

## A scientific discovery: learning about the Reading paper

By the end of the lesson I will be able to:

- understand the requirements of the IELTS Reading paper.
- skim texts in order to identify the topic and the organisation of ideas.
- understand verbs relating to scientific discovery.



### GET TO KNOW IELTS

**1. Answer the questions below about the IELTS Reading paper. Choose the correct answer to each question.**

1. How many sections are there in the Reading paper?
  - A. Two
  - B. Three
  - C. Five
2. How many questions are there in the Reading paper?
  - A. 30
  - B. 40
  - C. 50
3. How many marks are there for each correct answer?
  - A. One
  - B. Three
  - C. Five
4. On average, how much time should be spent on each question?
  - A. One and a half minutes
  - B. Two minutes
  - C. Two and a half minutes
5. How many marks are typically required to get a band score of 6?
  - A. 25
  - B. 30
  - C. 35

6. What is the maximum number of words you can write when answering a short answer question?
- A. One
  - B. Three
  - C. It depends on the question
7. Where in the reading passage can the answer to each question usually be found?
- A. After the previous answer
  - B. In any paragraph
  - C. In more than one paragraph
8. Which one of these sentences about writing down answers is true?
- A. Spelling and grammar are not important.
  - B. Hyphenated words, e.g. *hard-working* count as two words.
  - C. Contracted words, e.g. *it's* should not be written in answers.
9. How much time do you have to complete the Reading paper?
- A. 40 minutes
  - B. 60 minutes
  - C. 90 minutes



## USEFUL LANGUAGE FOR IELTS

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2. Underline the action in each pair of words that a scientist would do first. The first one has been done for you.

1. propose/prove

3. calculate/measure

2. publish/research

4. observe/analyse

3. Complete the text with words from activity 2, using each word only once. Add -d or -ed if necessary. Some gaps have been filled for you.

Scientists 1. proposed that there were once large areas of water on Mars, but they couldn't 2. \_\_\_\_\_ it. So they used cameras to 3. observe the planet's surface and they 4. \_\_\_\_\_ the dry rivers to see how much water they used to contain. They used the data to 5. \_\_\_\_\_ how much water there once was. Their research was 6. \_\_\_\_\_ on the internet last night and it seems there were once vast lakes there. The scientists will continue to 7. \_\_\_\_\_ the history of Mars. They want to explore other parts of Mars, where they hope to 8. \_\_\_\_\_ samples of rock and to discover more about the history of this planet.



## IELTS SKILLS

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- 4. These groups of words have been taken from a text. What do you think the text is about?**
- A. Adverbs: *closely, now, seriously*
  - B. Adjectives: *great, best, remote*
  - C. Nouns: *continents, Africa, discovery*
  - D. Pronouns: *this, who, he*
  - E. Verbs: *explore, search*
- 5. Which groups of words from activity 4 were the most helpful when you were identifying the topic?**
- 6. Look at the title, the picture and the nouns in the first paragraph of the reading passage. Then decide which of these options describe what the passage is about.**
- A. The migration of people
  - B. The discovery of a new country
  - C. The movement of continents



## TASK FOCUS

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- 7. Skim the reading passage and answer these questions.**
- 1. Which paragraph describes the process of continental drift?
  - 2. Which paragraphs are about Wegener's life?
- 8. Look at activity 9 and 10 below and answer these questions.**
- 1. Which activity refers to the process of continental drift?
  - 2. Which activity asks questions about Wegener's life?



9. Complete the task below on the reading passage.

Complete the flow-chart below.

Choose NO MORE THAN THREE WORDS from the passage for each answer.

### Continental Drift

1. \_\_\_\_\_ rises in liquid rock.



Surface of the earth is pulled in different directions.

Liquid rock rises through 2. \_\_\_\_\_ in the sea bed.



Sea bed descends where it meets 3. \_\_\_\_\_

4. \_\_\_\_\_ also makes the sea bed move downwards.



The sea bed eventually 5. \_\_\_\_\_

**10. Answer these questions on the reading passage.**

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

- |                                           |                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------|
| 1. As a young man, Wegener                | 5. Wegener's explanations for continental drift                                        |
| A. made a discovery about astronomy.      | A. were carefully calculated.                                                          |
| B. changed the focus of his studies.      | B. changed during his lifetime.                                                        |
| C. studied climate science at university. | C. were proved to be facts.                                                            |
| D. was a hard-working student.            | D. were accurate.                                                                      |
| 2. Wegener became famous for              | 6. The main reason why Wegener's concept of continental drift was not accepted was his |
| A. working in dangerous conditions.       | A. age.                                                                                |
| B. discovering a part of Greenland.       | B. nationality.                                                                        |
| C. measuring air temperatures.            | C. attitude.                                                                           |
| D. calculating the movement of glaciers.  | D. academic background.                                                                |
| 3. Wegener's theory of continental drift  | 7. Wegener failed to communicate his ideas successfully because                        |
| A. was found to be incorrect.             | A. his books were not translated into English.                                         |
| B. was believed during his lifetime.      | B. he was very shy.                                                                    |
| C. was supported with evidence.           | C. he criticised people who argued with him.                                           |
| D. was too complex to understand.         | D. he didn't speak English.                                                            |
| 4. During the First World War, Wegener    | 8. Since his death, Wegener's ideas                                                    |
| A. moved to the United States.            | A. have not been given the recognition they deserve.                                   |
| B. studied animals.                       | B. have become very well respected.                                                    |
| C. produced a book.                       | C. have still not been accepted by everyone.                                           |
| D. became famous because of his ideas.    | D. have helped people conduct polar research.                                          |

**11. All of the statements below were thought to be true in the past. Two of them were later proved to be untrue. Which ones do you think they were?**

1. Adults are 60 per cent water.
2. Head shape affects personality.
3. The universe is expanding.
4. Light is a mixture of colours.
5. All humans have the same personality at birth.
6. Lightning is a form of electricity.

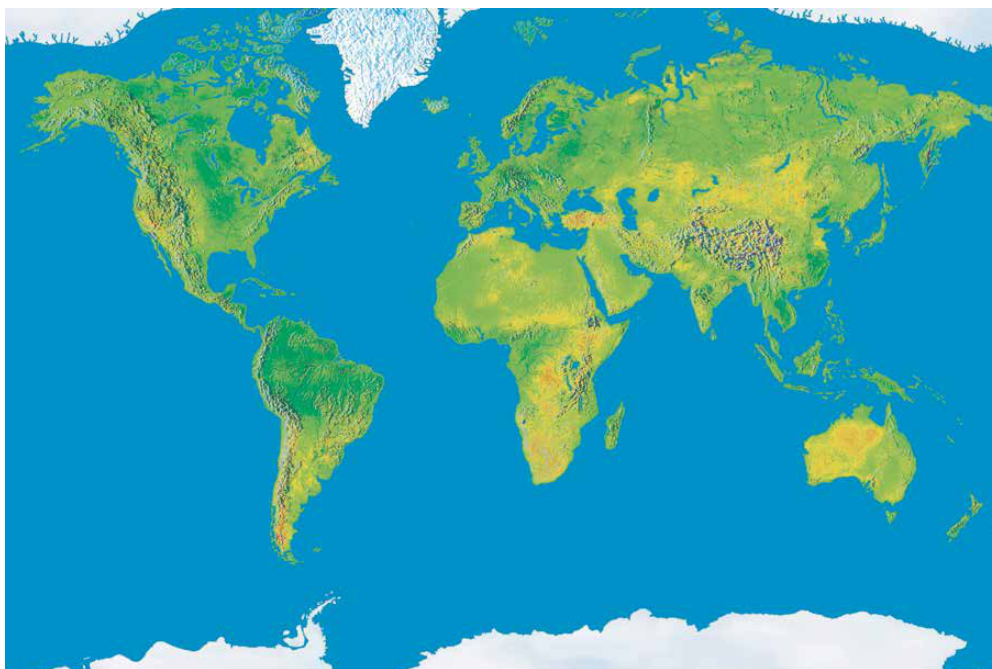
**12. Do you think that Wegener's discovery is more or less impressive than the four true statements from activity 11?**



**SELF-STUDY**

Answer the questions on Reading passage 1 of this IELTS Reading paper. <http://tinyurl.com/oylh7uz>

## The world on the move



- A. If you look at a map of the earth, you will observe that the different continents could almost fit together like a jigsaw puzzle. For example, the east coast of the Americas fits very closely to Africa and Europe. Antarctica, Australia, India and Madagascar fit next to the tip of southern Africa. In fact, we now know that the continents were once a single mass of land, Pangaea, that broke apart as the continents were pulled in different directions.
- B. We also know how this happened. Below the solid surface of the earth there are layers of liquid rock where there are currents, produced by rising heat. These 'convection currents' move in circles and pull the surface of the earth along with them. This pulling effect is more powerful below the bedrock of the ocean than below the land. Where the sea bed is pulled in different directions, cracks open up in the thin layer of basalt rock. Hot molten rock then pushes through them to create new sea floor and the bottom of the ocean spreads outwards away from the cracks. Where the ocean floor then bumps into a land mass, it is forced downwards. Gravity continues to push it further, increasing the movement. The ocean bed finally breaks up many kilometres below the earth's surface. Not surprisingly, this complex process, called continental drift, wasn't obvious to anyone 100 years ago. And the man who proposed and proved that continents were once joined together, Alfred Wegener, was not taken seriously in his lifetime.
- C. Wegener had always been interested in discovery. Born in 1880 in Berlin he graduated in astronomy but decided to explore other scientific disciplines, notably climate studies, because he worried that as an astronomer he might not be able to make the great discovery he was searching for. During his lifetime he was best known for his daring research in an unexplored region of Greenland's north-eastern coast, where he studied remote glaciers and winds high in the atmosphere.
- D. His first writings on continental drift were published in 1912 after he had analysed rock samples on either side of the Atlantic and found similarities in structures and in the types of animal fossils in both locations. Yet despite his research efforts, his ideas were not well received. Some of this was due to timing. In 1914 the First World War broke out in Europe and Wegener joined the German army. Though he was unable to continue his research at first, he was injured in 1915 and was able to return to academic life and publish his key work *The Origin of Continents and Oceans* though few people took much notice of it initially because of the war.

- E. Wegener too must take some responsibility for the failure of his ideas to become well known. Most importantly, he was unable to decide upon a single theory for how continental drift happened. He considered the correct theory briefly but then began to speculate that it was the circular movement of the earth that was pulling the continents away from the poles towards the equator. He was also very inaccurate in some of his claims, calculating that continents were moving at 125 cm per year when in fact the rate of drift was more like 2.5 cm, the speed at which a human fingernail grows.
- F. However, the prejudice of others certainly played a part. Wegener was just 32 when he published his theories, and some people thought he was too young to be taken seriously. He was also from a country that had been in a war against the United States, which dominated much of the academic establishment at the time. Perhaps most importantly, he was not a specialist in geology and it was not easy for scientists to have influence outside their areas of expertise at that time. Wegener was certainly not the only scientist who got a hostile reaction to his ideas when writing about new subjects (famously, the physicist Luis Alvarez was also sharply criticised when he proposed in 1980 that a meteorite killed the dinosaurs). Experts queued up to attack Wegener's ideas, despite the very large body of evidence that he collected during his lifetime. George Gaylord Simpson, for example, wrote angrily in 1943 that it was 'almost unique in scientific history for (an academic) without special competence in a given field thus to reject the all but unanimous verdict of those who do have such competence'.
- G. This prejudice was made worse by the fact that Wegener was not an English speaker. One important translation of his work into English in 1925 was particularly unpopular because it was not written in the cautious style that is used in English-language academic writing. It sounded too confident, even dogmatic. Some say that lack of English also made Wegener reluctant to defend himself. He was once criticised by a colleague who claimed that the shape of the coastlines would have been very different millions of years ago and therefore it was ridiculous to discuss how modern coasts fitted together. Wegener was there when this was said but didn't argue, even though it would have been easy for him to do so. After all, his theory was based on how land 200m below the ocean surface fitted together, not the coastline.
- H. Wegener died in 1930 attempting to measure the jet stream in Greenland. It wasn't until the 1960s that his ideas came to be accepted, when Harry Hesse discovered the correct mechanism of sea-floor spreading. Since then, Wegener's achievements have been celebrated properly. There are craters on both the moon and on Mars named after Wegener, as well as the asteroid 29227 Wegener. In addition, the *Alfred Wegener Institute for Polar and Marine Research*, founded in 1980, carries on the valuable work that Wegener lived and died doing.

## Nature: scanning for specific information

By the end of the lesson I will be able to:

- deal with short answer questions.
- scan for specific information.
- develop knowledge of word families.



### INTRODUCTION

#### 1. Read the text, look at the pictures and discuss the questions.

World Heritage Sites are places that are recognised and protected by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Places are chosen because they have cultural, historical, scientific or some other form of significance. Each World Heritage Site is unique in some way, either geographically, historically or culturally.



1. Machu Picchu, Peru



2. Taj Mahal, India



3. Great Barrier Reef, Australia

1. Which of these sites do you think is protected by UNESCO because ...
  - A. it is an important part of nature?
  - B. it is an important part of human culture?
  - C. it is important for both nature and culture?
2. Do you know about any other World Heritage Sites?
3. Would you prefer to visit a place that is important for culture or for nature?
4. Have you visited any places that have cultural, historical or scientific importance recently?



## IELTS SKILLS

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**2. Which of these tasks require skimming and which require scanning?**

1. Looking for a specific piece of information in a timetable, e.g. when a bus leaves.
2. Identifying the main points in a report before a meeting.
3. Finding a car that is in your price range on a website.
4. Looking for a word in a dictionary.
5. Deciding which textbook to buy in a bookshop.

**3. Look at these three examples of three different IELTS tasks. Do you need to skim, scan or use both skills to respond to them?**

1. How many sites are protected? \_\_\_\_\_
  2. The \_\_\_\_\_ was the first site on the list.
  3. Match each statement with the correct person, A, B or C.
    1. More places should be added to the list of World Heritage Sites.
    2. World Heritage status does not help to protect sites.
    3. Cultural sites help us to understand past events.
- A. John Smith  
B. Michael Johnson  
C. Katie Shepard

**4. Scan the reading passage and find what each of these things refers to.**

1. 2,600 \_\_\_\_\_
2. aye-aye \_\_\_\_\_
3. 173 \_\_\_\_\_
4. serpent eagle \_\_\_\_\_
5. 60,000 \_\_\_\_\_



## TASK FOCUS

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**5. Read the IELTS task in activity 6 and answer the questions below.**

1. Should you answer the questions using your own words?
2. How many words should you use to answer each question?
3. Do you think the questions will follow the order of the information in the passage?

6. **Underline the key words in each question. Try to think of synonyms or other ways of expressing these words. Then answer the questions.**

*Answer the questions below.*

*Choose NO MORE THAN THREE WORDS AND/OR A NUMBER from the passage for each answer.*

1. When did the area become protected?
2. What was being cut down without permission?
3. Which area is next to the sea?
4. What does the large number of different natural environments lead to?
5. Which animal finds food in a similar way to the aye-aye?
6. Which group of animals is the most threatened?
7. Where on the island are new creatures still being found?



## USEFUL LANGUAGE FOR IELTS

7. **Look at the bold words in the passage and match them to their meanings.**

- |                   |                                                        |
|-------------------|--------------------------------------------------------|
| 1. unique         | A. to find something for the first time (verb)         |
| 2. rare           | B. to be different from each other (verb)              |
| 3. vary           | C. important or very large (adjective)                 |
| 4. contribute     | D. taking something from one place to another (noun)   |
| 5. discover       | E. to give something to a person or a situation (verb) |
| 6. significant    | F. to make something possible (verb)                   |
| 7. enable         | G. the only one of its type (adjective)                |
| 8. transportation | H. very unusual (adjective)                            |

8. **Complete the table with the correct form of each word.**

| Noun           | Verb       | Adjective    | Adverb            |
|----------------|------------|--------------|-------------------|
| uniqueness     |            | unique       | 1.                |
| rarity         |            | rare         | 2.                |
| variability    | vary       | 3.           | variedly/variably |
| 4.             | contribute | contributory |                   |
| 5.             | discover   | discoverable | discoverably      |
| 6.             | signify    | significant  | 7.                |
| 8.             | enable     | enabling     |                   |
| transportation | 9.         |              |                   |

**9. Complete these sentences with the correct form of the word in brackets.**

1. Learning about \_\_\_\_\_ animals and plants may help us cure diseases. (uniqueness)
2. In order to survive we need to protect \_\_\_\_\_ plants and animals. (rarely)
3. Animals and plants \_\_\_\_\_ greatly in different parts of the world. (variably)
4. We should all make a greater \_\_\_\_\_ to the cost of protecting nature. (contribute)
5. Scientists continue to \_\_\_\_\_ new species of plants and animals. (discovery)
6. Animal numbers have not fallen \_\_\_\_\_ because of human behaviour. (significant)
7. New technology is an \_\_\_\_\_ that helps us to protect the environment. (enable)
8. The \_\_\_\_\_ of rare plants and animals should not be banned. (transport)



## IELTS PRACTICE

**10. Look at the summary completion IELTS task below. Identify whether you need a noun, verb, adjective or adverb to fill each gap. Then complete the task.**

*Complete the summary below.*

*Choose NO MORE THAN THREE WORDS AND/OR A NUMBER from the passage for each answer.*

### Human impact

One of the main human impacts came from 1. \_\_\_\_\_ when thousands of trees were removed. Most of these were cut to allow the 2. \_\_\_\_\_ of the more expensive wood. Loggers caught and ate local animals and 3. \_\_\_\_\_ fell because of this. Agriculture is also having an effect, especially in the 4. . \_\_\_\_\_ Farming cattle, goats and sheep could also be a problem as it might not allow the 5. \_\_\_\_\_ to grow back. Some loggers remained in the region and this made the 6. \_\_\_\_\_ different, which may also have affected the animal population. The effects of 7. \_\_\_\_\_ have been minimal but there is a worry that it may increase.

**11. Discuss the sentences in activity 9 and say whether you agree or disagree with them.**



## SELF-STUDY

Watch the video on the IELTS Reading paper. What other tips about skimming and scanning does the video give you?

<http://tinyurl.com/hjllgwp>

## Rainforests of the Astinanana

- A. The Madagascan rainforest contains six national parks: Marojejy, Masaola, Zahamena, Ranomafana, Andringitra and Andohahela. These parks are part of the rainforest that once covered most of the eastern side of the island. In 2007 the site was added to the World Heritage List due to the large number of animals that are **unique** to the area. Somewhere close to 100 per cent of the animals found in the rainforest can only be found here. In 2010 the site was added to a list of places considered to be in danger due mainly to the illegal logging of **rare** trees. The rainforest is vital to the preservation of the unique biodiversity on the island.
- B. One of the features that makes this rainforest unique is the diversity of its habitats. The altitude range **varies** from zero metres above sea level in the coastal and lowland park of Masaola up to over 2,600 metres. Each park has mid-level rainforests, but other areas include the lower dry montane forest at Marojejy, Andringitra and Andohahela; ericoid montane thicket above 1,800 metres on four of the island's tallest mountains; and the swamp vegetation at Ranomafana. The wide range of habitats in such a small area **contributes** to much of the species diversity that can be found on the island.
- C. One of the most famous creatures on the island is the lemur, and 25 different species live there. Perhaps the most interesting lemur species is the aye-aye. It is classified as the largest nocturnal primate in the world, but at first people were not sure whether it was a primate or not. The aye-aye has many features that are similar to rodents such as squirrels, and also has some features that are similar to cats. However, its connection to the other lemur species has been genetically proven. The aye-aye has rodent-like teeth and a special long middle finger. They use this finger to extract small creatures from inside trees which they then eat. The only other creature known to eat in this way is the Australian possum.
- D. The site is also home to a number of birds and mammals that are rare and endemic (unique to the area). There are 173 bird species within the site, and five bird families that are endemic or near-endemic. Unfortunately many species, such as the serpent eagle, are also endangered. In total 18 species of the island's birds are endangered. The situation is even worse for the mammals on the island. Of the 78 different mammals that live in the rainforest 72 are considered to be endangered. All of these mammals are only found in Madagascar.
- E. Many animals and plants are still being **discovered** on the island. Currently there are just over 300 known reptiles and amphibians, but as further research is carried out new species continue to be identified. In Ranomafana, for example, there are 31 species of amphibian awaiting scientific recognition.
- F. Although the site is difficult to access, there have been problems due to the number of people living in the area. These people rely on the rainforest for natural resources, and prior to 2010 commercial logging was a **significant** problem. The rainforest is home to some particularly valuable hardwood trees such as rosewood and ebony. More than 60,000 of these trees were cut down and a further 500,000 trees were destroyed to **enable** the **transportation** of the valuable wood. The extent of this logging had a major impact on the natural habitats and biodiversity of the island. In addition, birds and small mammals are often hunted by local people. A small amount of hunting is probably sustainable, commercial logging caused an increase in the number of people living in the area. This led to dangerously high levels of hunting, and a reduction in lemur populations. To a certain extent this problem has become less serious since the site was added to the list of 'World Heritage Sites In Danger'.
- G. Humans continue to have a negative impact on the rainforest in a number of ways. Farming is becoming an increasing problem on the edges of all six national parks. In some cases agriculture is extending into the parks themselves, especially along river valleys. One farming practice that is proving to be particularly damaging is the slash-and-burn technique, in which trees and bushes are cut down and burned to create farmland. Clearly this destroys natural woodland, but it also makes the remaining areas of natural habitat become increasingly isolated. Grazing animals in and around the national parks is also a potential issue. While the impact of grazing has not been fully assessed, it is thought that it may stop parts of the rainforest regenerating.
- H. People are causing further problems in two other ways. When commercial logging was taking place in the rainforest many people moved to the area and a number still remain. This influx of people from outside the area has changed the cultural dynamic of the parks. Local communities and their beliefs provided a certain amount of protection for the plants and animals, in particular some species of lemurs that were not hunted for food. However, the people who moved to the area do not necessarily hold these beliefs and now these animals are hunted. Tourism has yet to have a major impact on the area but its influence is likely to increase in the near future. Already hotels and resorts are being built in coastal areas without enough assessment of their potential environmental impact.

## Population change: comparing statements

By the end of the lesson I will be able to:

- decide whether statements give similar or contrasting information.
- respond to True/False/Not Given tasks.
- understand vocabulary relating to numbers.



### INTRODUCTION

**1. Which two of these statements about population do you think are true?**

1. The world's population is growing by approximately 80 million per year.
2. Few women live longer than men.
3. Fewer people live in towns than in the countryside.
4. High birth rates are usually seen in richer regions of the world.
5. In the future 75 per cent of people will live on two continents.
6. The average family in the world has nearly two children.



### IELTS SKILLS

**2. Read this text about population change and check your answers to activity 1.**

The world's population is growing by 78 million per year at the moment due to high birth rates and increasing life expectancy (currently 68 years for men and 73 years for women). Growth has been so great that about seven per cent of the humans that have existed over the last 200,000 years are alive today. In the future most new arrivals will live in the world's cities, whose populations now outnumber rural areas. Few will live in high-income countries. If current trends continue, three quarters of people will be born in Asia or Africa. However, they will be born into families that are smaller than they used to be and they are likely to only have 1.9 brothers or sisters on average.

**3. Look at the four incorrect statements in activity 1. In which sentence is the following wrong? The first answer has been given as an example.**

1. The quantifier, e.g. *some, most*      Sentence 2: Few
2. The frequency adverb, e.g. *rarely, always*
3. The quantity, e.g. *a quarter, five per cent*
4. The comparative adjective, e.g. *greater, less*

4. Rewrite the four incorrect statements in activity 1 so they are true. Only change one word in each statement. The first one has been done for you.

2. Few women live longer than men. *Most women live longer than men.*
3. Fewer people live in towns than in the countryside.
4. High birth rates are usually seen in richer regions of the world.
6. The average family in the world has nearly two children.

5. Look at the sentence below. Can you tell whether it is true or not according to the text about population change?

Nowadays more babies are born in Asia than in Africa.



## TASK FOCUS

6. Look at these three statements. Then read paragraph A of the reading passage and decide if the statements are True, False or Not Given.

1. The world's population has just reached one billion.
2. People disagree about the causes of population growth.
3. High population levels have helped technology to develop.



## IELTS PRACTICE

7. Answer the questions below on the reading passage.

Do the following statements agree with the information given in the reading passage? Write

**TRUE** *if the statement agrees with the information*

**FALSE** *if the statement contradicts the information*

**NOT GIVEN** *if there is no information on this*

1. Stone polishing technology caused the world's population to increase to five million.
2. The world's human population has always been growing.
3. Polished stone weapons were more effective for hunting.
4. It took a long time for hunting communities to start farming.
5. People living in farming communities required more food than hunters.
6. In 3000 BC the world's population was smaller than Zimbabwe's population is today.
7. Irrigation created a need for more labour.
8. New farming methods in river valleys helped cities to develop.

## 8. Answer the questions below on the reading passage.

For questions 1–6, choose TWO letters, A–E.

1–2 Which TWO things did Roman and Moorish civilisations achieve with technology?

- A. They used water to move water.
- B. They created large buildings for people to live in.
- C. They were able to feed more soldiers.
- D. They used vehicles to carry water.
- E. They took water from river valleys.

3–4 Which TWO things does the reading passage say about the mechanisation of agriculture?

- A. It made many people unemployed.
- B. It caused changes in land ownership.
- C. It led to a rapid increase in food production.
- D. It meant that more animals could be used by farmers.
- E. It helped increase the world's population to over one billion.

5–6 Which TWO things does the reading passage say about the twentieth century?

- A. There were few significant changes in farming.
- B. Many new jobs were created.
- C. New types of plants were produced.
- D. Chemical fertilisers had a negative effect on people's health.
- E. Healthcare made little difference to population size.



## USEFUL LANGUAGE FOR IELTS

### 9. Match the expressions (1–8) with the amounts (A–H).

- |                       |                         |
|-----------------------|-------------------------|
| 1. a rapid rate       | A. 15 to 150            |
| 2. a billion          | B. 4,000 years          |
| 3. a large ratio      | C. 1,000,000            |
| 4. several millennia  | D. 1,000,000,000        |
| 5. a tenfold increase | E. 100 years            |
| 6. a million          | F. 88 per cent          |
| 7. a century          | G. 700 words per minute |
| 8. a large proportion | H. 15:1                 |

### 10. Complete these sentences to create statements that are true.

- |                                               |                                                       |
|-----------------------------------------------|-------------------------------------------------------|
| 1. A large proportion of my classmates ...    | 5. In the last century ...                            |
| 2. There are more than a billion ...          | 6. The ratio of teachers to students is ...           |
| 3. There has been a threefold increase in ... | 7. For millennia people have ...                      |
| 4. In my country more than a million ...      | 8. There has been a rapid increase in the rate of ... |

11. Talk in groups about the facts that you wrote about in activity 10. Do they make you feel positive or negative?



## SELF-STUDY

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Read this article on archaeology and write six of your own True/False/Not Given questions.

<https://learnenglish.britishcouncil.org/en/magazine/archaeology>

## The technology of population growth



- A. By 1805 the world's population had reached one billion for the first time in the 200,000 year history of our species. It is now approaching eight billion. The reason why growth has accelerated so rapidly can be summed up in one word: technology. If we look back over the last 10,000 years we can see that the processes of population change and technological development have always taken place side by side, each creating the conditions for the other to occur.
- B. The first major growth in population levels was caused by a simple technological change, in the form of stone polishing. Around 10,000 years ago, the world's population stood at between four and five million people (the current population of New Zealand) where it had remained for millennia. Humans had survived by gathering fruit and hunting wild animals with weapons made from stones. But some communities had started not only to cut stone but also polish it, making tools that were smooth and sharp enough to use for agriculture. These farming communities had to work hard but did not need to search for food over large areas and were therefore able to survive on small plots of around 25 acres. They produced reliable food supplies, provided for weaker members of social groups more easily, and were also able to produce better clothing by rearing sheep and growing flax. Slowly but surely, more and more hunting communities adopted farming techniques. This transition to farming therefore made it easier for communities to survive and made labour more valuable. By around 3000 BC the world's population had tripled, reaching 14 million, the number of people that live in modern day Zimbabwe.
- C. The next great shifts in population and technology were dependent on one another. The technology in this case was irrigation – the supply of water. The most fertile areas in the world at the time were the river valleys of the Euphrates, Nile, Tigris and Indus but periods of flooding followed by drought made it difficult to exploit the fertile soils. However, in around 3500 BC farmers with sufficient labour started digging pools and constructing dams, which allowed them to channel water across a wider area and prevent it from flowing away. This change had enormous significance for population growth. Not only was it now possible to produce surplus crops that could be sold, but the management and defence of irrigation systems meant that a large amount of additional labour was required that didn't work on the land. This led to the creation of a number of urban centres and by 1000 BC, (2,500 years later) the world's population had grown to 50 million, the size of South Korea today.

- D. It was engineering that both facilitated and absorbed the next significant increase in population growth. Roman civilizations in the Mediterranean and Moorish civilizations in the Middle East developed a range of engineering structures that used the power of water to sustain population growth. The structures included aqueducts that carried water across valleys, wheel-like devices called *norias* and *sakias* that used the power of water to lift water and enable further irrigation, and water mills that ground flour and produced the large quantities of food that were needed to support growing populations and indeed armies. Within a further 2,500 years (in around 1600 AD) the world's population had grown tenfold to 545 million, just over twice the size of modern-day Indonesia.
- E. It was around this time that mechanisation of agriculture started in Europe. Until this point, farmers had used animals and fairly basic tools to prepare the land for planting. But all this was about to change. Mechanical devices like the seed drill (1700) which placed seeds at regular intervals, and plough technology that turned soil over rather than parting it, allowed land to be cultivated more efficiently. Ongoing changes in patterns of land ownership allowed these devices to be used on blocks of land rather than strips, and productivity rose dramatically. Meanwhile, threshing machines separated the grain from the rest of the plant automatically, allowing grain production to keep pace with yields. Such changes meant that, for the first time, fewer people were needed to work in the countryside. But workers were required to produce machinery and so new factory jobs soaked up the agricultural workers, while growing food supplies fed them. By 1875 the world's population had risen to the size of modern day India (1.3 billion).
- F. This trend continued into the twentieth century. On the one, sophisticated technology has enabled the development of new varieties of crops, new chemical fertilisers, and petrol-driven machines that enable vast areas of land to be farmed efficiently, producing greater food supplies. On the other hand, it has continued to provide new employment opportunities for workers in areas such as car production, communications technology, medicine, and so on. So great has been the expansion of economic opportunity that it has even accommodated the record increases in population brought on by advances in healthcare.
- G. Time and time again we have seen how technological and demographic change have together reorganised society on a large scale, creating more complex systems that increased food supply and economic opportunities at the same time. In the future, as populations begin to decline, technology may help us adapt to population change once again, by replacing humans with robots in some roles. Whether populations face upward or downward pressure on numbers, technology seems ever willing to provide support.