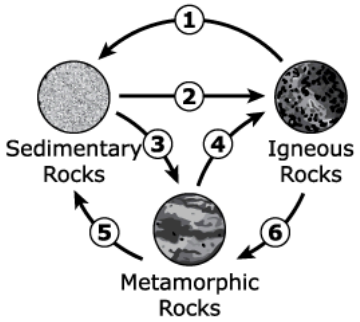
Tennessee Comprehensive Assessment Program (TCAP) Grade 8 Practice Items

A model of the rock cycle shows how different types of rocks can be formed from other types of rocks.



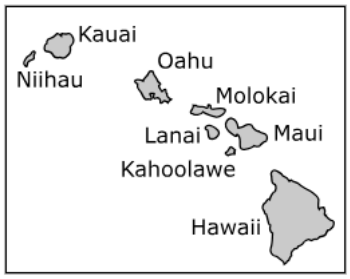
Which statement correctly describes a process occurring in the model?

- A. Arrow 1 shows weathering of igneous rocks making particles that can form sedimentary rocks.
- B. Arrow 2 shows erosion turning sedimentary rocks into igneous rocks.
- C. Arrow 3 shows magma cooling to form metamorphic rocks.
- D. Arrow 5 shows erosion and weathering turning sedimentary rocks into metamorphic rocks.

The movement of the Pacific Plate can be detected by studying the ages of the different Hawaiian Islands. The presence of active volcanoes also provides a clue to the islands' relative ages.

Hawaiian Islands Volcano Data

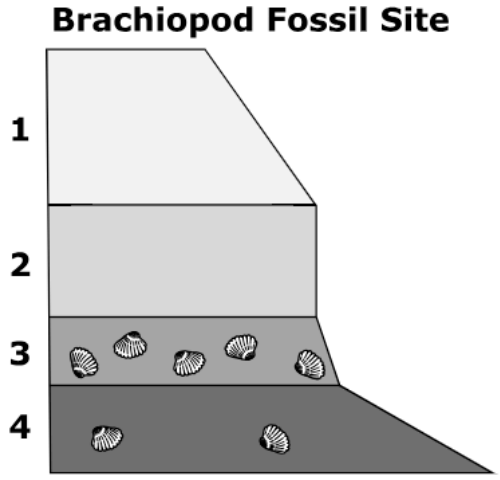
Hawaiian Island	Age	Active Volcanoes
Oahu	3.4 to 2.2 million years	none
Molokai	1.8 to 1.3 million years	none
Maui	1.3 to 0.8 million years	none
Hawaii	Less than 0.7 million years	Mauna Loa and Kilauea



Which **three** statements correctly describe the pattern of movement that forms the Hawaiian Islands?

- [ ] A. Hawaii is the island that currently sits over the hot spot.
- [ ] B. Kauai and Niihau are younger than Oahu.
- [ ] C. Maui is moving toward the hot spot.
- [ ] D. Kahoolawe is younger than Lanai.
- [ ] E. Niihau is farthest from the hot spot.

A diagram of rock layers from western Tennessee is shown. The diagram shows which layers contain brachiopod fossils and how many fossils are in each of those layers.

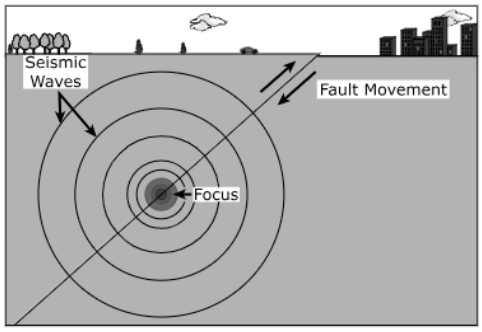


Which statement **best** explains the presence of the brachiopod fossils in the rock layers?

- A. The organism gradually became extinct because of a slow change in the environment.
- B. The organism became extinct quickly because of a catastrophic event.
- C. The organism changed into different species over time.
- D. The organism's population thrived in layers 1 and 2.

Earthquakes – Part 1

There are many earthquakes that occur all across Tennessee. Most of them are too minor to be felt. Students in a classroom in western Tennessee felt a minor earthquake. Pictures on the wall rattled and startled the students, but the earthquake lasted only ten seconds. The small earthquake fascinated the students and made them eager to learn more about how earthquakes occur and how the waves travel. The teacher decides to show them how the energy from an earthquake moves through the surface of Earth. The teacher shows the students a model of an earthquake happening because of the movement of Earth's crust. When this movement occurs, energy is released in the form of seismic waves.



Which type of wave carries the seismic energy released, and how does it travel through Earth?

A. The sound waves travel through Earth by absorption.

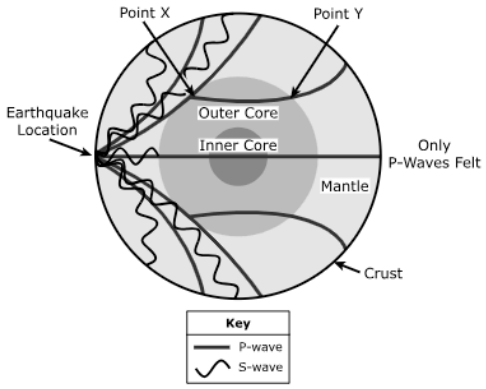
B. The sound waves travel through Earth by transmission.

C. The longitudinal waves travel through Earth by absorption.

D. The longitudinal waves travel through Earth by transmission.

Earthquakes – Part 2

A student asks how far an earthquake can be felt around the world. The teacher explains that seismic waves can travel along the surface of Earth as well as within the inside of Earth. By studying earthquake data, scientists were able to figure out that the inside of Earth is made of different layers. The teacher shows the students a different model that shows how P-waves and S-waves travel through the different layers of Earth. Point X and Point Y are labeled in the model.



Based on the model, which material property makes the seismic wave change direction when it moves from the mantle to the outer core?

- A. mass
- B. density
- C. volume
- D. weight

The model shows that Earth has at least four distinctly different layers. What is the **best** explanation for why these layers have formed over the history of Earth?

- A. The layers formed because earthquakes separated different sections of Earth.
- B. The layers formed from the same rock type that experienced different temperatures.
- C. The layers formed because rock that was produced in the inner core rose to the crust.
- D. The layers formed when different rock types separated because of their different densities.

In the model, Point X and Point Y are shown. Which explanation accurately compares the energy of the P-wave at Point X and Point Y?

- A. The energy of the wave at Point X is greater than at Point Y, because some of the energy has been absorbed in the outer core.
- B. The energy of the wave at Point X is greater than at Point Y, because some of the energy has been absorbed through the inner core.
- C. The energy of the wave at Point X is less than at Point Y, because some of the energy has been absorbed in the outer core.
- D. The energy of the wave at Point X is less than at Point Y, because some of the energy has been absorbed through the inner core.

	The model shows that only P-waves go through the outer core. What does that tell scientists about the composition of the outer core? ○ A. It is liquid, because S-waves cannot travel through liquids. ○ B. It is solid, because S-waves cannot travel through solids. ○ C. It is metal, because only P-waves can travel through metal. ○ D. It is rock, because only P-waves can travel through rock.

Students observing a population of fruit flies over four weeks recorded their observations.

1. A small number of flies are born with short wings that prevent them from flying.
2. Flies with normal wings sometimes produce offspring with short wings.
3. Flies with short wings produce offspring with normal wings.

The short-wing phenotype is **most likely** a result of

○ A. wings being damaged during egg hatching.

○ B. a mutation.

○ C. a dominant gene.

○ D. a change in incubation temperature.

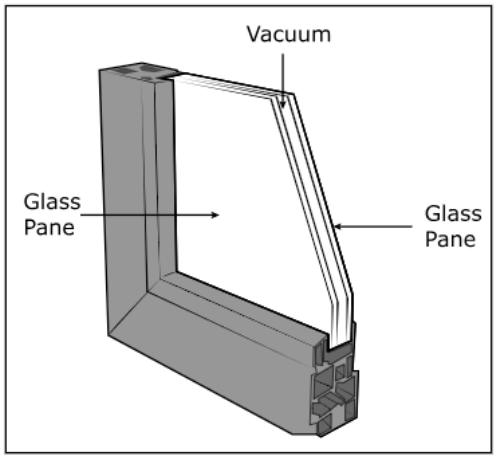
Gravity plays a major role in the movement of planets, moons, comets, and asteroids in the solar system.

Which **two** statements correctly explain ways gravity affects the motion of objects in the solar system?

- [ ] A. The sun's gravity keeps the planets in orbit around the sun.
- [ ] B. The sun's gravity keeps the stars in orbit around the sun.
- [ ] C. The planets' gravity keeps the asteroids and comets in orbit around the sun.
- [ ] D. The planets' gravity keeps the moons in orbit around the planets.
- [ ] E. The planets' gravity keeps the stars in orbit around the planets.

A type of window on a building is made with two panes of glass that are separated by a vacuum. The vacuum between the glass panes is designed to keep low-frequency waves from passing into the building. The diagram shows a cross-section of this type of window.

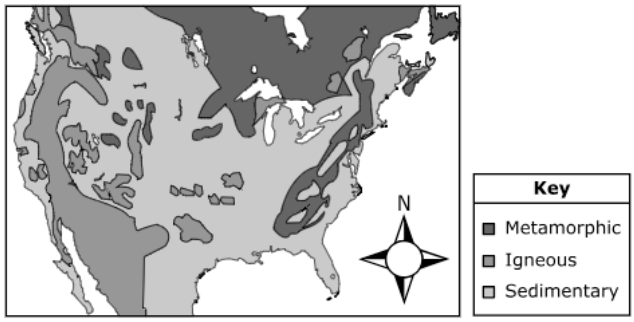
Window Design



Light waves and sound waves outside the building reach the window. Which statement **best** describes the behavior of these waves when they reach the vacuum in the window?

- ○ A. The light waves are transmitted and the sound waves are reflected.
- ○ B. The light waves are absorbed and the sound waves are reflected.
- ○ C. The light waves are refracted and the sound waves are transmitted.
- ○ D. The light waves are reflected and the sound waves are transmitted.

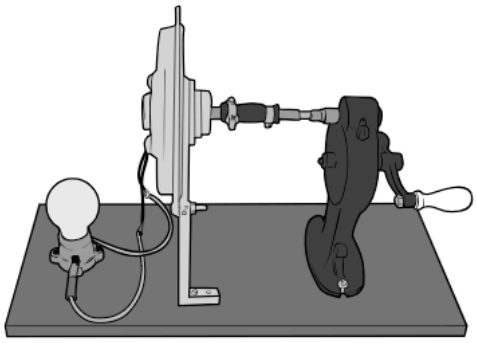
The map shows where different types of rock are found in North America.



Which **two** statements about the type of rock are **correct**?

- [ ] A. Sedimentary rock can be found inland and by the ocean.
- [ ] B. Metamorphism requires the presence of coastal water.
- [ ] C. Sedimentary processes are the least common of the processes.
- [ ] D. Igneous rock is much more likely to be formed on the eastern side of the continent.
- [ ] E. Metamorphic processes occurred in large areas in the northern part of the continent.

This diagram shows a hand-crank generator. A student used the generator to produce light in light bulbs of different voltages. First, the student turned the hand-crank 10 times and produced light in both a 28-volt bulb and a 55-volt bulb. Next, the student tried to produce light in a 130-volt bulb, but no light was produced even after the student turned the crank 50 times. The student determined that the amount of electricity produced by the generator should be increased.

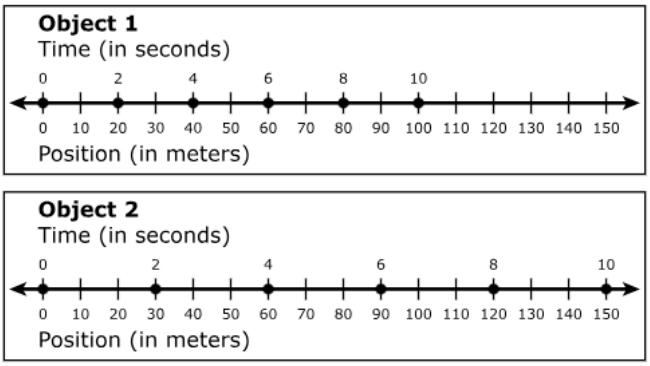


Which of these will increase the amount of electricity produced by the hand-crank generator?

- A. Attach an adapter that has larger electrical terminals to the electromagnet.
- B. Use a thicker wire with fewer coils around the core of the electromagnet.
- C. Replace the bar magnet with a more powerful magnet.
- D. Spin the crank wheel slowly but with more force.

The motion of two objects is shown with motion maps. The position of each object is shown every two seconds.

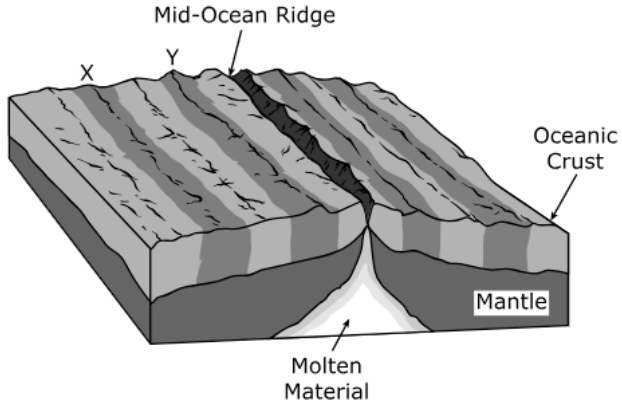
Motion Maps of Two Objects



Which **three** statements **best** describe the motion of the objects?

- [ ] A. Object 1 is accelerating.
- [ ] B. Object 2 has a constant speed.
- [ ] C. The speed of Object 2 is greater than the speed of Object 1.
- [ ] D. Object 2 has traveled 40 meters farther than Object 1 at 8 seconds.
- [ ] E. If Object 1's motion does not change, its position will be 120 meters when the clock reads 14 seconds.

This is a diagram of a mid-ocean ridge.



Which statement provides the **best** evidence that seafloor spreading occurs?

A. The material at ridge Y is less jagged than the material at ridge X.

B. The material at ridge X has less sediment than the material at ridge Y.

C. The crust at ridge Y is older than the crust at ridge X because it is located closer to the mid-ocean ridge.

D. The crust at ridge X is older than the crust at ridge Y because it is located farther away from the mid-ocean ridge.

Diving Birds – Part 1

Penguins have the remarkable ability to change their vision from air mode to water mode. Penguins can focus their vision to see clearly while they are on land. As penguins dive into water, their eyes adjust so that they can also see clearly underwater. Humans, on the other hand, have blurry vision underwater. Since humans cannot see clearly underwater, most humans are above the water when they hunt for fish.

Humans have used a method of fishing called spearfishing to catch fish for thousands of years. People who spearfish stand in or near a body of water and throw a sharpened stick into the water to spear the fish. Spearfishing is difficult because humans cannot see the actual position of a fish through the surface of the water.

Figure 1 shows how human eyes see into the water. Figure 2 shows how penguins see when they are in the water.

Figure 1: Human's View of Fish in Water

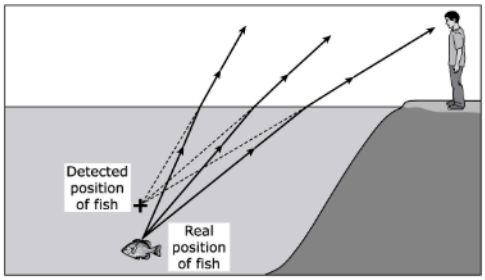
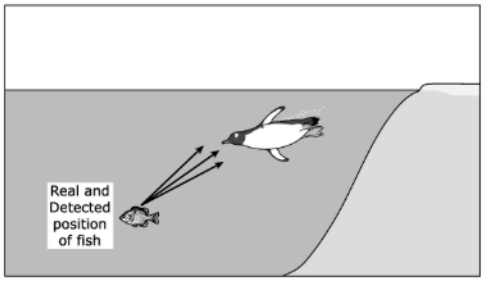


Figure 2: Penguin's View of Fish in Water



According to Figure 1, where should someone spearfishing aim to spear a fish underwater?

A. to the side of where the fish appears to be

B. in front of where the fish appears to be

C. below where the fish appears to be

D. above where the fish appears to be

Diving Birds – Part 2

Figure 3 shows the typical structure of a human eye, a penguin eye, and a fish eye. Data Table 1 lists characteristics of typical human, penguin, and fish eyes. The structures for individuals may vary.

Figure 3: Comparison of Typical Eye Structures

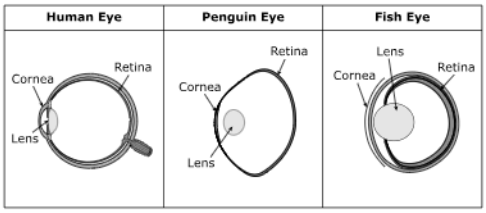
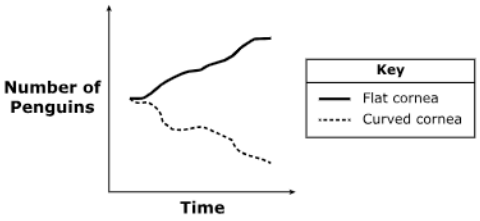


Table 1: Comparison of Typical Eye Structures

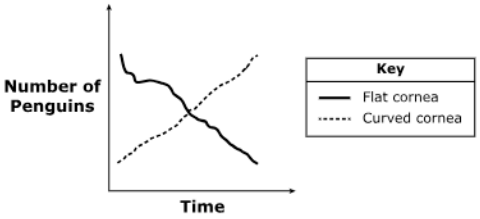
Human	Penguin	Fish
Curved cornea	Flat cornea	Flat cornea
Oval-shaped lens	Spherical lens that can flatten	Spherical lens

A penguin's diet is mainly fish. If a new species of flying fish outcompeted penguins' usual prey, penguins would have to begin hunting fish without diving. Which graph represents the **most likely** change to the affected population of penguins?

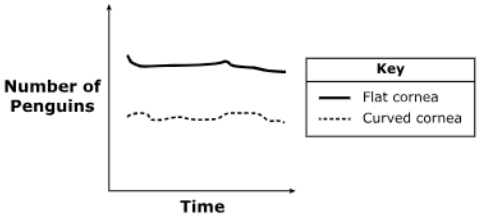
A. **Number of Penguins vs. Time**



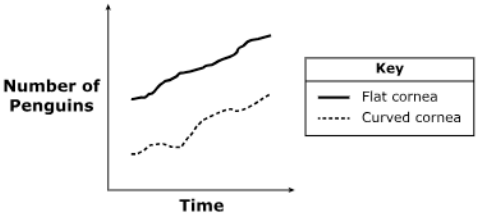
B. **Number of Penguins vs. Time**



C. **Number of Penguins vs. Time**



D. **Number of Penguins vs. Time**



A community of flying, diving birds would be more likely to reproduce over time if their eye structure were

A. a flat cornea and a spherical lens.

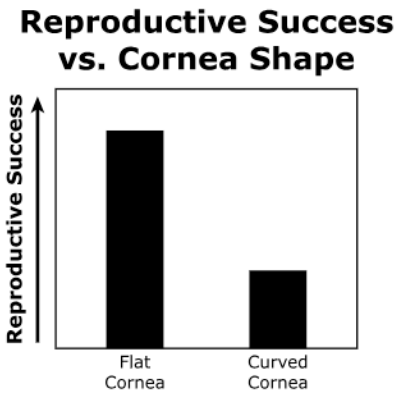
B. a flat cornea and an oval-shaped lens.

C. a curved cornea and a spherical lens.

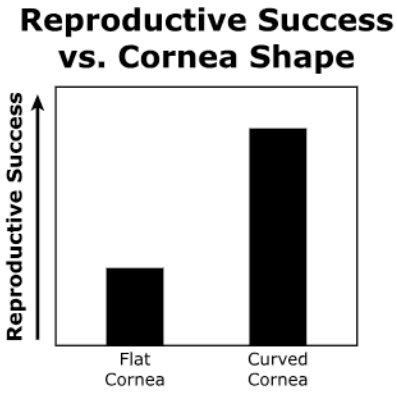
D. a curved cornea and an oval-shaped lens.

Given a diet of mainly fish, which graph **most likely** illustrates the reproductive success of penguins with different cornea shapes?

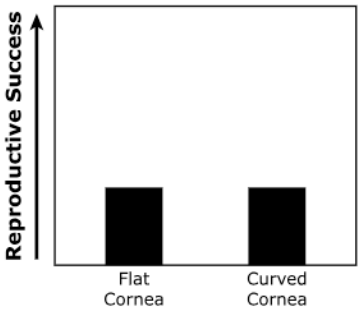
A.



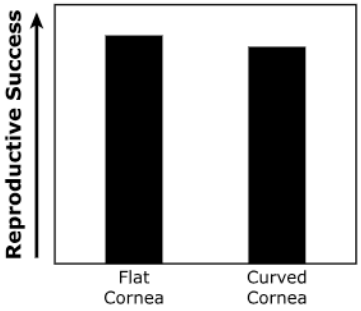
B.



C. **Reproductive Success vs. Cornea Shape**



D. **Reproductive Success vs. Cornea Shape**



Which statement explains how natural selection impacts the changes of penguin eyes over time?

A. Searching for fish in water caused a flattened penguin eye.

B. Penguins with flattened eyes obtained more food than penguins with rounder eyes.

C. Female penguins prefer males with flattened eyes more than they prefer males with round eyes.

D. Competition with other predators caused penguins to develop flattened eyes.