

Reading Practice Test 1

READING PASSAGE 1

*You should spend about 20 minutes on **Questions 1-13**, which are based on Reading Passage 1 below.*



William Gilbert and Magnetism

A

The 16th and 17th centuries saw two great pioneers of modern science: Galileo and Gilbert. The impact of their findings is eminent. Gilbert was the first modern scientist, also the accredited father of the science of electricity and magnetism, an Englishman of learning and a physician at the court of Elizabeth. Prior to him, all that was known of electricity and magnetism was what the ancients knew, nothing more than that the lodestone possessed magnetic properties and that amber and jet, when rubbed, would attract bits of paper or other substances of small specific gravity. However, he is less well known than he deserves.

B

Gilbert's birth pre-dated Galileo. Born in an eminent local family in Colchester County in the UK, on May 24, 1544, he went to grammar school, and then studied medicine at St John's College, Cambridge, graduating in 1573. Later he travelled in the continent and eventually settled down in London.

C

He was a very successful and eminent doctor. All this culminated in his election to the president of the Royal Science Society. He was also appointed personal physician to the Queen (Elizabeth I), and later knighted by the Queen. He faithfully served her until her death. However, he didn't outlive the Queen for long and died on November 30, 1603, only a few months after his appointment as personal physician to King James.

D

Gilbert was first interested in chemistry but later changed his focus due to the large portion of mysticism of alchemy involved (such as the transmutation of metal). He gradually developed his interest in physics after the great minds of the ancient, particularly about the knowledge the ancient Greeks had about lodestones, strange minerals with the power to attract iron. In the meantime, Britain became a major seafaring nation in 1588 when the Spanish Armada was defeated, opening the way to British settlement of America. British ships depended on the magnetic compass, yet no one understood why it worked. Did the Pole Star attract it, as Columbus once speculated; or was there a magnetic mountain at the pole, as described in Odyssey, which ships would never approach, because the sailors thought its pull would yank out all their iron nails and fittings? For nearly 20 years, William Gilbert conducted ingenious experiments to understand magnetism. His works include *On the Magnet*, *Magnetic Bodies*, and *the Great Magnet of the Earth*.

E

Gilbert's discovery was so important to modern physics. He investigated the nature of magnetism and electricity. He even coined the word "electric". Though the early beliefs of magnetism were also largely entangled with superstitions such as that rubbing garlic on lodestone can neutralise its magnetism, one example being that sailors even believed the smell of garlic would even interfere with the action of compass, which is why helmsmen were forbidden to eat it near a ship's compass. Gilbert also found that metals can be magnetised by rubbing materials such as fur, plastic or the like on them. He named the ends of a magnet "north pole" and "south pole". The magnetic poles can attract or repel, depending on polarity. In addition, however, ordinary iron is always attracted to a magnet. Though he started to study the relationship between magnetism and electricity, sadly he didn't complete it. His research of static electricity using amber and jet only demonstrated that objects with electrical charges can work like magnets attracting small pieces of paper and stuff. It is a French guy named du Fay that discovered that there are

actually two electrical charges, positive and negative.

F

He also questioned the traditional astronomical beliefs. Though a Copernican, he didn't express in his quintessential beliefs whether the earth is at the centre of the universe or in orbit around the sun. However, he believed that stars are not equidistant from the earth but have their own earth-like planets orbiting around them. The earth itself is like a giant magnet, which is also why compasses always point north. They spin on an axis that is aligned with the earth's polarity. He even likened the polarity of the magnet to the polarity of the earth and built an entire magnetic philosophy on this analogy. In his explanation, magnetism is the soul of the earth. Thus a perfectly spherical lodestone, when aligned with the earth's poles, would wobble all by itself in 24 hours. Further, he also believed that the sun and other stars wobble just like the earth does around a crystal core, and speculated that the moon might also be a magnet caused to orbit by its magnetic attraction to the earth. This was perhaps the first proposal that a force might cause a heavenly orbit.

G

His research method was revolutionary in that he used experiments rather than pure logic and reasoning like the ancient Greek philosophers did. It was a new attitude towards scientific investigation. Until then, scientific experiments were not in fashion. It was because of this scientific attitude, together with his contribution to our knowledge of magnetism, that a unit of magneto motive force, also known as magnetic potential, was named Gilbert in his honour. His approach of careful observation and experimentation rather than the authoritative opinion or deductive philosophy of others had laid the very foundation for modern science.

Questions 1-7

*Reading Passage 1 has seven paragraphs **A-G**.*

Choose the correct heading for each paragraph from the list of headings below.

*Write the correct number **i-x** in boxes **1-7** on your answer sheet.*

List of headings	
i	Early years of Gilbert
ii	What was new about his scientific research method
iii	The development of chemistry
iv	Questioning traditional astronomy
v	Pioneers of the early science
vi	Professional and social recognition
vii	Becoming the president of the Royal Science Society
viii	The great works of Gilbert
ix	His discovery about magnetism
x	His change of focus

- 1 Paragraph A
- 2 Paragraph B
- 3 Paragraph C
- 4 Paragraph D
- 5 Paragraph E
- 6 Paragraph F
- 7 Paragraph G

Questions 8-10

Do the following statements agree with the information given in Reading Passage 1?

*In boxes **8-10** on your answer sheet, write*

TRUE	if the statement is true
FALSE	if the statement is false
NOT GIVEN	if the information is not given in the passage

- 8 He is less famous than he should be.
- 9 He was famous as a doctor before he was employed

by the Queen.

10

He lost faith in the medical theories of his time.

Questions 11-13

Choose **THREE** letters **A-F**.

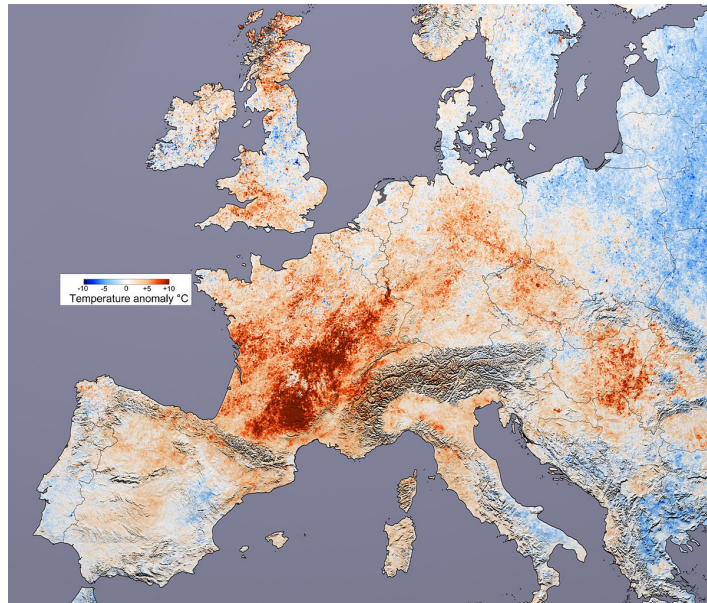
Write your answers in boxes **11-13** on your answer sheet.

Which **THREE** of the following are parts of Gilbert's discovery?

- A** ☐ Metal can be transformed into another.
- B** ☐ Garlic can remove magnetism,
- C** ☐ Metals can be magnetised.
- D** ☐ Stars are at different distances from the earth.
- E** ☐ The earth wobbles on its axis.
- F** ☐ There are two charges of electricity.

READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14-26**, which are based on Reading Passage 2 below.*



The 2003 Heatwave

It was the summer, scientists now realise, when global warming at last made itself unmistakably felt. We knew that summer 2003 was remarkable: Britain experienced its record high temperature and continental Europe saw forest fires raging out of control, great rivers drying to a trickle and thousands of heat-related deaths. But just how remarkable is only now becoming clear.

The three months of June, July and August were the warmest ever recorded in western and central Europe, with record national highs in Portugal, Germany and Switzerland as well as in Britain. And they were the warmest by a very long way. Over a great rectangular block of the earth stretching from west of Paris to northern Italy, taking in Switzerland and southern Germany, the average temperature for the summer months was 3.78°C above the long-term norm, said the Climatic Research Unit (CRU) of the University of East Anglia in Norwich, which is one of the world's leading institutions for the monitoring and analysis of temperature records.

That excess might not seem a lot until you are aware of the context - but then you realise it is enormous. There is nothing like this in previous data, anywhere. It is considered so exceptional that Professor Phil Jones, the CRU's director, is prepared to say openly - in a way few scientists have done before - that the 2003 extreme may be directly attributed, not to natural climate

variability, but to global warming caused by human actions.

Meteorologists have hitherto contented themselves with the formula that recent high temperatures are “consistent with predictions” of climate change. For the great block of the map - that stretching between 35-50N and 0-20E - the CRU has reliable temperature records dating back to 1781. Using as a baseline the average summer temperature recorded between 1961 and 1990, departures from the temperature norm, or “anomalies”, over the area as a whole can easily be plotted. As the graph shows, such is the variability of our climate that over the past 200 years, there have been at least half a dozen anomalies, in terms of excess temperature - the peaks on the graph denoting very hot years - approaching, or even exceeding, 2°C. But there has been nothing remotely like 2003, when the anomaly is nearly four degrees.

“This is quite remarkable,’ Professor Jones told *The Independent*. “It’s very unusual in a statistical sense. If this series had a normal statistical distribution, you wouldn’t get this number. The return period [how often it could be expected to recur] would be something like one in a thousand years. If we look at an excess above the average of nearly four degrees, then perhaps nearly three degrees of that is natural variability, because we’ve seen that in past summers. But the final degree of it is likely to be due to global warming, caused by human actions.”

The summer of 2003 has, in a sense, been one that climate scientists have long been expecting. Until now, the warming has been manifesting itself mainly in winters that have been less cold than in summers that have been much hotter. Last week, the United Nations predicted that winters were warming so quickly that winter sports would die out in Europe’s lower-level ski resorts. But sooner or later, the unprecedented hot summer was bound to come, and this year it did.

One of the most dramatic features of the summer was the hot nights, especially in the first half of August. In Paris, the temperature never dropped below 23°C (73.4°F) at all between 7 and 14 August, and the city recorded its warmest-ever night on 11-12 August, when the mercury did not drop below 25.5°C (77.9°F). Germany recorded its warmest-ever night at Weinbiet in the Rhine Valley with a lowest figure of 27.6°C (80.6°F) on 13 August, and similar record-breaking nighttime temperatures were recorded in Switzerland and Italy.

The 15,000 excess deaths in France during August, compared with previous years, have been related to the high night-time temperatures. The number gradually increased during the first 12 days of the month, peaking at about 2,000 per day on the night of 12-13 August, then fell off dramatically after 14 August when the minimum temperatures fell by about 5°C. The elderly were most affected, with a 70 per cent increase in mortality rate in those aged 75-94.

For Britain, the year as a whole is likely to be the warmest ever recorded, but despite the high temperature record on 10 August, the summer itself - defined as the June, July and August period - still comes behind 1976 and 1995, when there were longer periods of intense heat. "At the moment, the year is on course to be the third hottest ever in the global temperature record, which goes back to 1856, behind 1998 and 2002, but when all the records for October, November and December are collated, it might move into second place," Professor Jones said. The ten hottest years in the record have all now occurred since 1990. Professor Jones is in no doubt about the astonishing nature of European summer of 2003. "The temperatures recorded were out of all proportion to the previous record," he said.

"It was the warmest summer in the past 500 years and probably way beyond that. It was enormously exceptional."

His colleagues at the University of East Anglia's Tyndall Centre for Climate Change Research are now planning a special study of it. "It was a summer that has not been experienced before, either in terms of the temperature extremes that were reached, or the range and diversity of the impacts of the extreme heat," said the centre's executive director, Professor Mike Hulme.

"It will certainly have left its mark on a number of countries, as to how they think and plan for climate change in the future, much as the 2000 floods have revolutionised the way the Government is thinking about flooding in the UK. The 2003 heatwave will have similar repercussions across Europe."

Questions 14-19

*Do the following statements agree with the information given in Reading Passage 2? In boxes **14-19** on your answer sheet write*

YES	if the statement agrees with the views of the writer
NO	if the statement contradicts the views of the writer
NOT GIVEN	if it is impossible to say what the writer thinks about this

14 The average summer temperature in 2003 is almost 4 degrees higher than the average temperature of the past.

15 Global warming is caused by human activities.

16 Jones believes the temperature variation is within the normal range.

17 The temperature is measured twice a day in major cities.

18 There were milder winters rather than hotter summers.

19 Governments are building new high-altitude ski resorts.

Questions 20-21

Answer the questions below using **NO MORE THAN TWO WORDS AND/OR NUMBERS** from the passage for each answer.

Write your answers in boxes **20-21** on your answer sheet.

What are the other two hottest years in Britain besides 2003?

20

What has also influenced government policies like the hot summer in 2003?

21

Questions 22-25

Complete the summary below using **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes **22-25** on your answer sheet.

The other two hottest years around the globe were 22

The ten hottest years on record all come after the year 23

This temperature data has been gathered since 24

Thousands of people died in the country of 25

Question 26

*Choose the correct letter **A**, **B**, **C** or **D**.*

*Write your answer in box **26** on your answer sheet.*

26 Which one of the following can be best used as the title of this passage?

- A** ☐ Global Warming
- B** ☐ What Caused Global Warming
- C** ☐ The Effects of Global Warming
- D** ☐ That Hot Year in Europe

READING PASSAGE 3

You should spend about 20 minutes on **Questions 27-40**, which are based on Reading Passage 3 below.



Amateur Naturalists

From the results of an annual Alaskan betting contest to sightings of migratory birds, ecologists are using a wealth of unusual data to predict the impact of climate change.

A Tim Sparks slides a small leather-bound notebook out of an envelope. The book's yellowing pages contain bee-keeping notes made between 1941 and 1969 by the late Walter Coates of Kilworth, Leicestershire. He adds it to his growing pile of local journals, birdwatchers' lists and gardening diaries. "We're uncovering about one major new record each month," he says, "I still get surprised." Around two centuries before Coates, Robert Marsham, a landowner from Norfolk in the east of England, began recording the life cycles of plants and animals on his estate - when the first wood anemones flowered, the dates on which the oaks burst into leaf and the rooks began nesting. Successive Marshams continued compiling these notes for 211 years.

B Today, such records are being put to uses that their authors could not possibly have expected. These data sets, and others like them, are proving invaluable to ecologists interested in the timing of biological events, or phenology. By combining the records with climate data, researchers can reveal how, for example, changes in temperature affect the arrival of spring, allowing ecologists to make improved predictions about the impact of climate change. A small band of researchers is combing through hundreds of years of records

taken by thousands of amateur naturalists. And more systematic projects have also started up, producing an overwhelming response. "The amount of interest is almost frightening," says Sparks, a climate researcher at the Centre for Ecology and Hydrology in Monks Wood, Cambridgeshire.

C Sparks first became aware of the army of "closet phenologists", as he describes them, when a retiring colleague gave him the Marsham records. He now spends much of his time following leads from one historical data set to another. As news of his quest spreads, people tip him off to other historical records, and more amateur phenologists come out of their closets. The British devotion to recording and collecting makes his job easier - one man from Kent sent him 30 years' worth of kitchen calendars, on which he had noted the date that his neighbour's magnolia tree flowered.

D Other researchers have unearthed data from equally odd sources. Rafe Sagarin, an ecologist at Stanford University in California, recently studied records of a betting contest in which participants attempt to guess the exact time at which a specially erected wooden tripod will fall through the surface of a thawing river. The competition has taken place annually on the Tenana River in Alaska since 1917, and analysis of the results showed that the thaw now arrives five days earlier than it did when the contest began.

E Overall, such records have helped to show that, compared with 20 years ago, a raft of natural events now occur earlier across much of the northern hemisphere, from the opening of leaves to the return of birds from migration and the emergence of butterflies from hibernation. The data can also hint at how nature will change in the future. Together with models of climate change, amateurs' records could help guide conservation. Terry Root, an ecologist at the University of Michigan in Ann Arbor, has collected birdwatchers' counts of wildfowl taken between 1955 and 1996 on seasonal ponds in the American Midwest and combined them with climate data and models of future warming. Her analysis shows that the increased droughts that the models predict could halve the breeding populations at the ponds. "The number of waterfowl in North America will most probably drop significantly with global warming," she says.

F But not all professionals are happy to use amateur data. "A lot of scientists won't touch them, they say they're too full of problems," says Root. Because different observers can have different ideas of what constitutes, for example, an open snowdrop. "The biggest concern with ad hoc observations is how carefully and systematically they were taken," says Mark Schwartz of the University of Wisconsin, Milwaukee, who studies the interactions between plants and climate. "We need to know pretty precisely what a person's been

observing - if they just say 'I noted when the leaves came out', it might not be that useful." Measuring the onset of autumn can be particularly problematic because deciding when leaves change colour is a more subjective process than noting when they appear.

G Overall, most phenologists are positive about the contribution that amateurs can make. "They get at the raw power of science: careful observation of the natural world," says Sagarin. But the professionals also acknowledge the need for careful quality control. Root, for example, tries to gauge the quality of an amateur archive by interviewing its collector. "You always have to worry - things as trivial as vacations can affect measurement. I disregard a lot of records because they're not rigorous enough," she says. Others suggest that the right statistics can iron out some of the problems with amateur data. Together with colleagues at Wageningen University in the Netherlands, environmental scientist Arnold van Vliet is developing statistical techniques to account for the uncertainty in amateur phenological data. With the enthusiasm of amateur phenologists evident from past records, professional researchers are now trying to create standardised recording schemes for future efforts. They hope that well-designed studies will generate a volume of observations large enough to drown out the idiosyncrasies of individual recorders. The data are cheap to collect, and can provide breadth in space, time and range of species. "It's very difficult to collect data on a large geographical scale without enlisting an army of observers," says Root.

H Phenology also helps to drive home messages about climate change. "Because the public understand these records, they accept them," says Sparks. It can also illustrate potentially unpleasant consequences, he adds, such as the finding that more rat infestations are reported to local councils in warmer years. And getting people involved is great for public relations. "People are thrilled to think that the data they've been collecting as a hobby can be used for something scientific - it empowers them," says Root.

Questions 27-33

Reading Passage 3 has eight paragraphs A-H.

Which paragraph contains the following information?

Write the correct letter A-H in boxes 27-33 on your answer sheet.

27 The definition of phenology

28 How Sparks first became aware of amateur records

- 29 How people reacted to their involvement in data collection
- 30 The necessity to encourage amateur data collection
- 31 A description of using amateur records to make predictions
- 32 Records of a competition providing clues to climate change
- 33 A description of a very old record compiled by generations of amateur naturalists

Questions 34-36

Complete the sentences below with **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes **34-36** on your answer sheet.

Walter Coates's records largely contain the information of 34

Robert Marsham is famous for recording the 35 of animals and plants on his land.

According to some phenologists, global warming may cause the number of waterfowl in North America to drop significantly due to increased 36

Questions 37-40

Choose the correct letter **A**, **B**, **C** or **D**.

Write your answers in boxes **37-40** on your answer sheet.

37 Why do a lot of scientists discredit the data collected by amateurs?

- A** ☐ Scientific methods were not used in data collection.
- B** ☐ Amateur observers are not careful in recording their data.
- C** ☐ Amateur data is not reliable.
- D** ☐ Amateur data is produced by wrong candidates.

38 Mark Schwartz used the example of leaves to illustrate that

- A** ☐ amateur records can't be used.
- B** ☐ amateur records are always unsystematic.
- C** ☐ the colour change of leaves is hard to observe.
- D** ☐ valuable information is often precise.

39 How do the scientists suggest amateur data should be used?

- A** ☐ Using improved methods
- B** ☐ Being more careful in observation
- C** ☐ Using raw materials
- D** ☐ Applying statistical techniques in data collection

40 What's the implication of phenology for ordinary people?

- A** ☐ It empowers the public.
- B** ☐ It promotes public relations.
- C** ☐ It warns people of animal infestation.
- D** ☐ It raises awareness about climate change in the public.