehood option received only 45% of the vote if abstentions are included. If abstentions are taken into account, the referendum result is much closer to 44%, below the 50% majority threshold.

**Question 0**

What percentage of voters rejected the status of the region?

**Question 1**

What percentage of voters supported independence?

**Question 2**

What percentage of voters abstained from voting for the alternative position?

**Question 3**

What is the argument used by opponents of independence?

**Question 4**

What percentage of voters rejected statehood?

**Question 5**

What percentage of voters preferred the regional quota clause?

**Question 6**

What percentage of voters abstained from the majority?

**Question 7**

What is the argument used by opponents of the regional quota clause?

**Question 8**

What was the most inclusive referendum?

**Text number 9**

The Washington Post, New York Times and Boston Herald have published opinion pieces supporting Puerto Rican independence. On 8 November 2012, the Washington newspaper The Hill published an article saying that Congress is likely to ignore the results of the referendum because of the circumstances behind the vote. and US Congressman Luis Gutiérrez US Congresswoman Nydia Velázquez, both of Puerto Rican descent, echoed The Hill's statements. Shortly after the results were announced, Puerto Rican-born US Congressman José Enrique Serrano commented: "I was particularly impressed with the outcome of the referendum on Puerto Rico's 'status'. A majority of those who voted expressed their desire to change the current territorial status. On the second question, an even greater majority asked for it to become a state. This is an earthquake in Puerto Rico politics. It demands congressional attention and a definitive answer to Puerto Ricans' call for change. This is a historic moment when voters asked to move forward."

**Question 0**

Which newspapers have published opinion pieces supporting Puerto Rico's independence?

**Question 1**

Which newspaper suggested that Congress should ignore the Puerto Rico referendum?

**Question 2**

When was this article published?

**Question 3**

Which members of Congress agreed with Hill's assessment?

**Question 4**

Which newspapers have published opinion pieces expressing support for Serrano's independence?

**Question 5**

Which newspaper suggested that Congress should ignore the Serrano referendum?

**Question 6**

When was the Velazquez article published?

**Question 7**

Which members of Congress agreed with Serrano's assessment?

**Question 8**

Who published the article that Puerto Rico is likely to ignore the results of the referendum?

**Text number 10**

A few days after the referendum, Commissioner Pedro Pierluisi, Governor Luis Fortuño and incoming Governor Alejandro García Padilla wrote separate letters to US President Barack Obama on the results of the vote. Mr Pierluisi urged Mr Obama to initiate legislation for Puerto Rico's independence, as Puerto Rico won the referendum. Fortuño urged him to move the process forward. García Padilla asked him to reject the results because of their ambiguity. The White House's position on the November 2012 referendum was that the results were clear, the people of Puerto Rico want to resolve the question of status, and a majority chose independence on the second question. The former White House Director of Hispanic Media Affairs said, "Now is the time for Congress to act, and the administration will work with them to allow the people of Puerto Rico to decide their own future."

**Question 0**

Which politicians pushed for Puerto Rico's independence?

**Question 1**

Which politician opposed Puerto Rico's autonomy?

**Question 2**

How did these politicians express their concerns?

**Question 3**

What was the White House position?

**Question 4**

Who were the politicians who pushed for the status of the state of Padilla?

**Question 5**

Which politician fought against the independence of Pierluisi?

**Question 6**

How did Congress express its concerns?

**Question 7**

What was the position of Congress?

**Question 8**

Who said, "It's time for Puerto Rico to act"?

**Text number 11**

On May 15, 2013, Commissioner Pierluisi introduced a bill to Congress, H.R. 2000, to "establish a process for Puerto Rico to be admitted as a state of the Union" and asked Congress to vote to ratify Puerto Rico as the 51st state. On February 12, 2014, Senator Martin Heinrich introduced the bill in the US Senate. The bill would require Puerto Rico to hold a binding referendum asking whether the territory wants to be admitted as a state. If the vote is in favour, the President would be asked to submit a bill to Congress to accept Puerto Rico as a state.

**Question 0**

When was H.R. 2000 introduced?

**Question 1**

What would H.R. 2000 do?

**Question 2**

What did Senator Heinrich's bill call for?

**Question 3**

What would happen if the referendum were a "yes" vote?

**Question 4**

When was H.R. 2014 presented?

**Question 5**

What would H.R. 2014 do?

**Question 6**

What Senator H.R. Heinrich's bill called for?

**Question 7**

What would happen if the referendum were to result in a "no" vote?

**Question 8**

Who was asked to ratify the Puerto Rico Senate?

**Text number 12**

Washington D.C. is often mentioned as a candidate for a separate state. In Federalist Papers, Federalist No. 43, James Madison pondered the implications of the definition of "seat of government" in the US Constitution. Although he noted the potential conflicts of interest and the "necessity of a municipal legislature for local purposes," Madison did not address the role of the district in the national vote. Legal scholars disagree as to whether a county can be admitted as a state by a mere act of Congress, since it is the seat of US government, which Article I, Section 8 of the Constitution requires to be within the exclusive jurisdiction of Congress. Depending on the interpretation of this text, the recognition of an entire county as a state may require a constitutional amendment, which is much more difficult to achieve. However, the constitution does not set a minimum size for a district. Its size has already changed once before, when Virginia regained the part of the county south of the Potomac River. The constitutional requirement for a federal district can therefore be met by reducing the size of the district to a small central unit of government buildings and monuments and ceding the rest of the territory to the new state.

**Question 0**

Who considered the implications of the constitutional definition of the seat of government?

**Question 1**

Where are these ideas located in the Federalist Papers?

**Question 2**

What are the constitutional restrictions on the Washington D.C. meeting?

**Question 3**

What caused Washington to change size?

**Question 4**

Who pondered the implications of the definition of a seat of government south of Potomac?

**Question 5**

Where are these ideas located south of the Potomac?

**Question 6**

What restrictions does the Constitution place on Virginia's assembly?

**Question 7**

What made Federalist No 43 change?

**Question 8**

Who can recognise the district as Federalist No 43?

**Text number 13**

Washington residents who support the independence movement sometimes use an abbreviated version of the Revolutionary War protest slogan "No Taxation Without Representation", omitting the initial "No" to suggest that they have no congressional representation; the phrase is now printed on Washington license plates (although the driver can choose to go to the Washington website address instead). President Bill Clinton's presidential limousine bore a "Taxation without representation" license plate towards the end of his term, while President George W. Bush replaced the plates shortly after taking office. President Barack Obama changed the number plates back to protest style at the beginning of his second term.

**Question 0**

What Revolutionary War motto has been adapted and used by Washington State independence supporters?

**Question 1**

What does the saying mean?

**Question 2**

How has the phrase spread widely?

**Question 3**

When did Obama have protest signs made for his presidential limousine?

**Question 4**

What motto of the revolutionary war has been adapted and used by the congressional supporters?

**Question 5**

What does the expression shortened start mean?

**Question 6**

In what way has the sentence been challenged?

**Question 7**

When did George W. Bush get protest signs in his presidential limousine?

**Question 8**

Which president had a "Taxation with Representation" registration plate towards the end of his term?

**Text number 14**

This position was supported by the D.C. Statehood Party, a political party; it has since merged with a local Green Party member party to form the D.C. Statehood Green Party. The closest this movement came to success was in 1978, when Congress passed the District of Columbia Voting Rights Amendment. Two years later, in 1980, local citizens passed an initiative calling for a constitutional convention to create a new state. In 1982, voters ratified the state constitution, which was renamed New Columbia. However, the effort to create a state came to a halt in 1985 when Washington's Voting Rights Amendment failed because not enough states ratified it within seven years.

**Question 0**

Which party supported D.C. independence?

**Question 1**

Which party did the D.C. Statehood Party merge with and when?

**Question 2**

When was the business closest to success?

**Question 3**

What should be the new name of Washington State?

**Question 4**

When did the quest for independence fade?

**Question 5**

Which party was in favour of statehood for Colombia?

**Question 6**

Which party did the Washington Party merge with?

**Question 7**

When did Columbia come closest to success?

**Question 8**

What should be the new name of the state of Colombia?

**Question 9**

When did Colombia's quest for independence end?

**Text number 15**

Other less likely candidates are Guam and the US Virgin Islands, both unorganised territories of the United States. The Northern Mariana Islands and American Samoa, an unorganised, unincorporated territory, could also both seek statehood. Some proposals call for the Virgin Islands to be admitted as a single state with Puerto Rico (often known as the "Commonwealth of Prusvi", Puerto Rico/U.S. Virgin Islands or "Puerto Virgo") and for U.S. territories or former territories in the Pacific Ocean to be merged along the lines of the "Greater Hawaii" concept of the 1960s. Guam and the Northern Mariana Islands would be recognised as a single state, as would Palau, the Federated States of Micronesia and the Marshall Islands (although the latter three are now separate sovereign nations with a free trade agreement with the US). Such a state would have a population of 412,381 (slightly less than Wyoming) and an area of 911.82 square miles (2,361.6 km2) (slightly less than Rhode Island). American Samoa could potentially be part of such a state, bringing its population to 467 900 and its area to 988.65 square miles (2 560.6 km2). In late May 2008, Radio Australia gave indications that Guam and the Northern Mariana Islands would reunite to become the 51st state.

**Question 0**

What is another likely state that could be independent?

**Question 1**

Who announced the unification of Guam and Northern Mariana Islands?

**Question 2**

What is another likely country where free association is possible?

**Question 3**

Who announced the unification of Guam and the Virgin Islands?

**Question 4**

Which would have a slightly larger population than Wyoming?

**Question 5**

When did Radio Australia report that Guam and the Virgin Islands will become one again?

**Text number 16**

There have been small grassroots movements in the Philippines that have sought to make the United States a state of its own. It was originally part of the platform of the Progressive Party, then known as the Federalist Party, but the party dropped it in 1907, coinciding with a name change. As late as 2004, the idea of the Philippines becoming a state of the United States was still part of the Philippine political programme. Supporters of this movement include Filipinos who believe that the quality of life in the Philippines would be higher and poverty reduced if the Philippines became a US state or territory. Supporters also include Filipinos who had fought as members of the US armed forces in various wars during the Commonwealth.

**Question 0**

In which country was there a small grassroots movement for US independence?

**Question 1**

Which party was formerly known as the Federalist Party?

**Question 2**

What was the last year the Philippines sought independence?

**Question 3**

In which country was there a small grassroots movement for the Commonwealth states?

**Question 4**

Which party was formerly known as the Armed Forces Party?

**Question 5**

What was the last year in which the Commonwealth sought independence?

**Question 6**

What has been the political programme of the Fillipinos party?

**Question 7**

What do supporters of the movement to make the Commonwealth a state include?

**Text number 17**

In Canada, "51st state" is a phrase that is usually used to mean that if a certain political direction is taken, Canada is destined to be just part of the United States. Examples include the 1988 Canada-US Free Trade Agreement, the debate on the creation of a common defence area, the 1992 Charlottetown Agreement and the 1999 Clarity Act, which were possible consequences of the failure to accept proposals to resolve the issue of Quebec's sovereignty.

**Question 0**

What is the second meaning of the 51st state?

**Question 1**

When was the free trade agreement between Canada and the United States signed?

**Question 2**

When was the Charlottetown Agreement signed?

**Question 3**

When did the Law on Liquidation enter into force?

**Question 4**

What is the second meaning of the 1999 entry?

**Question 5**

When was the free trade agreement between Canada and Quebec approved?

**Question 6**

When was the agreement between Canada and the United States signed?

**Question 7**

When did the Charlottetown Act come into force?

**Question 8**

What were the consequences of the adoption of the proposals aimed at resolving the issue of Quebec's sovereignty?

**Text number 18**

The expression is usually used in local political debates, polemical writings or private conversations. It is rarely used publicly by politicians themselves, although other similar images have sometimes been used by political parties in Canada's history. In the 1988 federal election, the Liberals argued that the proposed free trade agreement represented an American takeover of Canada. The party released an advertisement showing Progressive Conservative (PC) strategists slowly erasing the Canada-US border from the North American map after the agreement was approved. A few days later, however, the PC Party responded with an ad that redrew the border with a permanent marker and an announcer intoned: "This is where we draw the line".

**Question 0**

Who suggested that a free trade agreement would mean taking over Canada from the Americans?

**Question 1**

When did this campaign take place?

**Question 2**

Who removed the border from the ad?

**Question 3**

What was the slogan of this advertisement?

**Question 4**

Who suggested that a Progressive Conservative Party would mean an American takeover of Canada?

**Question 5**

When was the campaign to display ads on the Progressive Conservative map launched?

**Question 6**

Who abolished the boundary between political parties?

**Question 7**

What was the motto of this coup?

**Question 8**

Who claimed that the proposed Canada-US border is an American permanent marker?

**Text number 19**

This has a historical basis, dating back to the break-up of British America during the American Revolution. The colonies that joined the United States invaded Canada (at the time the term referred specifically to the present-day provinces of Quebec and Ontario, which had only been under British control since 1763) at least twice, but neither of them succeeded in taking control of the territory. The first invasion took place during the Revolution on the assumption that the supposed hostility of French-speaking Canadians to the British colonial administration, combined with the Franco-American alliance, would make them natural allies for the American cause; the Continental Army successfully recruited two Canadian regiments for the invasion. The failure of the attack forced the members of these regiments into exile, and they settled mainly in upstate New York. The Articles of Confederation drawn up during the Revolution included a provision that Canada could join the United States if it ever decided to do so, without having to ask the permission of the United States, as other states would have had to do. The United States invaded Canada again during the War of 1812, but this attempt was hampered by the large number of Loyalist Americans who had fled to what is now Ontario and continued to oppose joining the Republic. The Hunter Patriots in the 1830s and the Fenian raids after the American Civil War were private attacks on Canada from the United States. In the 19th century, several US politicians also spoke out in favour of Canadian annexation.

**Question 0**

When did Quebec pass into British hands?

**Question 1**

When did Ontario pass into British hands?

**Question 2**

When will the United States attack Canada?

**Question 3**

What did several American politicians propose in the 19th century?

**Question 4**

When did the United States fall into British hands?

**Question 5**

When did the land of New York pass into British hands?

**Question 6**

During what period did the British invade Canada?

**Question 7**

What did several British politicians propose in the 19th century?

**Question 8**

Who recruited two British regiments?

**Text number 20**

In the late 1940s, in the last days of the Dominion of Newfoundland (then a Commonwealth dominion dependency independent of Canada), there was mainstream support, though not a majority, for the formation of a Newfoundland Economic Union with the United States, thanks to the efforts of the Economic Union Party and significant US investment in Newfoundland by the United States and the United Kingdom as a result of the US-British alliance during World War II. The movement ultimately failed when voters narrowly chose an alliance with Canada in a 1948 referendum (the Economic Union Party favoured an independent 'responsible government', which they then pushed towards their goals).

**Question 0**

When were the last days of the Newfoundland Territory?

**Question 1**

What was the result of the 1948 referendum?

**Question 2**

What did the Economic Alliance Party support?

**Question 3**

When were the last days of the US-British alliance?

**Question 4**

What was the result of the 1940 referendum?

**Question 5**

What did the US-British alliance support?

**Question 6**

What was dominion dependency in the United States?

**Question 7**

What did we get majority support for?

**Text number 21**

In the US, the term "51st state" applied to Canada can highlight the similarities and close relations between the US and Canada. Sometimes the term is used in a derogatory way, intended to mock Canada as an insignificant neighbour. In Quebec's 1989 general election, the political party Parti 51 fielded 11 candidates who advocated Quebec's secession from Canada and accession to the United States (according to its leader André Perron, Quebec could not survive as an independent state). The party received only 3 846 votes in the province as a whole, 0.11% of the total votes cast. By comparison, the other pro-sovereignty parties in Quebec obtained 40.16% (PQ) and 1.22% (NPDQ) in the elections in question.

**Question 0**

What does it mean in the United States in general that Canada is called the 51st state in a positive way?

**Question 1**

What is the negative connotation of the term?

**Question 2**

How many votes did the Party 51 get in 1989?

**Question 3**

What did the other parties get that year?

**Question 4**

What does calling Quebec the 51st state mean in the US in general/

**Question 5**

What is the negative connotation of Andre Perron?

**Question 6**

How many votes did the United States get in 1989?

**Question 7**

What did the other parties get in 1988?

**Question 8**

When did the political party Parti 51 nominate 51 candidates for Quebec to secede from Canada and join the United States?

**Text number 22**

Given the geographical proximity of the Central American countries to the United States, which has strong military, economic and political influence, the United States took several initiatives and proposals in the 19th and 20th centuries to incorporate some or all of the Central American republics (Costa Rica, El Salvador, Guatemala, Honduras and the former British-ruled Bay Islands, Nicaragua, Panama, which was the US-controlled Canal Zone from 1903 to 1979, and the former British-controlled Honduras or Belize since 1981). However, the United States never acted on the proposals of some of these US politicians; some of them were never acted upon or seriously considered. In 2001, El Salvador adopted the US dollar as its currency, while Panama has used it for decades because of its links with the Canal Zone.

**Question 0**

When did Panama get the US-controlled Canal Zone?

**Question 1**

When did British Honduras become Belize?

**Question 2**

When did El Salvador adopt the US dollar as its currency?

**Question 3**

When did the British have the US-controlled Canal Zone?

**Question 4**

When did Honduras become Belize from the United States?

**Question 5**

When did Panama adopt the US dollar as its currency?

**Question 6**

When were proposals made to annex Panama partially or fully to Britain?

**Question 7**

Who has been using British currency for decades?

**Text number 23**

Cuba, like many other Spanish regions, wanted to break away from Spain. The United States supported the Cuban independence movement, and Cuban guerrilla leaders wanted to annex Cuba to the United States, but Cuban revolutionary leader José Martí insisted on Cuban nationality. When the US battleship Maine sank in Havana harbour, the US blamed Spain, and in 1898 the Spanish-American War broke out. When the United States won the war, Spain gave up territory, including Cuba. The United States administered Cuba as a protectorate until 1902. Several decades later, in 1959, the corrupt Cuban government of Fulgencio Batista, supported by the US, was overthrown by Fidel Castro. Castro installed a Marxist-Leninist government allied with the Soviet Union, which has been in power ever since.

**Question 0**

Which country was Cuba part of?

**Question 1**

Which battleship sank in Havana harbour?

**Question 2**

When did Fidel Castro overthrow the Cuban government?

**Question 3**

Which government did Castro install?

**Question 4**

Which country was Maine part of?

**Question 5**

Which battleship sank in a Spanish port?

**Question 6**

When did Fulgencio Batista overthrow the Cuban government?

**Question 7**

Which government did Batista set up?

**Question 8**

Who wanted to break away from the United States?

**Text number 24**

Several websites claim that Israel is the 51st state because it receives annual funding and defence aid from the United States. An example of this concept dates back to 2003, when Martine Rothblatt published a book called Two Stars for Peace, which argued for the addition of Israel and the surrounding Palestinian territories as the 51st state of the Union. In March 2009, Alfred de Grazia, professor of politics and sociology, published a book entitled The American State of Canaan, in which he proposed the creation of a 51st and 52nd state from Israel and the Palestinian territories.

**Question 0**

Why is Israel called the 51st state?

**Question 1**

Which book was published by Martine Rothblatt?

**Question 2**

When was Two Stars for Peace published?

**Question 3**

Who wrote the book American Canaan?

**Question 4**

Why is Israel called Canaan?

**Question 5**

Which book was published by Alfred de Grazia?

**Question 6**

When did the United States support Alfred de Grazia?

**Question 7**

Who wrote the book Martine Rothblatt?

**Question 8**

What justified the addition of the United States to the books?

**Text number 25**

Article 3 of the San Francisco Treaty between the Allied countries and Japan, which entered into force in April 1952, placed the Ryukyus Islands, including Okinawa Island, home to more than one million Okinawans of Japanese descent, as well as the Bonin Islands, the Volcano Islands and Iwo Jima Island, under US guardianship. All these protectorates were slowly returned to Japanese control. Okinawa was returned on 15 May 1972, but the US deployed troops to the island's bases in Japan's defence.

**Question 0**

When did Article 3 of the San Francisco Treaty enter into force?

**Question 1**

How many people lived on the island of Okinawa?

**Question 2**

When was Okinawa finally returned?

**Question 3**

Why did the United States have troops in Okinawa?

**Question 4**

When did Article 2 of the San Francisco Treaty enter into force?

**Question 5**

How many people lived on Bonin Island?

**Question 6**

When was San Francisco finally restored?

**Question 7**

Why did the Japanese have troops in Okinawa?

**Question 8**

Who put the Ryukyus Islands under Bonin's lobby?

**Text number 26**

In 2010, the New Zealand Electoral Commission attempted to register the 51st state party. The party advocates that New Zealand should become the 51st state of the United States of America. The party's secretary is Paulus Telfer, a former Christchurch mayoral candidate. On 5 February 2010, the party applied to the Electoral Commission for registration of its logo. The Electoral Commission rejected the logo - a US flag with 51 stars - on the grounds that it was likely to cause confusion or mislead voters. As of 2014[update], the party remains unregistered and cannot appear on the ballot.

**Question 0**

When did the 51st state party try to register in New Zealand?

**Question 1**

What is the 51st Party in favour of?

**Question 2**

Who is the 51st Secretary of the State Party?

**Question 3**

Can people in New Zealand vote for the 51st state party?

**Question 4**

When did the 51st state party try to register Paulus Telfer?

**Question 5**

What does the Electoral Commission Party stand for?

**Question 6**

Who is the secretary of the Election Committee?

**Question 7**

Can people in New Zealand vote for an electoral college party?

**Question 8**

What is the logo of the Electoral Commission Party?

**Text number 27**

Albania is often referred to as the 51st country because of its strongly perceived pro-American positions, mainly due to the US policy towards Albania. Referring to President George W. Bush's European tour in 2007, Edi Rama, mayor of Tirana and leader of the opposition Socialist Party, said: "Albania is certainly the most pro-American country in Europe, maybe even in the world... Nowhere else is there such respect and hospitality for the President of the United States. Even in Michigan he would not be so welcome." During former Secretary of State James Baker's visit in 1992, there was even an attempt to hold a referendum in the country to declare it the 51st state of the United States. In addition to Albania, Kosovo, a predominantly Albanian country, is also considered the 51st state because of the strong US presence and influence. The US has had troops in the region and the largest non-US base outside the territory, Camp Bondsteel, since 1999.

**Question 0**

Who is the mayor of Tirana?

**Question 1**

Who said Albania is the most pro-American country in Europe?

**Question 2**

When did James Baker visit Albania as Foreign Minister?

**Question 3**

What is the name of the largest US military base outside US territory?

**Question 4**

Who is the mayor of Albania?

**Question 5**

Who said Albania is the most Bondsteel-friendly country in Europe?

**Question 6**

When did James Baker visit the United States as Secretary of State?

**Question 7**

What is the name of Albania's largest military base outside Albanian territory?

**Question 8**

Who is the leader of the socialists?

**Text number 28**

During World War II, when Nazi Germany occupied Denmark, the United States briefly controlled Greenland for battlefields and shelter. In 1946, the United States offered to buy Greenland from Denmark for $100 million (now $1.2 billion), but Denmark refused to sell it. Several politicians and others have argued in recent years that Greenland could hypothetically be in a better economic position as part of the US; for example, Professor Gudmundur Alfredsson of the University of Akureyri mentioned this in 2014. One real reason for US interest in Greenland could be the island's vast natural resources. According to Wikileaks, the US seems very interested in investing in the island's natural resources and in exploiting the huge hydrocarbons expected off the coast of Greenland.

**Question 0**

When did the United States take control of Greenland?

**Question 1**

How much did the US offer to pay for Greenland?

**Question 2**

Which university did Professor Gudmundur Alfredsson graduate from?

**Question 3**

What is one reason why the United States would be interested in Greenland?

**Question 4**

When did the United States take control of Akureyri?

**Question 5**

How much did the United States offer to pay for Akureyri?

**Question 6**

Where was Gudmundur Alfredsson a professor in 1946?

**Question 7**

What is one reason why Alfredsson would be interested in Greenland?

**Question 8**

Who has argued that Greenland could not hypothetically be in a better economic situation as part of the United States?

**Text number 29**

Poland has historically been staunchly pro-American, with General Tadeusz Kościuszko and Casimir Pulaski taking part in the American Revolution. This pro-American attitude was reinforced after the favourable intervention of the United States in the First World War (which led to the creation of an independent Poland) and during the Cold War (which culminated in the creation of a Polish state independent of Soviet influence). Poland was a major contributor to the 'coalition of the willing' in Iraq. The quote calling Poland the "51st state" has been attributed to James Pavitt, then Deputy Director of Operations at the Central Intelligence Agency, particularly in the context of extraordinary renditions.

**Question 0**

What has been Poland's historical relationship with the United States?

**Question 1**

What led to the creation of independent Poland?

**Question 2**

What did Poland contribute to the "coalition of the willing"?

**Question 3**

What was the Soviet Union's attitude towards the United States historically?

**Question 4**

What led to the emergence of independent councils?

**Question 5**

What was the Soviet contribution to the "coalition of the willing"?

**Question 6**

To whom was the quote referring to Poland as a Soviet state addressed?

**Question 7**

What led to the Polish state being dependent on Soviet influence?

**Text number 30**

The Sicilian Reconstruction Party, which in 1944 gathered 40 000 members, campaigned for Sicily to become a US state. The party was one of several Sicilian separatist movements that operated after the fall of Italian fascism. Sicilians felt neglected or underrepresented by the Italian government after the annexation of the Kingdom of Sicily from Naples in 1861. The large Sicilian population in America and the US-led Allied invasion of Sicily in July and August 1943 may have contributed to this feeling.

**Question 0**

How many members did the Sicilian Reconstruction Party have in 1944?

**Question 1**

What is the Sicilian Reconstruction Party campaigning for?

**Question 2**

When did the Allied invasion of Sicily take place?

**Question 3**

When was Sicily annexed to Italy?

**Question 4**

How many members did the Kingdom of the Two Sicilies have in 1944?

**Question 5**

What is the Kingdom of Sicily campaigning for?

**Question 6**

When did the Allied invasion of Sicily take place?

**Question 7**

When was Naples annexed to Italy?

**Question 8**

Who campaigned for Naples to become a US state?

**Text number 31**

Terra nullius, or land unclaimed by any nation, comes in four categories: the small unclaimed area of Bir Tawil between Egypt and Sudan, Antarctica, the oceans and celestial bodies such as the Moon or Mars. For the latter three, international treaties (Antarctic Treaty, United Nations Convention on the Law of the Sea and Outer Space Treaty) prevent the colonisation and possible nationalisation of uninhabited (and, according to current technology, not permanently habitable) territories.

**Question 0**

What are the four categories of terra nullius?

**Question 1**

What are the three treaties on unclaimed land?

**Question 2**

What are the agreements defending against?

**Question 3**

Where is Bir Tawil located?

**Question 4**

What are the four categories of the Outer Space Treaty?

**Question 5**

What are the three treaties on redeemed lands?

**Question 6**

What does terra nullius protect against?

**Question 7**

Where was the United Nations Convention located?

**Question 8**

How many classes of outer space are there?

**Document number 367**

**Text number 0**

An antenna (plural antennas or aerials) is an electrical device that converts electrical power into radio waves and vice versa. It is usually used with a radio transmitter or receiver. The radio transmitter feeds an electric current (i.e. high-frequency alternating current (AC)) oscillating at radio frequency to the antenna's terminals, and the antenna radiates the energy of the current as electromagnetic waves (radio waves). In reception, the antenna intercepts some of the power of the electromagnetic wave to produce a small voltage at its terminals, which is fed to the receiver for amplification.

**Question 0**

Which device can convert electrical energy into radio waves and do the opposite?

**Question 1**

What device is often used in combination with an antenna?

**Question 2**

Which antenna-related process produces high-frequency alternating current?

**Question 3**

What else can radio waves be called?

**Question 4**

When does an antenna trap electromagnetic waves?

**Text number 1**

Typically, an antenna consists of metal conductors (elements) electrically connected (often via a transmission line) to a receiver or transmitter. The oscillating electron current forced through the antenna by the transmitter creates an oscillating magnetic field around the antenna elements, while the charge on the electrons also creates an oscillating electric field along the elements. These time-varying fields radiate away from the antenna into space as a moving transverse electromagnetic field wave. During reception, the oscillating electric and magnetic fields of the incoming radio wave affect the electrons in the antenna elements and cause them to move back and forth, generating oscillating currents in the antenna.

**Question 0**

What is often used to connect elements to the receiver?

**Question 1**

What particles does the transmitter push through the antenna?

**Question 2**

Does the electric field wave move closer to the antenna during transmission?

**Question 3**

What is the process by which electrons oscillate in an antenna?

**Text number 2**

The words antenna (in US English, plural antennas, although in international English both "antennas" and "antennae" are used interchangeably) and aerial are used interchangeably. Sometimes the term "antenna" is used to refer to a wire antenna. Note, however, the important international technical journal IEEE Transactions on Antennas and Propagation. In the UK and other areas where British English is used, the term antenna is sometimes used, although "aerial" has been in common professional use for many years.

**Question 0**

What is an acceptable synonym for antenna?

**Question 1**

What can sometimes be meant by the term antenna?

**Question 2**

What is one way to refer to more than one antenna?

**Question 3**

What is the most commonly accepted term for an electrical device that converts electrical power into radio waves?

**Text number 3**

The origin of the word 'antenna' in the context of wireless devices comes from the Italian pioneer of radio technology, Guglielmo Marconi. In the summer of 1895, Marconi began testing his wireless system outdoors on his father's farm near Bologna and soon began experimenting with long wire 'antennas'. Marconi found that by raising the aerial wire above the ground and connecting one end of the transmitter to the ground, the transmission range increased. Soon he was able to send signals over a hill, some 2.4 kilometres away. In Italian, the tent pole is known as l'antenna centrale, and the pole with the wire was simply called l'antenna. Until then, wireless transmitting and receiving elements were simply called antennas or terminals.

**Question 0**

Who is most associated with the origin of the word antenna?

**Question 1**

When did electromagnetic waves start to be experimented with?

**Question 2**

What is the way to increase the strength of a radio transmission?

**Question 3**

How far could Marconi get his signal to go with this technique?

**Text number 4**

Antennas are needed in all radio receivers and transmitters to enable their electrical connection to the electromagnetic field. Radio waves are electromagnetic waves that carry signals through the air (or space) at the speed of light with almost no transmission loss. Radio transmitters and receivers are used to transmit signals (data) in applications such as radio broadcasting, television, mobile phones, Wi-Fi (WLAN) data networks, trunk lines and point-to-point communications (telephone and data networks), satellite links, many remote-controlled devices such as garage door openers, and wireless remote controls. Radio waves are also used for direct measurements in technologies such as radar, GPS and radio astronomy. In all cases, transmitters and receivers need antennas, even if they are sometimes hidden (such as the antenna inside an AM radio or the antenna inside a laptop with Wi-Fi).

**Question 0**

What is essential for the association of elements that generate radio waves?

**Question 1**

How fast are the signals from the antenna transmitted?

**Question 2**

What is one system that uses electromagnetic waves?

**Question 3**

Which mobile positioning and navigation technologies use radio waves?

**Question 4**

What is the often overlooked part of a laptop that allows you to access the internet?

**Text number 5**

One example of an omnidirectional antenna is the very common vertical antenna, which consists of a metal rod (often, but not always, a quarter of a wavelength long). A dipole antenna is similar, but consists of two wires extending in opposite directions, often, but not always, half a wavelength in total length. Dipoles are typically oriented horizontally, making them weakly directional: signals are radiated or received reasonably well in all directions except in the direction of the conductor itself; this region is called the blind cone or null of the antenna.

**Question 0**

What is the main element of an omnidirectional antenna?

**Question 1**

What kind of antenna would probably be half a wavelength long?

**Question 2**

In which direction would you expect to find a dipole?

**Question 3**

What is meant by a region where signals cannot be well received by a conductor?

**Text number 6**

Both vertical and dipole antennas are simple in design and relatively inexpensive. The dipole antenna, which is the basis of most antenna designs, is a balanced component with two terminals receiving equal but opposite voltages and currents via a balanced transmission line (or a coaxial transmission line via a so-called balun). A vertical antenna, on the other hand, is a monopole antenna. It is typically connected to the inner conductor of the coaxial transmission line (or to the matching network); the transmission line shield is connected to ground. In this way, the ground (or any large conductive surface) acts as a second conductor of the dipole, thus forming a complete circuit. Since monopole antennas are based on conducting ground, a so-called grounding structure can be used, which provides a better grounding contact to the ground or which itself acts as a ground plane and performs this function regardless of whether actual contact to the ground is present (or absent).

**Question 0**

Are basic antennas expensive?

**Question 1**

What is the most common basis for creating new antenna designs?

**Question 2**

Which category do vertical antennas belong to?

**Question 3**

What is used to close the circuit of a dipole antenna?

**Text number 7**

More complex antennas than dipole or vertical models usually aim to increase the directionality and thus the gain of the antenna. This can be achieved in many different ways, leading to a wide variety of antenna designs. The majority of designs are fed by a balanced line (as opposed to a monopole) and are based on a dipole antenna with added components (or elements) to increase its directivity. The antenna "gain" in this case describes the concentration of radiated power at a fixed angle in space, as opposed to the spherically uniform radiation of an ideal radiator. The increase in power in the desired direction occurs at the expense of power in the undesired direction. The power is conserved and there is no net increase in power compared to the power from the power source (transmitter).

**Question 0**

What do the different models aim to increase?

**Question 1**

What is the difference between a monopole antenna and most other types of antenna?

**Question 2**

The antenna gain refers to what radiated power?

**Question 3**

Where does shared power come from?

**Text number 8**

For example, a phased array consists of two or more simple antennas connected to each other via an electrical network. Often these are several dipole antennas in parallel, spaced at a certain distance apart. Depending on the relative phase provided by the network, the same dipole antenna array may act as a 'broadside array' (oriented normal to the line connecting the elements) or as an 'end array' (oriented along the line connecting the elements). Antenna arrays may use any basic antenna type (omni-directional or weakly directional), such as dipole, loop or slot antennas. These elements are often identical.

**Question 0**

How many antennas would form a phased array?

**Question 1**

How are the antennas oriented when they are placed at a certain distance apart?

**Question 2**

What are the two standard types of antenna?

**Question 3**

What determines whether the antenna forms a broadside or end-fire cluster?

**Text number 9**

However, a log-periodic dipole array consists of several dipole elements of different lengths to provide a somewhat directional antenna with a very wide bandwidth: these are often used for TV reception in fringe areas. The dipole antennas that make it up are considered 'active elements' because they are all electrically connected to each other (and to the transmission line). On the other hand, a superficially similar dipole array, the Yagi-Uda antenna (or simply "Yagi"), has only one dipole element that is electrically coupled; the other so-called parasitic elements interact with the electromagnetic field to produce a relatively directional antenna, but limited to a relatively narrow bandwidth. The Yagi antenna has similar parasitic dipole elements, but they work differently because they are slightly different in length. There may be several so-called "guides" in front of the active element in the direction of propagation and usually one (but possibly more) "reflector" on the opposite side of the active element.

**Question 0**

Which type of antenna configuration consists of several dipole elements of different lengths?

**Question 1**

What are the benefits of this type of formation?

**Question 2**

What is the main purpose of these configurations?

**Question 3**

What is a variation of this type of antenna?

**Text number 10**

At low frequencies (such as AM broadcasting), vertical towers are used to achieve directionality and occupy large areas of land. For reception, a long Beverage antenna can have significant directivity. For omnidirectional portable use, a short vertical antenna or small loop antenna works well, and the main design challenge is impedance matching. In a vertical antenna, a loading coil at the base of the antenna can be used to cancel the reactive component of the impedance; small loop antennas are tuned with parallel capacitors for this purpose.

**Question 0**

What types of towers are used for radio transmissions that can be heard in your car?

**Question 1**

Why is this particular type of antenna used?

**Question 2**

If you want to take the antenna to different locations, which type of antenna would be best?

**Question 3**

What problems can occur when using a portable antenna?

**Text number 11**

The antenna feed wire is the transmission (or feed) wire that connects the antenna to the transmitter or receiver. The antenna feed may refer to any component that connects the antenna to the transmitter or receiver, such as a transmission line, but also an impedance matching network. In a so-called slot antenna, such as a horn or parabolic dish antenna, the 'feed' may also refer to the base antenna within the whole system (usually at the focal point or horn throat of a parabolic dish antenna), which may be considered the only active element of that antenna system. The microwave antenna may also be fed directly from a waveguide instead of a (conductive) transmission line.

**Question 0**

What is mainly responsible for connecting the antenna to its end points?

**Question 1**

What is the group of elements used to connect the elements of an antenna?

**Question 2**

What are the types of satellite TV antennas called?

**Question 3**

What can be used instead of a conventional transmission line?

**Text number 12**

Monopole antennas consist of a single radiating element, such as a metal rod, often mounted on a conductive surface, the ground plane. One half of the feed line from the receiver or transmitter is connected to the rod and the other half to the ground plane, which can be the earth. The most common form is the quarter-wave monopole, which is one-quarter wavelength long and has a gain of 5,12 dBi when mounted on the ground plane. Monopoles have an omnidirectional radiation pattern, so they are used for wide area coverage, and have a vertical polarisation. Ground waves used for transmission at low frequencies must be vertically polarised, so large vertical monopoles are used for transmission at MF, LF and VLF frequencies. Small monopoles are used as omnidirectional antennas for portable radios at HF, VHF and UHF frequencies.

**Question 0**

What are the elements that make up a monopole antenna?

**Question 1**

What is the most common form?

**Question 2**

What are small monopolies used for?

**Question 3**

What is vertical polarisation?

**Text number 13**

The most commonly used class of antenna, the dipole antenna, consists of two symmetrical radiators, such as a metal rod or wire, each with one half of a balanced feed line from the transmitter or receiver attached to it. The horizontal dipole radiates in two blocks perpendicular to the axis of the antenna. The most commonly used half-wave dipole has two colinear elements, each of one-quarter wavelength length, with a gain of 2,15 dBi. Dipoles are used individually as low-gain antennas, but are also used as guiding elements in many more complex, higher-gain antennas.

**Question 0**

What is the most commonly used category of antenna?

**Question 1**

What radiates from two blocks perpendicular to the axis of the antenna?

**Question 2**

What is used not only in low gain antennas but also in complex higher gain antennas?

**Question 3**

How much gain is there on a half-wave dipole?

**Text number 14**

A necessary condition for the above mentioned reciprocity property is that the materials of the antenna and the transmission medium are linear and reciprocal. Reciprocal (or bilateral) means that the material reacts to an electric current or magnetic field in one direction in the same way as it reacts to the field or current in the opposite direction. Most materials used in antennas meet these conditions, but some microwave antennas use high-tech components such as isolators and rotary switches made of non-reciprocal materials such as ferrite. These allow the antenna to behave differently in reception than in transmission, which can be useful for radar applications, for example.

**Question 0**

What must be true of the antenna and transmission medium for the repetition rule to apply?

**Question 1**

What is called when the direction of the electric current has no effect on the flow of the current?

**Question 2**

What is a material that does not have this property?

**Question 3**

How can the lack of this feature be exploited in everyday life?

**Text number 15**

Antennas are characterised by a set of performance metrics that the user takes into account when selecting or designing an antenna for a particular application. The most important of these relate to the directional characteristics (as reflected in the radiation pattern of the antenna) and the resulting gain. Even omnidirectional (or poorly directional) antennas can often be made more gain by concentrating more power in horizontal directions, thus reducing the power radiated to the sky and ground. Antenna power gain (or simply "gain") also takes into account the antenna's efficiency, and is often the primary metric.

**Question 0**

How to decide what type of antenna is needed for the project?

**Question 1**

What would probably be the main concern in making this decision?

**Question 2**

How would you distribute the power to get more out of it?

**Question 3**

What is often the main credit factor for antennas?

**Text number 16**

Resonant antennas are expected to be used around a particular resonant frequency, so the antenna must be built or commissioned to match the frequency range of the intended application. The design of a given antenna has a certain input impedance. This may influence the choice of antenna, but the impedance of the antenna can also be matched by a matching network to the desired impedance level of the system with all other characteristics unchanged (except for a possible loss of efficiency).

**Question 0**

Which type of antenna would be best for a project requiring a specific frequency?

**Question 1**

How could the antenna be matched to the required frequency?

**Question 2**

What factor would lead to the desired independence of feedback?

**Question 3**

If you couldn't choose the antenna you wanted, how could you still achieve this result?

**Text number 17**

An antenna transmits and receives radio waves with a certain polarisation, which in many (but not all) cases can be reoriented by tilting the axis of the antenna. The physical size of the antenna is often a practical problem, especially at lower frequencies (longer wavelengths). Highly directional antennas need to be significantly larger than the wavelength. Resonant antennas usually use a linear conductor (or element) or a pair of elements, each about a quarter wavelength long (the odd multiple of a quarter wavelength is also resonant). Antennas, which must be small relative to the wavelength, lose efficiency and cannot be very directional. Fortunately, at higher frequencies (UHF, microwaves), performance degradation to achieve smaller physical size is generally not required.

**Question 0**

What is the essential difference in the radio waves emitted by an antenna?

**Question 1**

How can this be adjusted more easily than by changing the antenna type?

**Question 2**

When can the size of the antenna cause problems?

**Question 3**

There is a relationship between antenna size and wavelength size with which antenna type?

**Question 4**

What size antenna would not be good when the antenna must be directional?

**Text number 18**

Most antenna design is based on the resonance principle. This is based on the behaviour of moving electrons reflected from surfaces whose dielectric constant changes, in the same way that light is reflected when optical properties change. In these models, the reflecting surface consists of the end of a conductor, usually a thin metal wire or rod, one end of which, in the simplest case, has an input point where it is connected to the transmission line. The orientation of the conductor or element is in the direction of the electric field of the desired signal, which usually means that it is perpendicular to the line from the antenna to the source (or receiver in the case of a transmitting antenna).

**Question 0**

What are most antennas based on?

**Question 1**

Which particle is the resonance principle based on?

**Question 2**

What kind of surface is formed at the tip of the conductor?

**Question 3**

How would you place the conductor in relation to the desired signal?

**Text number 19**

The electrical component of a radio signal causes a voltage in the conductor. This causes an electric current to start flowing in the direction of the signal's instantaneous field. When the resulting current reaches the end of the conductor, it is reflected, which corresponds to a 180 degree phase shift. If the wire is 1⁄4 wavelength long, the phase of the current from the input point will change 90 degrees as it reaches the end of the wire, be reflected 180 degrees, and then another 90 degrees as it travels back. This means that it has undergone a total phase change of 360 degrees, returning to the original signal. The current in the element thus increases the current generated by the source at that moment. This process creates a standing wave in the conductor where the current is at its maximum at the input.

**Question 0**

Which part of the radio signal creates the voltage?

**Question 1**

Where would the electric current always go?

**Question 2**

What is the result when currency is reflected >

**Question 3**

How large a phase change would restore the signal to its original state?

**Text number 20**

The standard half-wave dipole is probably the most commonly used antenna design. It consists of two elements of 1⁄4 wavelength, placed end-to-end, basically on the same axis (or collinearly), each feeding one side of a two-wire transmission line. The physical positioning of the two elements places them 180 degrees apart, which means that at any given moment one of the elements is feeding current into the transmission line while the other is drawing it out. A monopole antenna is essentially half of a half-wave dipole, one element of 1⁄4 wavelength, with the other half connected to ground or an equivalent ground plane (or counterpoise). Monopoles that are half of a dipole are common in long-wavelength radio signals, where the dipole would be impractically large. Another common design is the folded dipole, which basically consists of two dipoles placed side by side and connected at their ends to form a single wavelength antenna.

**Question 0**

What is the most popular type of antenna?

**Question 1**

What are said to be elements that are in a half-wave pole and on an identical axis?

**Question 2**

What current is usually applied to it or drawn from it?

**Question 3**

Which type of antenna is part of a half-wave dipole?

**Question 4**

Which popular type connects more than one antenna?

**Text number 21**

The standing wave forms this desired pattern at a design frequency of f0, and antennas are usually designed to this size. However, feeding that element at 3f0 (which has a wavelength of 1⁄3 of the wavelength of f0) also produces a standing wave pattern. Thus, the antenna element is resonant even when its length is 3⁄4 wavelengths. This is true for all odd multiples of 1⁄4 of the wavelength. This allows some flexibility in the design of antenna lengths and feed points. Antennas used in this way are known to perform harmonically.

**Question 0**

For which frequency are antennas usually designed?

**Question 1**

What can be added to f0 to create a standing wave pattern?

**Question 2**

What multiplier is relevant for wavelengths?

**Question 3**

How are the waves used in the treated ways controlled?

**Text number 22**

Quarter-wave elements mimic a series-resonant electric element thanks to the standing wave in the conductor. At the resonant frequency, the standing wave has a current spike and a voltage node (minimum) at the input. In electrical engineering terms, this means that the element has minimum reactance, so that it produces the highest current at the lowest voltage. This is the ideal situation because it produces the maximum power with the minimum input, which produces the maximum efficiency. Unlike in an ideal (lossless) series resonant circuit, the antenna's radiation resistance and any actual electrical losses leave a finite resistance (corresponding to a relatively low voltage at the input point).

**Question 0**

How do quarter-wave elements work in relation to the electrical element associated with the series?

**Question 1**

At what frequency does a power surge occur?

**Question 2**

How would you describe a current with maximum efficiency?

**Question 3**

What could be the best possible output to input ratio?

**Text number 23**

Impedance matching concepts make it possible to build vertical antennas that are significantly shorter than the 1⁄4 wavelength at which the antenna is resonant. By adding an inductor in series with the antenna, called a loading coil, the capacitive reactance of this antenna can be removed, leaving a pure resistor that can be matched to the transmission line. Sometimes the resonant frequency of such a system (antenna and matching network) is described in terms of electrical length, and using a shorter antenna at a lower frequency than the resonant frequency is called electrical extension.

**Question 0**

What can be connected to the antenna as a pure resistor?

**Question 1**

Which element should this pure resistor be connected to?

**Question 2**

Which term describes the process of deliberately using a lower standing antenna at a lower frequency than the peak frequency?

**Text number 24**

The end result is that a resonant antenna will only feed the signal into the transmission line efficiently when the frequency of the source signal is close to the antenna design frequency or one of the resonance coefficients. This makes resonant antenna designs inherently narrowband, and they are most commonly used with a single target signal. They are particularly common in radar systems where the same antenna is used for both transmission and reception, or in radio and television broadcasting where the antenna operates on a single frequency. They are less commonly used in reception with multiple channels, where additional modifications are used to increase the bandwidth or completely different antenna designs are used.

**Question 0**

If you couldn't match the source frequency to the design frequency of the antenna, what could you use?

**Question 1**

What is the most common use of resonance antennas?

**Question 2**

What type of antenna installation is usually used for watching TV?

**Question 3**

When using more than one channel, changes are made to add which feature?

**Text number 25**

The amount of signal received from a distant transmitter is essentially geometric in nature due to the inverse square law, and this leads to the concept of effective area. This measures the performance of an antenna by comparing the amount of power it produces to the amount of power in the original signal, measured as the power density of the signal in watts per square metre. The effective area of a half-wave dipole is 0.13 2. If more power is needed, the antenna cannot simply be enlarged. Although this would capture more energy from the signal, it would, for the reasons discussed above, reduce the power significantly because it would be shifted away from the resonant length. In tasks where higher performance is required, designers often use multiple elements in combination with each other.

**Question 0**

What is the geometry associated with the use of an antenna?

**Question 1**

How is signal integrity measured?

**Question 2**

What type of project requires more than one element to be used together?

**Text number 26**

To return to the basic concept of current in a conductor, let's consider what happens if the half-wave dipole is not connected to the supply point, but is short-circuited. Electrically, this constitutes a single element of 1⁄2 wavelength. However, the overall current pattern is the same; the current is zero at both ends and reaches a maximum in the middle. Thus, signals close to the design frequency still create a standing wave pattern. Any fluctuating electric current, such as a standing wave in an element, will radiate a signal. In this case, apart from the resistive losses in the element, the retransmitted signal is remarkably similar to the original signal in both magnitude and shape. If this element is positioned so that its signal reaches the main dipole in a plane, it amplifies the original signal and increases the dipole current. Elements used in this way are called passive elements.

**Question 0**

Where should the half-wave pole be connected in most cases?

**Question 1**

Which part of the current is usually the strongest?

**Question 2**

What's the consequence?

**Question 3**

The element used to support the original signal is called?

**Text number 27**

The Yagi-Uda set uses passive elements to increase amplification considerably. It is built along a support beam that is oriented towards the signal, so it does not see the induced signal and does not affect the antenna. The end closer to the source is called the front end. Near the rear end is a single active element, typically a half-wave dipole or folded dipole. Passive elements are placed in front of (guides) and behind (reflectors) the active element along booms. The Yagi antenna has the inherent property that its directivity, and hence gain, increases with increasing number of elements. If the frequency of the signal changes, the active element receives less energy directly, but any passive elements that add to the signal also reduce their power and their signals no longer reach the active element in the same phase.

**Question 0**

How can these elements be exploited to increase profit?

**Question 1**

Does this device improve the performance of the antenna?

**Question 2**

What is the name of the passive elements closer to the signal source?

**Question 3**

What would be the impact of adding more elements to Yagi-Uda?

**Text number 28**

It is also possible to use several active elements and combine them with transmission lines to create a similar system where the phases add up and amplify the output. An antenna array and a very similar reflective array antenna consist of several elements, often half-wave dipoles, placed in a plane and connected together with transmission lines of a certain phase length to produce a single phase signal at the output. A log-periodic antenna is a more complex structure using multiple aligned elements, similar in appearance to a Yagi-Uda antenna, but using transmission lines between the elements to produce the output.

**Question 0**

What can be combined with transmission lines to create phases that would support production?

**Question 1**

What is the most common element used to create a single-phase signal?

**Question 2**

What must be accurate to bring this signal to the output?

**Question 3**

What is more complex than a single phase antenna?

**Text number 29**

The original signal is also reflected when it hits an extended conductive surface, like a mirror. This effect can also be used to increase the signal by using a reflector, usually placed behind the active element and positioned so that the reflected signal enters the element at the same time. In general, the reflector remains highly reflective even if it is not fixed; gaps smaller than 1⁄10 in size usually have little effect on the final result. For this reason, reflectors are often wire meshes or rows of passive elements, making them lighter and less susceptible to wind. The parabolic reflector is perhaps the best known example of a reflector-based antenna, with a much larger effective area than a simple active element.

**Question 0**

If you wanted to somehow clone the original signal, could you?

**Question 1**

How would the use of a reflector affect the signal?

**Question 2**

How many gaps can be accommodated without compromising performance?

**Question 3**

What is the best known type of antenna based on reflection?

**Text number 30**

Another extreme case of impedance matching is the use of a small loop antenna (usually, but not always, for reception) at a relatively low frequency, making it appear almost like a pure inductor. Resonating such an inductor with a capacitor at the operating frequency not only cancels the reactance, but also greatly increases the very low radiation resistance of such a loop. This is accomplished in most AM transceivers by a small ferrite loop antenna resonating with a capacitor that is varied with the tuning of the receiver to maintain resonance over the AM transmission band.

**Question 0**

What increases the low radiative response of the loop?

**Question 1**

What is used in most AM broadcast receivers?

**Question 2**

What resonates on the capacitor along with the receiver tuning that maintains the resonance in the AM transmission band?

**Question 3**

What can happen when using a small loop antenna at low frequency?

**Text number 31**

Antenna tuning usually means cancelling out the reactance at the antenna terminals, leaving only the resistive impedance, which may or may not be exactly the desired impedance (transmission line impedance). Although an antenna may be designed so that the impedance of its input point is purely resistive (for example, a dipole with a length of 97% of half the wavelength), this may not be entirely true at the frequency at which it is ultimately used. In some cases, the physical length of the antenna can be "trimmed" to achieve pure resistivity. On the other hand, increasing the series inductance or parallel capacitance can be used to cancel the remaining capacitive or inductive reactance.

**Question 0**

Where is the reversal of the reactance shown?

**Question 1**

What is left after tuning the antenna?

**Question 2**

What can be used to cancel inductive reactance or residual capacitive capacitance?

**Question 3**

What is the antenna supposed to be?

**Text number 32**

Although a resonant antenna has a purely resistive input impedance at a given frequency, many (if not most) applications require the antenna to operate at a wide range of frequencies. The bandwidth of the antenna determines the frequency range over which the antenna performance does not suffer due to poor impedance. Also in the case of the Yagi-Uda array, using an antenna very far from its design frequency reduces the directionality of the antenna, which reduces the usable bandwidth regardless of impedance matching.

**Question 0**

What type of antenna has an impedance at a given frequency?

**Question 1**

What term can be used to refer to the useful spectrum of an antenna frequency?

**Question 2**

What causes the out-of-bandwidth frequencies to be unusable?

**Question 3**

What does the Yagi-Uda model reduce?

**Text number 33**

Instead, an antenna with less impedance variation for a given bandwidth is often desired. It turns out that the amount of reactance in resonant antenna terminals when the frequency is shifted by, say, 5%, depends very much on the diameter of the conductor used. A long thin wire used as a half-wave (or quarter-wave) monopole will have a reactance that is significantly higher than the resistive impedance at resonance, leading to poor matching and generally poor performance. However, fabricating the element from a tube with a diameter of perhaps 1/50th of its length results in the reactance not being so high at this changed frequency, and the matching is much less severe, with little loss in the net performance of the antenna. Thus, the fixed elements of such antennas, including Yagi-Uda arrays, usually use quite thick tubes.

**Question 0**

Which feature would be better if it were flat?

**Question 1**

Which property of the conductor changes the reactance?

**Question 2**

What is used to create a half-wave or quarter-wave dipole?

**Text number 34**

Instead of just using a thick tube, there are similar techniques that can achieve the same effect, such as replacing thin wire elements with cages to simulate a thicker element. This extends the bandwidth of the resonance. On the other hand, amateur radio antennas have to operate in several frequency bands that are far apart. This can often be achieved simply by connecting resonant elements in different bands in parallel. Most of the transmitter's power flows into the resonant element, while the other elements form a high (reactive) impedance and draw little power from the same voltage. The preferred solution uses so-called traps, which consist of parallel resonant circuits strategically placed in breaks along each antenna element. When the traps are used in a particular frequency band, they form a very high impedance (parallel resonance) that effectively cuts off the element along that length, making it a true resonant antenna. At lower frequencies, the trap allows the entire length of the element to be used, although the resonant frequency is shifted because the net resonance of the trap is involved at that lower frequency.

**Question 0**

What type of tubes are usually used for more robust antennas?

**Question 1**

How do cages affect the spectrum of usable frequencies?

**Question 2**

How could you create an antenna that can be used in different frequency bands?

**Question 3**

What is essential in directing the flow of power?

**Text number 35**

Gain is a parameter that measures the directivity of the radiation pattern of an antenna. An antenna with high gain radiates most of its power in a particular direction, while an antenna with low gain radiates over a wider angle. Antenna gain or antenna power gain is defined as the ratio of the intensity (power per unit area) radiated in the direction of maximum antenna power at an arbitrary distance divided by the intensity radiated at the same distance by a hypothetical isotropic antenna radiating equal power in all directions. This dimensionless ratio is usually expressed in logarithmic decibels, and these units are called "decibel-isotropic" (dBi).

**Question 0**

What is the acknowledgement of the possible directional range of the antenna?

**Question 1**

What is another way to refer to antenna gain?

**Question 2**

What is intensity?

**Question 3**

What kind of antenna would provide the same power to all possible destinations?

**Text number 36**

High gain antennas have the advantage of longer range and better signal quality, but they must be carefully aimed at the other antenna. An example of a high gain antenna is a parabolic antenna, such as a satellite TV antenna. Low-power antennas have a shorter range, but the orientation of the antenna does not play a major role. An example of a low gain antenna is the whip antenna in portable radios and cordless phones. Antenna gain should not be confused with amplifier gain, which is a separate parameter that measures the increase in signal power due to the amplification device.

**Question 0**

What is the positive characteristic of antennas with higher gain?

**Question 1**

Dish network Tv take for example what type of antenna?

**Question 2**

What kind of antenna would be best if placement is difficult?

**Question 3**

What is the metric for measuring how much efficiency is improved by adding a device designed to make something stronger?

**Text number 37**

Because of the reciprocity (discussed above), the gain of the antenna used for transmission must be proportional to its effective area when used for reception. Consider an antenna with no losses, i.e. with an electrical efficiency of 100%. It can be shown that its effective area in all directions must be the average of λ2/4π, wavelength squared divided by 4π. The gain is defined such that the average gain in all directions of an antenna with an electrical efficiency of 100 % is 1. Thus the effective area Aeff with respect to the gain G in a given direction is as follows:

**Question 0**

What is the relationship between the antenna and the reception area for reciprocity?

**Question 1**

what could be said about an antenna with perfect electrical efficiency?

**Question 2**

What could a fully electrically efficient antenna look like?

**Question 3**

Another term for an efficient area is?

**Text number 38**

The radiation pattern of an antenna is the relative field strength of the radio waves emitted by the antenna at different angles. It is typically represented as a three-dimensional graph or as polar patterns of horizontal and vertical cross-sections. For an ideal isotropic antenna radiating equally in all directions, the pattern would look like a sphere. Many omnidirectional antennas, such as monopoles and dipoles, radiate equal power in all horizontal directions, but the power decreases at higher and lower angles; this is called an omnidirectional pattern, and when drawn it looks like a torus or donut.

**Question 0**

What would a graph of the antenna's radiation behaviour show?

**Question 1**

What type of visual aid is often used to demonstrate this?

**Question 2**

What type of antenna radiation is visible in the sphere?

**Question 3**

What type of antenna is considered a dipole?

**Question 4**

What would a directionless antenna look like when drawn?

**Text number 39**

The radiation from many antennas has maxima or "blocks" at different angles, separated by "nulls", the angles at which the radiation falls to zero. This is because radio waves transmitted by different parts of the antenna typically interfere with each other, causing maxima at angles where the radio waves arrive at distant points in phase, and null radiation at other angles where the radio waves arrive out of phase. In a directional antenna designed to reflect radio waves in a particular direction, the beam in that direction is designed to be larger than the others and is called the 'main beam'. The other lobes usually represent unwanted radiation and are called "side lobes". The axis passing through the main wedge is called the 'principal axis' or 'boresight axis'.

**Question 0**

What is the term that refers to areas where the radiation from an antenna is zero?

**Question 1**

What do radio waves do that cause maxima or minima in the antenna pattern?

**Question 2**

If you wanted to reflect radio waves to the south, which part of the antenna would you build larger in that direction?

**Question 3**

What is the main difference between side plots?

**Text number 40**

As an electromagnetic wave travels through different parts of an antenna system (radio, feeder, antenna, free space), it may encounter impedance differences (E/H, V/I, etc.). At each interface, depending on the impedance match, some of the wave energy is reflected back to the source to form a standing wave on the feed line. The ratio of the maximum power of the wave to the minimum power can be measured and is called the standing wave ratio (SWR). A SWR of 1:1 is ideal. An SWR of 1.5:1 is considered marginally acceptable for low power applications where power dissipation is more critical, although an SWR of up to 6:1 may be useful for the right equipment. Minimizing impedance differences at each interface (impedance matching) reduces SWR and maximizes power transfer through each component of the antenna system.

**Question 0**

What is the one component that makes up an antenna system?

**Question 1**

What happens when some of the energy in radio waves is reversed?

**Question 2**

The term that refers to the rise and fall in power of electromagnetic waves is?

**Question 3**

Impedance matching makes a significant difference to the performance of which antenna?

**Text number 41**

The efficiency of a transmitting antenna is the ratio of the power radiated (in all directions) to the power absorbed by the antenna terminals. The power supplied to the antenna terminals that is not radiated is converted into heat. This usually occurs through the loss resistance of the antenna conductors, but may also be due to dielectric or magnetic losses in antennas (or antenna systems) using such components. Such losses effectively drain power from the transmitter, requiring a stronger transmitter to transmit a signal of a given strength.

**Question 0**

Measuring available power and power absorbed by terminal equipment?

**Question 1**

What happens to the power that is not absorbed by the antenna?

**Question 2**

What can cause such a reaction?

**Text number 42**

For example, if a transmitter feeds 100 W into an antenna with an efficiency of 80%, the antenna emits 80 W of radio waves and produces 20 W of heat. If 100 W of power is to be radiated, a transmitter capable of feeding 125 W into the antenna must be used. Note that antenna efficiency is different from impedance matching, which can also reduce the amount of power radiated by a given transmitter. If the SWR meter shows an input power of 150 W and a reflected power of 50 W, it means that the antenna has actually absorbed 100 W of power (ignoring transmission line losses). How much of this power has actually been radiated cannot be determined directly by electrical measurements at (or before) the antenna terminals, but requires careful measurement of (for example) the field strength. Fortunately, the loss resistance of antenna conductors such as aluminium rods can be calculated and the efficiency of an antenna using such materials can be predicted.

**Question 0**

What would you need to put in the transmitter to produce ten W oh of heat?

**Question 1**

What factor can contribute to a reduction in transmitter power?

**Question 2**

What would need to be investigated to determine how much power was irradiated?

**Text number 43**

However, the loss impedance usually affects the impedance of the input point by increasing its resistive (real) component. This resistance is the sum of the radiation resistance Rr and the loss resistance Rloss. If an rms current I is applied to the antenna terminals, the radiated power is I2Rr and the power I2Rloss is dissipated as heat. Thus, the antenna efficiency is equal to Rr / (Rr + Rloss). Of course, only the total resistance Rr + Rloss can be measured directly.

**Question 0**

What can increase the impedance of a component's input point?

**Question 1**

The addition of Rr and Rloss is equivalent to what?

**Question 2**

What equation is used to determine the efficiency of an antenna?

**Question 3**

What is the only factor that can be measured accurately?

**Text number 44**

According to reciprocity, the efficiency of the antenna used as the receiving antenna is the same as the efficiency defined above. The power delivered by the antenna to the receiver (when the impedance is correctly matched) is reduced by the same amount. In some receiving applications, highly inefficient antennas may have little effect on performance. At low frequencies, for example, atmospheric or human-induced noise can mask the antenna's inefficiency. For example, according to CCIR Rep. 258-3, anthropogenic noise in a residential environment at 40 MHz is about 28 dB above thermal noise. Thus, an antenna with a 20 dB loss (due to inefficiency) would have little effect on the noise performance of the system. The antenna's internal loss affects the intended signal and noise/interference identically, which does not lead to a loss of signal-to-noise ratio (SNR).

**Question 0**

In which programmes would low efficiency antennas have no effect on efficiency?

**Question 1**

At lower frequencies, what can cause incorrect assumptions about efficiency?

**Question 2**

What is the median level for measuring atmospheric noise?

**Question 3**

What is SNR?

**Text number 45**

The definition of antenna gain or power amplification already includes the effect of the antenna's efficiency. So if you are trying to transmit a signal to a receiver with a transmitter of a certain power, you only have to compare the gain of different antennas, instead of also taking the efficiency into account. This is also true for the receiving antenna at very high frequencies (especially microwave frequencies), when the aim is to receive a signal that is strong compared to the noise temperature of the receiver. However, in the case of a directional antenna used to receive signals and designed to reject interference from different directions, the efficiency of the antenna is no longer important, as stated above. In this case, instead of indicating the antenna gain, one would be more concerned with the directional gain, which does not include the effect of antenna (in)efficiency. The antenna directive gain can be calculated from the published gain divided by the antenna efficiency.

**Question 0**

What else is also called a power boost?

**Question 1**

What is used to transmit the signal to the receiver?

**Question 2**

Which gain does not include the antenna effect?

**Question 3**

Wats divided by antenna efficiency?

**Text number 46**

This is fortunate, because antennas operating at lower frequencies that are not quite large (a fraction of a wavelength) are inevitably inefficient (due to the low radiation resistance Rr of small antennas). Most AM radios (with the exception of car radios) exploit this principle by using a small loop antenna with very low efficiency. The use of such an inefficient antenna at this low frequency (530-1650 kHz) therefore has little effect on the net performance of the receiver, but simply requires greater gain in the receiver electronics. This small component can be compared to the massive and very tall towers of AM broadcasting stations used to transmit at the same frequencies, where every percentage point reduction in antenna efficiency results in a significant cost.

**Question 0**

What are small and low frequency antennas?

**Question 1**

What will be added to increase absorption capacity?

**Question 2**

How would this antenna be assessed on a larger scale?

**Question 3**

When we are talking about a much larger network, what effect can a reduction in antenna efficiency have?

**Text number 47**

Antenna polarization refers to the orientation of the electric field (E-plane) of a radio wave with respect to the earth's surface, and is determined by the physical structure and orientation of the antenna; note that this designation is completely different from antenna orientation. Thus, a simple straight wire antenna has one polarization when mounted vertically and a different polarization when mounted horizontally. As a transverse wave, the magnetic field of a radio wave is at right angles to the electric field, but convention has it that when we talk about the 'polarisation' of an antenna, we mean the direction of the electric field.

**Question 0**

What is another name for an electric field?

**Question 1**

How many polarizations does an antenna have when mounted vertically?

**Question 2**

What is meant by E-level direction?

**Question 3**

When is the magnetic field at right angles to the electric field?

**Text number 48**

Reflections usually affect polarisation. For radio waves, one important reflector is the ionosphere, which can change the polarisation of the wave. Thus, for signals received after reflection from the ionosphere (skywave), a uniform polarisation cannot be expected. In the case of line-of-sight communications or ground wave propagation, horizontally or vertically polarised transmissions generally remain approximately in the same polarisation state at the receiving site. Matching the polarisation of the receiving antenna with the polarisation of the transmitter can have a significant effect on the strength of the received signal.

**Question 0**

What has the biggest impact on polarisation?

**Question 1**

Which reflector can change the polarisation of waves?

**Question 2**

What do you do with the polarisation of the receiving antenna?

**Question 3**

What remains the same in terms of the polarisation state at the receiving site?

**Question 4**

What is the name given to the signals received after reflection by the ionosphere?

**Text number 49**

Polarisation is predictable from the geometry of the antenna, although in some cases it is not at all obvious (as in the case of a square antenna). The linear polarization of an antenna is usually in the direction of the antenna currents (as seen from the receiving site), if such a direction can be determined. For example, a vertically oriented vertical whip antenna or Wi-Fi antenna transmits and receives in a vertical polarization. Antennas with horizontal elements, such as most rooftop TV antennas in the United States, are horizontally polarized (horizontal polarization is generally used for broadcast TV in the United States). Also, when the antenna system is vertical, such as a group of horizontal dipole antennas, the polarization is horizontal, which corresponds to the flow of current. The polarization of a commercial antenna is an essential specification.

**Question 0**

What is predictable about the geometry of the antenna?

**Question 1**

What is the more complex type of polarisation due to the geometry of the antenna?

**Question 2**

Which antenna polarisation is the relevant specification?

**Question 3**

In which direction are most roof antennas polarised?

**Text number 50**

The polarization is the sum of the E-plane orientations as a function of time projected onto an imaginary plane perpendicular to the direction of the radio wave. In the most common case, the polarization is elliptical, which means that the polarization of radio waves varies with time. Two special cases are linear polarization (where the ellipse collapses into a line), as discussed above, and circular polarization (where the two axes of the ellipse are equal). In linear polarisation, the electric field of the radio wave oscillates back and forth in one direction; this may be influenced by the mounting of the antenna, but usually the desired direction is either horizontal or vertical polarisation. In circular polarisation, the electric field (and magnetic field) of the radio wave rotates in a circular pattern at radio frequency around the axis of propagation. Circularly or elliptically polarized radio waves are designated as right- or left-handed by the 'thumb in the direction of propagation' rule. Note that optical scientists use the opposite right-hand rule for circular polarization than radio engineers.

**Question 0**

Where are the electric fields reflected?

**Question 1**

What is the imaginary level perpendicular to?

**Question 2**

What is the name for the variation in the polarisation of radio waves over time?

**Question 3**

In how many directions does the E-plane of radio waves oscillate back and forth?

**Text number 51**

The receiving antenna should ideally match the polarisation of the transmitted wave for optimal reception. Intermediate matching loses some signal strength, but not as much as complete mismatch. A circularly polarized antenna can be used equally well for matching vertical or horizontal linear polarization. A transmission received by a linearly polarized antenna from a circularly polarized antenna (or vice versa) will cause a 3 dB decrease in the signal-to-noise ratio, since the received power is thus halved.

**Question 0**

What is the best receiving antenna for optimal reception?

**Question 1**

What loses signal strength?

**Question 2**

What is used to reconcile vertical and horizontal linear polarisation?

**Question 3**

What can be reduced by the impact of the switch?

**Text number 52**

Maximum power transfer requires matching the impedance of the antenna system (relative to the transmission line) to the complex conjugate of the receiver or transmitter impedance. However, in the case of a transmitter, the desired matching impedance may not necessarily correspond to the dynamic output impedance of the transmitter analysed as the source impedance, but rather to the design value (typically 50 ohms) required for efficient and safe operation of the transmitter circuit. The desired impedance is usually resistive, but the transmitter (and some receivers) may have additional controls to remove a certain amount of reactance to 'tune' the matching. When a transmission line is used between the antenna and the transmitter (or receiver), an antenna system with an impedance that is resistive and close to the characteristic impedance of the transmission line in question is usually desired in order to minimize the standing wave ratio (SWR) and the resulting increase in transmission line losses and to achieve a good match at the transmitter or receiver itself.

**Question 0**

What is required to match the empedance to the antenna system?

**Question 1**

What is the desired design value of the transmission circuit?

**Question 2**

Why would the transmitter have additional controls?

**Question 3**

What is SWR?

**Text number 53**

In some cases, this is done in an extreme way, not only to cancel a small residual reactance, but to resonate an antenna with a resonant frequency quite different from the intended operating frequency. For example, a "whip antenna" can, for practical reasons, be made much shorter than 1/4 wavelength and resonated by means of a so-called loading coil. This physically large inductor at the base of the antenna has an inductive reactance that is the opposite of the capacitive reactance that such a vertical antenna has at the desired operating frequency. The result is a pure resistance that is seen at the load coil input point; unfortunately, this resistance is somewhat lower than would be desirable to match the commercial coaxial [Reference].

**Question 0**

What can be shorter than 1/4 wavelength?

**Question 1**

What is the opposite of inductive reactance?

**Question 2**

What is at the base of the antenna?

**Question 3**

Where does the resistance appear on the load film?

**Text number 54**

In addition to cancelling the unwanted reactance, there is the additional problem of matching the remaining resistive impedance to the characteristic impedance of the transmission line. In principle, this can always be done with a transformer, but the turns ratio of the transformer is not adjustable. A general matching network with at least two adjustments can be made to correct the impedance of both components. Matching networks using separate inductors and capacitors have losses associated with these components and are limited in power when used for transmission. To avoid these difficulties, commercial antennas are usually designed with fixed matching elements or feeding strategies that achieve an approximate match to a standard coaxial such as 50 or 75 ohms. Dipole-based antennas (rather than vertical antennas) should have a balun between the transmission line and the antenna element, which can be integrated into any matching network.

**Question 0**

What cannot be adjusted on the transformer?

**Question 1**

What is the minimum number of adjustments required for a general matching network to correct all impedance components?

**Question 2**

How many ohms are in a standard coaxial wire?

**Question 3**

What is between the transmission line and the antenna element?

**Question 4**

Balu should be integrated into what?

**Text number 55**

Unlike the antennas mentioned above, traveling wave antennas are non-resonant, so they have an inherently wide bandwidth. They are typically multi-wavelength wire antennas through which voltage and current waves travel in one direction rather than bouncing back and forth to form standing waves, as in resonant antennas. They have linear polarization (except for helical antennas). Unidirectional traveling-wave antennas are terminated at one end with a resistance equal to the antenna's characteristic impedance to attenuate waves in one direction. This makes them inefficient as transmitting antennas.

**Question 0**

Which antennas are not resonant?

**Question 1**

How long are the wire antennas so that the voltage and current waves travel in the same direction?

**Question 2**

Which antenna does not have linear polarisation?

**Question 3**

Where do the non-directional travel directions end?

**Question 4**

What is the value of resistance?

**Text number 56**

The dielectric constant of nearby objects and especially the conductivity can affect the radiation pattern of the antenna and even the drift point impedance of the antenna. For a terrestrial antenna, the ground is usually one such important target. In this case, the height of the antenna above the ground and the electrical properties of the ground (permittivity and conductivity) can be important. In the case of a monopole antenna, the ground (or artificial ground plane) also acts as a return path for the antenna current, which also has a particular impact on the impedance seen by the feed line.

**Question 0**

What affects radiation levels?

**Question 1**

For which antenna is the ground important?

**Question 2**

What is another name for the country?

**Question 3**

How does an artificial ground plane affect the antenna current?

**Text number 57**

The net quality of the reflection from the surface depends on the topography of the surface. When the surface irregularities are much smaller than the wavelength, the reflection is speculative and the receiver sees both the image of the real antenna and the image of the antenna below ground due to the reflection. But if the ground surface irregularities are not small compared to the wavelength, the reflections are not coherent but randomly shifted. At shorter wavelengths (higher frequencies) this is usually the case.

**Question 0**

What is the net soil quality dependent on?

**Question 1**

Why does the receiver see both the image from the ral antenna and the image from the antenna?

**Question 2**

Which frequencies are associated with shorter wavelengths?

**Question 3**

When are the reflections not consistent?

**Text number 58**

The phase of reflection of electromagnetic waves depends on the polarisation of the incoming wave. Since the refractive index of the earth is higher (typically n=2) than that of air (n=1), the phase of horizontally polarised radiation is reversed upon reflection (radial or 180° phase shift). On the other hand, the vertical component of the wave's electric field is reflected at approximately the same phase at grazing angles of incidence. These phase shifts also apply to the ground, which is modeled as a good electrical conductor.

**Question 0**

What is the refractive index of the earth?

**Question 1**

What is the refractive index of air?

**Question 2**

When does polarised radiation reverse?

**Question 3**

What are these steps well suited to, apart from land?

**Text number 59**

When an electromagnetic wave hits a plane surface, such as the ground, part of the wave is transmitted to the ground and part is reflected according to Fresnel's coefficients. If the ground is a very good conductor, almost all of the wave is reflected (180° out of phase), while a ground modeled as a (lossy) dielectric can absorb much of the wave's power. The power remaining in the reflected wave and the phase shift due to reflection depend strongly on the angle of incidence and polarization of the wave. The dielectric constant and conductivity (or simply the complex dielectric constant) depend on the type of ground and are a function of frequency.

**Question 0**

What is reflected and transferred to the ground when a plane surface hits it?

**Question 1**

Who proposed this theory?

**Question 2**

If the country is a good conductor, how much of the wave is reflected?

**Question 3**

What depends on polarisation and wave angle?

**Text number 60**

The effective area or effective aperture of a receiving antenna indicates the fraction of the power of the travelling electromagnetic wave that it transmits to its terminals, expressed in terms of equivalent surface area. For example, if the power of a radio wave passing a given location is 1 pW/m2 (10-12 watts per square metre) and the effective area of the antenna is 12 m2 , the antenna delivers 12 pW of RF power (30 microvolts rms at 75 ohms) to the receiver. Since the receiving antenna is not equally sensitive to signals received from all directions, the effective area depends on the direction of the source.

**Question 0**

What is the proportion of a topic covered by a radio broadcast?

**Question 1**

What is the measure of antenna power?

**Question 2**

What affects the operation of the signals received by the antenna?

**Question 3**

How much power will the receiver receive if the effective area of the antenna is 12 m/2?

**Text number 61**

The bandwidth characteristics of a resonant antenna element can be characterized by its Q, just as the sharpness of an L-C resonant circuit is characterized. However, it is often assumed that an antenna with a high Q has an advantage. After all, Q is short for "quality factor", and low Q usually means excessive loss (due to unwanted resistance) in the L-C resonant circuit. However, this notion does not apply to resonant antennas, where the resistance in question is the radiation resistance, the desired quantity that removes energy from the resonant element to radiate it (the purpose of the antenna, after all!). Q is a measure of the ratio of reactance to resistance, so for a fixed radiation resistance (the radiation resistance of an element is almost independent of its diameter), a higher reactance outside the resonance corresponds to a poorer bandwidth for a very thin conductor. On the other hand, a thick element has a lower reactance outside the resonant frequency, so Q is only 5. These two antennas work equally well at the resonant frequency, but the bandwidth of the second antenna is three times that of the "hi-Q" antenna with a thin conductor.

**Question 0**

The characteristics of a usable radio frequency can be called its?

**Question 1**

What is the benchmark for comparing reactance and resistance?

**Question 2**

What is the maximum Q that could be achieved with a thinner band antenna?

**Question 3**

What type of element would be used to achieve a lower reactance?

**Text number 62**

For example, at 30 MHz (10 m wavelength), a true resonant 1⁄4 wavelength monopole would be almost 2.5 m long, and using an antenna only 1.5 m high would require the addition of a loading coil. In this case, the coil can be said to have lengthened the antenna so that its electrical length is 2.5 meters. However, the achieved resistive impedance is quite a bit lower than the impedance of the resonant monopole, which probably requires additional impedance matching. In addition to the lower radiation resistance, the reactance increases as the antenna size decreases, and the Q factor of the resonant circuit between the antenna and the tuning coil increases, eventually causing the antenna to have insufficient bandwidth for the transmitted signal. This is the main factor determining the size of antennas at frequencies of 1 MHz and below.

**Question 0**

What can be added to make the antenna shorter than the required height to achieve the desired results?

**Question 1**

How would the resistive impedance of this scenario compare to if the antenna were the right height?

**Question 2**

The reel has extended the antenna electrically for how long?

**Question 3**

What is the main thing that determines the size of antennas at lower frequencies?

**Text number 63**

Consider a half-wave dipole designed to work with signals at a wavelength of 1 metre, which means that the diameter of the antenna is about 50 cm. If the ratio of the length to the diameter of the element is 1000, its specific resistance is about 63 ohms. Using a suitable transmission line or balun, we match this resistance to minimise signal loss. Feeding the antenna with 1 ampere of current requires 63 volts of RF current, and the antenna emits 63 watts (not including losses) of radio frequency power. Now consider the case where a signal with a wavelength of 1.25 m is fed to the antenna; in this case, the reflected current enters the feed out of phase with the signal, resulting in a net current drop while the voltage remains the same. Electrically, this appears to be a very high impedance. The antenna and the transmission line no longer have the same impedance, and the signal is reflected back to the antenna, reducing the power. This could be addressed by changing the matching scheme between the antenna and the transmission line, but this solution only works well at the new design frequency.

**Question 0**

How large an antenna should be used at a wavelength of one metre?

**Question 1**

How could the reaction of the output be handled?

**Question 2**

What unit is used to measure current?

**Question 3**

What happens when the signal is reflected back to the antenna?

**Text number 64**

Remember that current is reflected when there is a change in the electrical properties of the material. In order to send a signal efficiently to the transmission line, it is important that the transmission line has the same impedance as the elements, otherwise part of the signal will be reflected back to the antenna. This leads to the concept of impedance matching, i.e. designing the overall system of antenna and transmission line so that the impedance is as close as possible to each other, thus reducing losses. Impedance matching between antennas and transmission lines is usually handled by a balun, although other solutions are also used for certain tasks. An important measure of this basic concept is the standing wave ratio, which measures the magnitude of the reflected signal.

**Question 0**

What kind of changes in the material would reflect the flow?

**Question 1**

What needs to be matched between the transmission line and the elements?

**Question 2**

What technology is used to prevent unintentional signal degradation?

**Question 3**

How is this process usually used in the manufacture of transmission lines and antennas?

**Text number 65**

In some aperture antennas, an electromagnetic wave refractor is a component which, by virtue of its shape and position, selectively delays or prematures portions of the electromagnetic wavefront passing through it. The refractor changes the spatial properties of the wave on one side relative to the other side. For example, it may focus the wave or otherwise modify the wavefront, usually to maximise the directivity of the antenna system. This is the radio equivalent of an optical lens.

**Question 0**

What is used to control the wavefronts passing through the antenna?

**Question 1**

What changes the structural features of the wave on either side?

**Question 2**

What is the main purpose of a refractor?

**Question 3**

What type of viewing can a refractor be compared to?

**Text number 66**

The actual antenna, which transmits the original wave, can also receive a strong signal from its own image on the ground. This causes an additional current to flow through the antenna element, which changes the current at the input point by a given input point voltage. Thus the impedance of the antenna, which is obtained from the ratio of the voltage and current at the input point, changes due to the proximity of the antenna to the ground. This can have quite a significant effect when the antenna is within a wavelength or two of the ground. But as the height of the antenna is increased, the decrease in reflected wave power (due to the inverse square law) allows the antenna to approach its asymptotic input point impedance given by the theory. At lower heights, the effect on the antenna impedance is very sensitive to the exact distance from the ground, as it affects the phase of the reflected wave relative to the currents in the antenna. If the height of the antenna is changed by a quarter of a wavelength, the phase of the reflected wave changes 180°, so the effect on the antenna impedance is completely different.

**Question 0**

What can receive a strong signal by transmitting the original wave?

**Question 1**

Where is the additional current induced?

**Question 2**

What will change because of the proximity of the country?

**Question 3**

What happens to the reflected wave that allows the antenna to reach the impedance of the asymptotic input point?

**Text number 67**

In horizontal propagation, the distances travelled by the direct and reflected beams between the transmitting and receiving antennas, which are close to the ground and reasonably far apart, are almost the same. There is almost no relative phase shift. If the radiation is vertically polarized, the two fields (direct and reflected) will sum and the received signal will be the highest possible. If the signal is polarized horizontally, the two signals are subtracted from each other and the received signal is largely cancelled. The vertical radiation patterns are shown in the figure on the right. Vertical polarization always has a maximum θ=0, horizontal propagation (left pattern). In horizontal polarization, a cancellation occurs at that angle. Note that in the formulas above and in these figures, the earth is assumed to be a perfect conductor. These radiation patterns correspond to a distance of 2.5λ between the antenna and its image. As the height of the antenna increases, the number of wedges also increases.

**Question 0**

What is the difference between a receiving antenna and a transmitting antenna?

**Question 1**

When is transmission maximised by the received signal?

**Question 2**

Where can you see the radiation pattern in the vertical plane?

**Question 3**

Which also increases with the height of the antenna?

**Text number 68**

On the other hand, classical (analogue) TV transmissions are usually horizontally polarised, because in urban areas buildings can reflect electromagnetic waves and create ghost images due to multi-way aethemism. With horizontal polarisation, ghosting is reduced because the reflection of electromagnetic waves from the p-polarisation (horizontal polarisation from the side of the building) is generally less than with s-polarisation (in this case, vertical polarisation). However, vertically polarised analogue TV has been used in some rural areas. In terrestrial digital television, such reflections are less of a problem because of the stability of binary transmission and error correction.

**Question 0**

What is another name for classic television?

**Question 1**

Buildings can create ghost images for what?

**Question 2**

When will ghosting decrease?

**Question 3**

What causes fewer problems with digital terrestrial TV?

**Text number 69**

The current circulating in one antenna usually causes a voltage at the feed point of nearby antennas or antenna elements. The mathematics presented below can be used to analyse the electrical behaviour of antenna arrays when the characteristics of the individual elements of the array (such as half-wave dipoles) are already known. If these elements were spaced apart and driven at a given amplitude and phase, each element would behave independently as that element is known to behave. However, since their electric and magnetic fields interact due to their proximity, the currents of each element are not only a function of the applied voltage (according to the impedance of its driving point), but depend on the currents of other nearby elements. Note that this is now a near-field phenomenon that cannot be properly accounted for by, for example, the Friesian transfer equation.

**Question 0**

How do you know the individual array elements?

**Question 1**

What causes the feed point to nearby antennas?

**Question 2**

What are the mathematical benefits?

**Question 3**

What causes the electric and magnetic fields of the elements to interact?

**Text number 70**

This is a consequence of Lorentz's reciprocity. For an antenna element that is not connected to anything (open circuit), one can write . But for an element that is short-circuited, a short-circuit across a current is generated, but no voltage is allowed, so the equivalent . This is the case, for example, with the so-called parasitic elements of the Yagi-Uda antenna, where a fixed rod can be considered as a dipole antenna short-circuited across its feed point. Lois elements are voltage-free elements that absorb and radiate RF energy according to the induced current, which is calculated using such a system of equations.

**Question 0**

the antenna element, which is not connected to anything, is connected how?

**Question 1**

When is the voltage of the element not allowed?

**Question 2**

Which element absorbs and radiates RF energy?

**Question 3**

Which antenna fixed rod can be considered a dipole antenna?

**Question 4**

Where can this fixed pole be viewed?

**Text number 71**

The difference in the above factors for θ=0 is the reason why most broadcast (public) radio transmissions use vertical polarisation. In receivers close to the ground, horizontally polarised transmissions suffer from cancellations. For best reception, the receiving antennas for these signals are also vertically polarised. In some applications where the receiving antenna must operate in any position, such as mobile phones, base station antennas use mixed polarisation, such as linear polarisation in an angle (with both vertical and horizontal components) or circular polarisation.

**Question 0**

What kind of programming device is based on vertical polarisation?

**Question 1**

If you were to place your receiver closer to the ground, what are the possible drawbacks?

**Question 2**

For what purpose do you need an antenna that can receive signals in different ways at the same time?

**Question 3**

If you were developing a signal for mobile phones, what would be an effective type of antenna?

**Question 4**

What would the antenna you are using take advantage of to work in multiple locations?

**Text number 72**

Loop antennas consist of a loop or wire coil. Loops with a circumference of one wavelength or more operate in the same way as dipole antennas. However, loops of small wavelength perform differently. They interact with the magnetic field of the radio wave, rather than the electric field like other antennas, so they are relatively insensitive to nearby electrical interference. However, they have a low radiation resistance, making them inefficient for transmission. They are used as receiving antennas at low frequencies and also as directional antennas.

**Question 0**

What type of antenna can be made from a round piece of wire?

**Question 1**

What is a loop antenna compared to in order to determine its strength?

**Question 2**

If you had to place an antenna in a place with a lot of interference, which type of antenna would be best?

**Question 3**

Why would this guy be good at receiving but not sending?

**Question 4**

What else would be an effective application for this type of antenna?

**Text number 73**

A basic characteristic of antennas is that the electrical properties of the antenna described in the next section, such as gain, radiation pattern, impedance, bandwidth, resonant frequency and polarisation, are the same whether the antenna is transmitting or receiving. For example, the 'receive pattern' (sensitivity as a function of direction) of an antenna when used for reception is identical to the radiation pattern of an antenna when it is steered and acts as a radiator. This follows from the reciprocal theory of electromagnetism. Therefore, in discussions of antenna characteristics, no distinction is usually made between receiving and transmitting terminology, and an antenna can be considered either transmitting or receiving, whichever is more appropriate.

**Question 0**

Do the essential characteristics of an antenna change depending on the function it performs?

**Question 1**

Which theorem explains the correspondence of the reception pattern of an antenna?

**Question 2**

Can the antenna serve more than one function at a time?

**Question 3**

What is one of the electrical properties of an antenna?

**Document number 368**

**Text number 0**

Flowering plants (angiospermae), also known as Angiospermae or Magnoliophyta, are the most diverse group of land plants, with around 350 000 species. They are distinguished from succulent plants by their flowers, the endosperm inside the seeds and the production of fruits containing seeds, among other things. Etymologically, angiosperm refers to a plant that produces seeds inside an enclosure, i.e. a fruit plant. The term "angiosperm" comes from the Greek compound word (angeion-, "cocoon" or "enclosure", and sperma, "seed"), which means "encapsulated seed" according to the encapsulated state of the seed.

**Question 0**

What is the most diverse group of land plants?

**Question 1**

How many species of flowers are there around?

**Question 2**

What do angiosperms and gymnosperms have in common?

**Question 3**

Where does angiosperm produce its seeds?

**Question 4**

What is the Greek word for "case" or "enclosure"?

**Question 5**

Where does the term gymnosperm come from?

**Question 6**

What is the name for vigorous growths?

**Question 7**

What do angiosperms and angiosperms have in common?

**Question 8**

How does producing fruit differ from producing a plant that bears fruit?

**Question 9**

What does gymnosperm mean etymologically?

**Text number 1**

Fossilised spores suggest that higher plants (embryophytes) have lived on land for at least 475 million years. Early land plants reproduced sexually by means of flagellate, floating sperm, like green algae, from which they evolved. Adaptation to terrestrial life was the development of vertical meiosporangia to spread spores to new habitats. This feature is absent in the descendants of their closest algal relatives, the Carophycean green algae. Subsequent terrestrial adaptation occurred by the preservation of a delicate, avascular sexual stage, the gametophyte, in the vascularized tissues of the sporophyte. This occurred through spore germination within sporangia rather than spore release as in non-seeded plants. A contemporary example of how this might have happened is the early spore germination of Selaginella, a spiny moss. The ancestors of angiosperms resulted from being enclosed in a cocoon, the seed. The first seed-bearing plants, such as ginkgo and conifers (like pines and spruces), did not produce flowers. The pollen grains (males) of ginkgo and cycads produce a pair of flagellating, motile sperm that "swim" along the developing pollen tube to the female and her ova.

**Question 0**

How long have higher plants lived on land?

**Question 1**

How did early plants reproduce sexually?

**Question 2**

Vertical meisporangia enabled the spread of what to new habitats?

**Question 3**

What are the closest relatives of algae that exist today?

**Question 4**

What is the common name of Selaginella?

**Question 5**

What do the first green leaves not produce?

**Question 6**

What pollen does the spiny moss produce for reproduction?

**Question 7**

What does the pollen of the spiny moss do to get to the female?

**Question 8**

What evidence is there to suggest that rhesus monkeys have lived on land for 475 million years?

**Question 9**

What did Charophycean green algae evolve to spread to new habitats by spores?

**Text number 2**

The apparent sudden appearance of near-modern flowers in fossils was initially such a problem for evolutionary theory that Charles Darwin called it a "hideous mystery". However, the fossil record has grown considerably since Darwin's time, and recent discoveries of angiosperm fossils such as Archaefructus, as well as new fossil discoveries of fossil vigor, suggest how the characteristics of angiosperm fossils may have evolved through a series of stages. Several extinct groups of angiosperms, particularly seed angiosperms, have been proposed as the ancestors of flowering plants, but there is no consistent fossil evidence to show exactly how flowers evolved. Some older fossils, such as the Upper Triassic Sanmiguel, have been proposed. Based on the current evidence, some suggest that the ancestors of the angiosperms diverged from an unknown group of vigorous plants in the Triassic (245-202 million years ago). Fossil angiosperm pollen from the Middle Triassic (247.2-242.0 Ma) suggests an older date for their origin. Based on morphological evidence, the proposed close relationship between angiosperms and gnetophytes has recently been challenged by molecular evidence suggesting that gnetophytes are instead more closely related to other gymnosperms[citation needed].

**Question 0**

What did Charles Darwin call the sudden appearance of near-modern flowers in fossils?

**Question 1**

What type of fossil has been recently discovered in Archaefructus?

**Question 2**

What fossil evidence is missing from flowers?

**Question 3**

From what period does the fossil pollen suggest an older date for the origin of angiosperms?

**Question 4**

Which proposed relationship based on morphological evidence has recently been disputed?

**Question 5**

What did Charles Darwin call the ancestors of angiosperms that suddenly appeared?

**Question 6**

What have been proposed for several Archaefructus groups?

**Question 7**

What is missing to show how the ancestors of the angiosperms differed from an unknown group?

**Question 8**

Why is the relationship between gnetophytes and fungal plants controversial?

**Question 9**

What type of fossil has been recently discovered in Sanmiguelia?

**Text number 3**

The evolution of seed plants and later angiosperms appears to be the result of two different whole-genome replication cycles. These occurred 319 million years ago and 192 million years ago. Another possible whole-genome replication event 160 million years ago may have created the ancestral lineage that gave rise to all modern flowering plants. This event was studied by sequencing the genome of an ancient flowering plant, Amborella trichopoda, and directly answers Darwin's "spooky mystery".

**Question 0**

How many separate rounds of genome duplication are suspected to have occurred in the evolution of seed plants?

**Question 1**

When did the first whole genome amplification occur?

**Question 2**

What event perhaps created the line that led to modern flowering plants?

**Question 3**

How are duplication events investigated?

**Question 4**

Who coined the term "creepy mystery"?

**Question 5**

What seems to be the cause of seedling multiplication?

**Question 6**

When did Darwin's 'spooky mystery' first appear?

**Question 7**

When did the ancient plant used in the study originate?

**Question 8**

How are modern plants studied?

**Question 9**

Who coined the term duplication event?

**Text number 4**

The earliest known macrofossil, Archaefructus liaoningensis, which has been confidently identified as an angiosperm, dates back to around 125 million years BP (Cretaceous), while pollen, which is considered to be angiospermic, has been found around 130 million years BP. However, one study has suggested that the early to middle Jurassic plant Schmeissneria, traditionally considered a species of ginkgo, may be the earliest known angiosperm, or at least a close relative. Chemical evidence has also been found that angiosperms existed as early as 250 million years ago. The secondary metabolite oleanane, produced by many flowering plants, has been found in Permian deposits of that age, together with fossils of gigantopterids. Gigantopterids are a group of extinct seed plants that share many morphological features with flowering plants, although they are not known to have been flowering plants themselves.

**Question 0**

When is the earliest known macrofossil identified as an angiosperm dated?

**Question 1**

What is the earliest known angiosperm?

**Question 2**

What pushes back the age of angiosperms by 5 million years?

**Question 3**

How long ago was circumstantial evidence of the existence of angiosperms discovered?

**Question 4**

Which now extinct seed plants had many of the characteristics of today's flowering plants?

**Question 5**

What is Oleanne, the earliest macrofossil, traditionally considered to be?

**Question 6**

What evidence is there that flowering plants existed 125 million years ago BP?

**Question 7**

What has been found in ginkgo layers of that age with gigantopterid fossils?

**Question 8**

With which does Oleante share morphological features?

**Question 9**

Where are there no known Permian deposits themselves?

**Text number 5**

The great angiosperm radiation, when a large variety of angiosperms are found in fossils, occurred in the middle of the Cretaceous (about 100 million years ago). However, a 2007 study estimated that the last five (Ceratophyllum genus, Chloranthaceae genus, eudicots, magnoliids and monocots) of the eight main groups split about 140 million years ago. In the Late Cretaceous, angiosperms appear to have dominated environments previously occupied by ferns and cycadophytes, but large canopy trees did not replace conifers as the dominant trees until near the end of the Cretaceous 66 million years ago or even later, at the beginning of the Tertiary. The radiation of herbaceous angiosperms occurred much later. However, many fossil plants that can be identified as belonging to the present plant genera (such as beech, oak, maple and magnolia) had already appeared by the end of the Cretaceous.

**Question 0**

When does the high diversity of angiosperms occur in the fossil record?

**Question 1**

What is the presence of a large number of angiosperms in the fossil record?

**Question 2**

When did the eight main groups of angiosperms divide?

**Question 3**

What did angiosperm plants do towards the end of the Cretaceous period?

**Question 4**

At what time had beech and maple already appeared?

**Question 5**

When does the diversity of magnoliids appear in fossils?

**Question 6**

What is the name given to the presence of ferns in fossils?

**Question 7**

What did angiosperms control by the end of the tertiary period?

**Question 8**

When did eudicots replace conifers as the dominant trees?

**Question 9**

When did the eight main Chloranthaceae families that can be identified as belonging to modern families appear?

**Text number 6**

Island genetics offers one explanation for the sudden, fully developed appearance of flowering plants. Island genetics is thought to be a common source of speciation in general, especially in the case of radical adaptations that seem to have required inferior forms of transition. Flowering plants may have evolved in isolation, such as on an island or island chain, where the plants that bore them were able to develop a highly specialised relationship with a particular animal (such as a wasp). Such a relationship, in which the hypothetical wasp carried pollen from one plant to another in a similar way to the way fig wasps do today, may have led to a high degree of specialisation of both the plant(s) and their companions. It should be noted that the wasp example is not coincidental; bees, which are thought to have evolved specifically through reciprocal plant relationships, are descended from wasps.

**Question 0**

What is one proposed explanation for the immediate appearance of flowering plants?

**Question 1**

Which island gene is considered the default source?

**Question 2**

What did the radical adjustments seem to require?

**Question 3**

How did an isolated environment like an island help the development of flowering plants?

**Question 4**

Where do bees come from?

**Question 5**

What are the origins of transitions?

**Question 6**

What is the explanation for the sudden appearance of fig wasps?

**Question 7**

What does the relationship between bees and wasps lead to?

**Question 8**

Which pollen is thought to be a common source?

**Question 9**

How did flowering plants help transitional forms to develop?

**Text number 7**

Animals are also involved in seed dispersal. The fruits, which form as the flower parts expand, are often a seed dispersal device, attracting animals to eat or otherwise disturb them, thus spreading the seeds they contain (see frugivory). Although many such mutualistic relationships are still too fragile to survive competition and spread widely, flowering has proven to be an unusually efficient means of reproduction that has spread (regardless of its origin) to become the dominant life form of land plants.

**Question 0**

Where do animals belong too?

**Question 1**

Where has the expansion of the flower's parts developed?

**Question 2**

What does the plant get from fruit formation?

**Question 3**

What are the many reciprocal relationships that cannot survive competition?

**Question 4**

What proved to be unusually effective for plant reproduction?

**Question 5**

Where did the competition prove effective?

**Question 6**

How did the reciprocal relations eventually spread?

**Question 7**

How does the plant benefit from competition?

**Question 8**

Which method of reproduction became widespread but made plants fragile?

**Question 9**

What did the accidentally scattered seeds help the flower parts to develop?

**Text number 8**

Flower ontogeny involves a combination of genes that are usually responsible for the formation of new shoots. The most primitive flowers probably had a variable number of flower parts, often separate (but in contact). Flowers tended to grow in a spiral, were bisexual (in plants this means that the same flower has both male and female parts) and were dominated by an ovary (female part). As flowers evolved, some variations developed fused parts, with a much more precise number and shape, and either flower- or plant-specific sexes, or at least 'ovaries down'.

**Question 0**

What uses a combination of genes to form new shoots?

**Question 1**

What were the parts of plants like in their early days?

**Question 2**

How did flowers become bixsexuals?

**Question 3**

What did some parts of the plant do when they evolved?

**Question 4**

What is the term for a plant that has a specific sex per flower?

**Question 5**

What were the male parts dominated by?

**Question 6**

How did flowers tend to grow when they were male-dominated?

**Question 7**

What did some parts of the plant do when there were only males in the flower?

**Question 8**

What was the name of a plant of a particular sex during the ontogeny of the flower?

**Question 9**

In which ovary do the less developed plants form new shoots?

**Text number 9**

The evolution of flowers continues to the present day; modern flowers have been so heavily influenced by humans that some cannot be pollinated in the wild. Many modern domesticated flower species were once simple weeds that only sprouted when the ground was disturbed. Some of them tended to grow with human crops, and perhaps already had symbiotic partner-plant relationships with them, and the most beautiful ones were not plucked for their beauty, but evolved to depend on and adapt specifically to human affection.

**Question 0**

How long has it taken for the flower to evolve?

**Question 1**

Have some flowers been so affected by humans that they can no longer do what they do in nature?

**Question 2**

What is the heritage of many modern domesticated flower species?

**Question 3**

Why did weeds grow alongside human crops?

**Question 4**

What feature helped the flowers not to pluck?

**Question 5**

What has happened to weeds as a result of human influence?

**Question 6**

How long has it taken for weeds to evolve?

**Question 7**

Where do many simple weeds come from?

**Question 8**

What have weeds developed an addiction to?

**Question 9**

Which feature caused the crop not to be harvested?

**Text number 10**

The exact relationships between these eight groups are not yet clear, although it is generally agreed that the first three groups that diverged from the ancestral angiosperms were the Amborellales, Nymphaeales and Austrobaileyales. The term basal angiosperms refers to these three groups. Of the other groups, the relationship between the three largest groups (magnoliids, monocots and eudicots) remains unclear. Some analyses suggest that magnoliids were the first to separate, others that monocots were the first. Ceratophyllum seems to belong to the group of eudicots rather than monocots.

**Question 0**

Which three groups were the first to separate from the angiosperm?

**Question 1**

Which term refers to the first three groups that diverged from angiosperm?

**Question 2**

How clear is the relationship between the three largest groups of non-genuine angiosperms?

**Question 3**

Which group seems to have split first, according to some analyses?

**Question 4**

Which of the first three groups were different from the magnoliids?

**Question 5**

Which group do amborellites usually fall into instead of monocots?

**Question 6**

What is the status of the relationship between Nymphaeales and monocots?

**Question 7**

What is the opinion that the first magnoliids were different from the angiosperms of the ancestors?

**Question 8**

What do some eudicots show about divorce first?

**Text number 11**

The botanical term "Angiospermae", which comes from the ancient Greek αγγείον, angeíon (bottle, vessel) and σπέρμα, (seed), is the name Paul Hermann coined in 1690 for Angiospermae, one of his primary divisions of botany. It included flowering plants with seeds enclosed in a capsule, as distinguished from his Gymnospermae, flowering plants with achenial or schizocarpic fruits, the whole or each part of the fruit being here regarded as a seed and naked. Carl Linnaeus used the term and its equivalent in the same sense, but in a restricted sense, in the names of the classes of his class Didynamia. It was only after 1827, when Robert Brown found that the Cycadeae and Coniferae did indeed have naked ova, that its use in a sense approaching its present scope became possible, and he used the name Gymnosperms for them.[citation needed] From then on, as long as these Gymnosperms were conventionally classified as dicotyledonous flowering plants, botanical authors used the term Angiosperms antithetically and to varying degrees as a group name for other dicotyledonous plants.

**Question 0**

What term was coined by Paul Hermann in 1690?

**Question 1**

What Hermann used the term angiosperms in the primary division of the plant kingdom?

**Question 2**

Who restricted the use of the term angiosperm?

**Question 3**

What did Robert Brown say about the existence of Cycadeae and Coniferae?

**Question 4**

Which group name has been used by botanical authors for angiosperm?

**Question 5**

Who invented the term bicuspid?

**Question 6**

In what year was the term bicuspid created?

**Question 7**

Why did Robert Brown use the term dicotyledonous?

**Question 8**

How did Robert Brown retain the term angeion?

**Question 9**

What happened in 1690 to Robert Brown's use of the term angeion?

**Text number 12**

In most taxonomies, flowering plants are treated as a single group. The most popular descriptive name has been Angiospermae (Angiospermae), and the second most popular is Anthophyta ("flowering plants"). There is no classification associated with these names. The Wettstein system and the Engler system use the name Angiospermae, which is given a subgroup ranking. In the Reveal system, flowering plants were treated as the subfamily Magnoliophytina (Frohne & U. Jensen ex Reveal, Phytologia 79: 70 1996), but were later subdivided into the subfamilies Magnoliopsida, Liliopsida and Rosopsida. The Takhtajan and Cronquist system treats this group at the level of subdivision, leading to the name Magnoliophyta (from the genus Magnoliaceae). The Dahlgren system and Thorne's system (1992) treat this group at the level of class, leading to the name Magnoliopsida. In the 1998 APG system and subsequent revisions in 2003 and 2009, flowering plants are treated as a clade called angiosperms without an official botanical name. However, the 2009 revision published an official classification in which flowering plants form the subclass Magnoliidae.

**Question 0**

As which group in the taxonomy are flowering plants treated?

**Question 1**

What does anthophyta mean?

**Question 2**

What is used in Wettstein and Engler's systems for the defined rank of a subgroup?

**Question 3**

How are flowering plants dealt with in the 1998 APG scheme and its 2003 and 2009 revisions?

**Question 4**

Which formal subclass classification was given to flowering plants in 2009?

**Question 5**

What are coherent groups not related to?

**Question 6**

What do Anthophyta and Magnoliophytina use in their subdivisions?

**Question 7**

How are flowering plants treated in the 1996 APG system?

**Question 8**

Which taxonomy was published in the 2003 revision?

**Question 9**

What does Magnoliophytina mean?

**Text number 13**

The internal classification of this group has been significantly revised. The Cronquist system, proposed by Arthur Cronquist in 1968 and published in its complete form in 1981, is still widely used but is no longer believed to accurately describe phylogeny. Consensus on how flowering plants should be organised has recently begun to emerge thanks to the work of the Angiosperm Phylogeny Group (APG). APG published an influential reclassification of angiosperms in 1998. Updates with more recent research results were published as APG II in 2003 and APG III in 2009.

**Question 0**

What internal part has been significantly revised?

**Question 1**

What system was first proposed by Arthur Cronquist in 1968, but not published in its complete form until 1981?

**Question 2**

What consensus is the AGP aiming for?

**Question 3**

Who published the influential reclassification of angiosperms in 1998?

**Question 4**

Which classification system was published by APG II in 1968?

**Question 5**

When was the APG II system published in full?

**Question 6**

What is no longer believed about the APG system?

**Question 7**

What kind of consensus has emerged as a result of Arthur Cronquist's work?

**Question 8**

What did Arthur Cronquist publish about angiosperms in 1998?

**Text number 14**

Recent studies, such as those conducted by APG, show that monocots form a monophyletic group (clade), but dicots do not (they are paraphyletic). However, most dicots form a monophyletic group called eudicots or tricolpates. Of the remaining dicots, most belong to a third large group known as the magnoliids, which includes about 9 000 species. The remainder are the paraphylactic group of primitive species, collectively known as the basal angiosperms, and the genera Ceratophyllaceae and Chloranthaceae.

**Question 0**

Based on recent APG studies, what groups do monocots form?

**Question 1**

Eudicots, or tricot, are part of the monophyletic group, which species?

**Question 2**

To which third main clade do many dicots belong?

**Question 3**

How many species of dicots are magnoliids?

**Question 4**

What group of primitive species are the basal angiosperms?

**Question 5**

How many species of Chloranthaceae are eudicots?

**Question 6**

What do the monophyletic group studies show?

**Question 7**

What make up the majority of monocot Ceratophyllaceae species?

**Question 8**

To which group do the remaining monocot species belong?

**Question 9**

Which group do the remaining monocot species belong to?

**Text number 15**

The number of species of flowering plants is estimated at between 250 000 and 400 000. This compares with around 12 000 mosses or 11 000 species of pteridophytes, indicating that flowering plants are much more diverse. In the APG (1998) the number of genera was 462. In APG II (2003) it is not stabilized; the maximum is 457, but within this number there are 55 optional segregants, so the minimum number of families in this system is 402. APG III (2009) has 415 families.

**Question 0**

What is the estimated range of the number of flowering plants?

**Question 1**

How many species of moss are there?

**Question 2**

What does the large number of flowering plant species indicate that they are generally true?

**Question 3**

What is the minimum number of APG families?

**Question 4**

How many families are there in AGP III?

**Question 5**

How is moss seen as more than families in the system?

**Question 6**

What is more true about genera than about mosses or pteridophytes?

**Question 7**

How many flowering plants are there in APG in 1998?

**Question 8**

What is the minimum number of mosses in the APG system?

**Question 9**

How many species of flowers are there in APG III?

**Text number 16**

In dicotyledonous plants, the bundles of very young stems are arranged in an open ring that separates the middle pith from the outer bark. Each bundle, separating the xylem from the phloem, has a layer of meristem or active forming tissue called cambium. When a layer of cambium (intervascular cambium) is formed between the bundles, a complete ring is formed, and the thickness increases regularly and periodically as the kyleema develops on the inside and the phloem on the outside. The soft phloem crumbles, but the hardwood persists and forms the bulk of the stems and branches of the perennial tree. Because of differences in the characteristics of the elements that emerge at the beginning and end of the growing season, the tree is divided in cross-section into concentric rings, one corresponding to each growing season, called annual rings.

**Question 0**

What shape are the bundles in the young stems of double-headed shoots?

**Question 1**

What makes the cambium different?

**Question 2**

What is the meristematic layer or constitutive tissue?

**Question 3**

What is the consequence of the kyleem developing on the inside and the phloem on the outside?

**Question 4**

What is another name for tree-centred rings?

**Question 5**

What is formed when a layer of bifurcated shoots is formed between the bundle?

**Question 6**

What causes the regular reproduction of young stems?

**Question 7**

What happens when the annual rings are crushed?

**Question 8**

How is the soft phloem labelled for each growing season?

**Question 9**

How are the young stem bundles arranged in the branches?

**Text number 17**

A characteristic feature of angiosperms is the flower. The flowers vary considerably in shape and development and are the most reliable external features for determining relationships between angiosperm species. The function of the flower is to ensure the fertilisation of the ovule and the development of the fruit, which contains the seeds. The floret can grow from the terminal point of the shoot or from the leaf axis (where the petal attaches to the stem). Sometimes, as in the case of violets, the flower grows singly on the axis of a normal leaf. Typically, the flower-bearing part of the plant is clearly separated from the leaf-bearing or vegetative part and forms a more or less developed branch system called the inflorescence.

**Question 0**

What is the hallmark of angiosperms?

**Question 1**

Which characteristic of flowers has variation?

**Question 2**

What is the best external feature of flowers?

**Question 3**

What is the role of the flower to ensure fertilisation?

**Question 4**

What is the name of the branch system?

**Question 5**

What is the main feature of the vegetative part of the plant?

**Question 6**

The leaf-bearing part of which plant forms the flowers?

**Question 7**

What does the advanced branching system show?

**Question 8**

What do seed-bearing fruits offer to explain relationships between species?

**Question 9**

What is the role of the stem?

**Text number 18**

A flower may consist of only these parts, as in the case of willow, which has only a few stamens or two stamens. Usually there are other structures that protect the spores and form a bark that attracts pollinators. The individual members of these surrounding structures are called sepals and petals (or petals in flowers such as Magnolia, where the sepals and petals are indistinguishable). The outer set (the sepal vase) is usually green and leafy and is designed to protect the rest of the flower, especially the bud. The inner row (the corolla of petals) is usually white or brightly coloured and more delicate in texture. Its function is to attract insect or bird pollinators. Attraction is by colour, scent and nectar, which may be secreted from a part of the flower. The pollinator attracting properties explain the popularity of flowers and flowering plants among humans.

**Question 0**

What is a willow flower made of?

**Question 1**

What have some structures evolved to protect?

**Question 2**

What terms are used to describe the individual members of the shell structures?

**Question 3**

What are the typical looks of the veils of the calendars?

**Question 4**

The characteristics of flowers that attract pollinators also attract what other creature?

**Question 5**

What does the sporophyll form to attract pollinators?

**Question 6**

In which flower are the stamens and ovules indistinguishable?

**Question 7**

What do petals protect?

**Question 8**

Which colour is the more delicate willow?

**Question 9**

What flower characteristics attract spores?

**Text number 19**

Although most flowers are complete or hermaphroditic (producing both pollen and ovules in the same flower structure), flowering plants have evolved numerous morphological and physiological mechanisms to reduce or prevent self-fertilisation. Heteromorphic flowers have short carpels and long stamens, or vice versa, so that animal pollinators cannot easily transfer pollen to the spermatheca (the receptive part of the carpel). Homomorphic flowers can use a biochemical (physiological) mechanism called self-incompatibility to distinguish between self and non-self pollen grains. In other species, the male and female parts are morphologically distinct and develop into different flowers.

**Question 0**

What sex characteristic do most flowers show?

**Question 1**

Why did flowering plants develop numerous morphological and physiological mechanisms?

**Question 2**

Why are the stamens and stamens of a heteromorphic flower different lengths?

**Question 3**

What mechanism might homomorphic flowers use to distinguish between foreign and their own pollen grains?

**Question 4**

How are male and female parts of some species distinguished?

**Question 5**

What is the property of most biochemical mechanisms?

**Question 6**

What do hermaphrodite flowers use to distinguish between self-pollination and non-self-pollination?

**Question 7**

What happens to the male and female parts of hermaphroditic carpels?

**Question 8**

Why have long stamens evolved numerous morphological and physiological mechanisms?

**Question 9**

What do homomorphic flowers have to make it harder for animals to pollinate them?

**Text number 20**

Double fertilisation is the process where two sperm fertilise cells in the ovary. The process starts when a pollen grain sticks to the sperm stigma (the female reproductive structure), germinates and grows a long pollen tube. As the pollen tube grows, the haploid gamete travels along the tube behind the nucleus of the tube. The generative cell divides by mitosis to produce two haploid (n) spermatozoa. As the pollen tube grows, it travels from the stamen, along the ovary and into the ovary. There, the pollen tube reaches the micropyle of the oocyte and fuses with the synergid, releasing its contents (which include sperm cells). The synergid in which the cells were released degenerates, and one spermatozoon passes to fertilise the egg cell, resulting in a diploid (2n) zygote. The second sperm cell fuses with the nuclei of both central cells, resulting in a triploid (3n) cell. When the zygote develops into an embryo, the triploid cell develops into an endosperm, which serves as the embryo's food source. The ovule now develops into a fruit and the ovum develops into a seed.

**Question 0**

What process does double fertilisation refer to?

**Question 1**

Where does the pollen grain stick to start the double fertilisation process?

**Question 2**

What type of cell travels along the pollen tube as it grows?

**Question 3**

Where does the pollen tube release sperm?

**Question 4**

What feeds the embryo?

**Question 5**

When a pollen tube fertilises cells in the ovary, what is it called?

**Question 6**

What starts the synergid process?

**Question 7**

What does the sperm cell take hold of to initiate double fertilisation?

**Question 8**

What degenerates when a grain of pollen sticks to a stigma?

**Question 9**

What does the zygote fuse with to produce triploid?

**Text number 21**

The nature of the seed coat is clearly proportional to the nature of the fruit. They protect the embryo and help in spreading; they can also directly promote germination. In plants with fruit, the fruit usually protects the embryo and ensures dispersal. In this case, the seed coat is only slightly developed. If the fruit is a hatchling and the seed is exposed, the seed coat is usually well developed and must perform the functions that the fruit would otherwise perform.

**Question 0**

The appearance of the seed coat is clearly proportional to the appearance of which seed?

**Question 1**

What does the seed coat protect?

**Question 2**

What does the fruit of the flower represent?

**Question 3**

How mature is the seed coat when used for application?

**Question 4**

What is the embryonic figure related to?

**Question 5**

What do the peeled fruits contribute directly?

**Question 6**

What is the protection of the exposed seed?

**Question 7**

What does the embryo inside the fruit protect?

**Question 8**

What does the fruit have to do, what does the fruit usually do?

**Text number 22**

Agriculture is almost entirely dependent on angiosperms, which produce almost all plant food and also a significant amount of animal feed. Of all the plant families, the Poaceae or grass family (cereals) is by far the most important, producing the majority of all feed materials (rice, maize - corn, wheat, barley, rye, oats, millet, sugar cane, sorghum). The Fabaceae or legume family is in second place. The Solanaceae family (including potatoes, tomatoes and peppers), the Cucurbitaceae family (including pumpkins and melons), the Brassicaceae family (including rape and the numerous varieties of Brassica oleracea) and the Apiaceae family (including parsley) are also of great importance. Many of our fruits come from the Rutaceae family (including oranges, lemons, grapefruit, etc.) and the Rosaceae family (including apples, pears, cherries, apricots, plums, etc.).

**Question 0**

What is agriculture almost entirely dependent on?

**Question 1**

Which plant group is the most important for human survival?

**Question 2**

What is the more common name for the genus Fabaceae?

**Question 3**

Which family do potatoes, tomatoes and peppers belong to?

**Question 4**

Which family would cherries belong to?

**Question 5**

What does the legume family offer as the most important of all plant families?

**Question 6**

What is the most common name of the genus Solanaceae, which is in second place?

**Question 7**

What does the iron needed by livestock provide?

**Question 8**

What are some examples of what moths offer as a major group?

**Question 9**

What makes the rod family an important group?

**Text number 23**

Traditionally, flowering plants have been divided into two groups, which in the Cronquist system are called the Magnoliopsida (the class consisting of the family name Magnoliaceae) and the Liliopsida (the class consisting of the family name Liliaceae). Other descriptive names allowed by Article 16 of the ICBN are Dicotyledones or Dicotyledoneae and Monocotyledones or Monocotyledoneae, which have a long history of use. In English, members of either group may be called dicotyledons (plural dicotyledons) and monocotyledons (plural monocotyledons) or, for short, dicotyledons (plural dicotyledons) and monocotyledons (plural monocotyledons). These names derive from the observation that dicots usually have two cotyledons, or embryonic leaves, in each seed. Monocots usually have only one, but the rule is not absolute in either case. From a diagnostic point of view, the number of cotyledons is not a particularly convenient or reliable characteristic.

**Question 0**

What are the usual two monocots in each seed?

**Question 1**

How does the Cronquist system look at the number of foetuses?

**Question 2**

What other descriptive names does the English system allow?

**Question 3**

How many groups are flowering plants divided into in the English system?

**Question 4**

What is one category used in the English system?