

TEST READING

READING PASSAGE 1

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

Ants Could Teach Ants

The ants are tiny and usually nest between rocks in the south coast of England. Transformed into research subjects at the University of Bristol, they raced along a tabletop foraging for food -and then, remarkably, returned to guide others. Time and again, followers trailed behind leaders, darting this way and that along the route, presumably to memorize land- marks. Once a follower got its bearings, it tapped the leader with its antennae, prompting the lesson to literally proceed to the next step. The ants were only looking for food but the researchers said the careful way the leaders led followers -thereby turning them into leaders in their own right -marked the *Temnothorax albipennis* ant as the very first example of a non-human animal exhibiting teaching behavior.

"Tandem running is an example of teaching, to our knowledge the first in a non-human animal, that involves bidirectional feedback between teacher and pupil," remarks Nigel Franks, professor of animal behavior and ecology, whose paper on the ant educators was published last week in the journal *Nature*.

No sooner was the paper published, of course, than another educator questioned it. Marc Hauser, a psychologist and biologist and one of the scientists who came up with the definition of teaching, said it was unclear whether the ants had learned a new skill or merely acquired new information.

Later, Franks took a further study and found that there were even races between leaders. With the guidance of leaders, ants could find food faster. But the help comes at a cost for the leader, who normally would have reached the food about four times faster if not hampered by a follower. This means the hypothesis that the leaders deliberately slowed down in order to pass the skills on to the followers seems potentially valid. His ideas were advocated by the students who carried out the video project with him.

Opposing views still arose, however. Hauser noted that mere communication of information is commonplace in the animal world. Consider a species, for example, that uses alarm calls to warn fellow members about the presence of a predator. Sounding the alarm can be costly, because the animal may draw the attention of the predator to itself. But it allows others to flee to safety. "Would you call this teaching?" wrote Hauser. "The caller incurs a cost. The naive animals gain a benefit and new knowledge that better enables them to learn about the predator's location than if the caller had not called. This happens throughout the animal kingdom, but we don't call it teaching, even though it is clearly transfer of information."

Tim Caro, a zoologist, presented two cases of animal communication. He found that cheetah mothers that take their cubs along on hunts gradually allow their cubs to do more of the hunting -going, for example, from killing a gazelle and allowing young cubs to eat to merely tripping the gazelle and letting the cubs finish it off. At one level, such behavior might be called teaching -except the mother was not really teaching the cubs to hunt but merely facilitating various stages of learning. In another instance, birds watching other birds using a stick to locate food such as insects and so on, are observed to do the same thing themselves while finding food late

Psychologists study animal behavior in part to understand the evolutionary roots of human behavior, Hauser said. The challenge in understanding whether other animals truly teach one another, he added, is that human teaching involves a "theory of mind" -teachers are aware that students don't know something. He questioned whether Franks's leader ants really knew that the follower ants were ignorant. Could they simply have been following an instinctive rule to proceed when the followers tapped them on the legs or abdomen? And did leaders that led the way to food -only to find that it had been removed by the experimenter -incur the wrath of followers? That, Hauser said, would suggest that the follower ant actually knew the leader was more knowledgeable and not merely following an instinctive routine itself.

The controversy went on, and for a good reason. The occurrence of teaching in ants, if proven to be true, indicates that teaching can evolve in animals with tiny brains. It is probably the value of information in social animals that determines when teaching will evolve rather than the constraints of brain size.

Bennett Galef Jr., a psychologist who studies animal behavior and social learning at McMaster University in Canada, maintained that ants were unlikely to have a "theory of mind" -meaning that leader and followers may well have been following instinctive routines that were not based on an understanding of what was happening in another ant's brain. He warned that scientists may be barking up the wrong tree when they look not only for examples of human like behavior among other animals but human like thinking that underlies such behavior. Animals may behave in ways similar to humans without a similar cognitive system, he said, so the behavior is not necessarily a good guide into how humans came to think the way they do.

SECTION 1: QUESTION 1-13

Questions 1-5

Look at the following statements (Questions 1-5) and the list of people in the box below.

Match each statement with the correct person, **A, B, C** or **D**.

Write the correct letter, **A, B, C** or **D**, in boxes 1-5 on your answer sheet.

NB You may use any letter **more than once**.

1 Animals could use objects to locate food.

2 Ants show two-way, interactive teaching behaviors.

3 It is risky to say ants can teach other ants like human beings do.

4 Ant leadership makes finding food faster.

5 Communication between ants is not entirely teaching.

A Nigel Franks

B Marc Hauser

C Tim Caro

D Bennett Galef Jr.

Questions 6-9

Choose **FOUR** letters, **A-H**

Write your answers in boxes 6-9 on your answer sheet.

Which **FOUR** of the following behaviors of animals are mentioned in the passage?

- **A** ☐ touch each other with antenna
- **B** ☐ alert others when there is danger
- **C** ☐ escape from predators
- **D** ☐ protect the young
- **E** ☐ hunt food for the young
- **F** ☐ fight with each other
- **G** ☐ use tools like twigs
- **H** ☐ feed on a variety of foods

Questions 10-13

Do the following statements agree with the claims of the writer in Reading Passage 1?

In boxes 10-13 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

10 Ants' tandem running involves only one-way communication.

11 Franks's theory got many supporters immediately after publicity.

12 Ants' teaching behavior is the same as that of human.

13 Cheetah share hunting gains to younger ones

READING PASSAGE 2

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

The Development of Plastics

When rubber was first commercially produced in Europe during the nineteenth century, it rapidly became a very important commodity, particularly in the fields of transportation and electricity. However, during the twentieth century a number of new synthetic materials, called plastics, superseded natural rubber in all but a few applications.

Rubber is a polymer—a compound containing large molecules that are formed by the bonding of many smaller, simpler units, repeated over and over again. The same bonding principle—polymerization—underlies the creation of a huge range of plastics by the chemical industry.

The first plastic was developed as a result of a competition in the USA. In the 1860s, \$10,000 was offered to anybody who could replace ivory—supplies of which were declining—with something equally good as a material for making billiard balls. The prize was won by John Wesley Hyatt with a material called celluloid. Celluloid was made by dissolving cellulose, a carbohydrate derived from plants, in a solution of camphor dissolved in ethanol. This new material rapidly found uses in the manufacture of products such as knife handles, detachable collars and cuffs, spectacle frames and photographic film. Without celluloid, the film industry could never have got off the ground at the end of the 19th century.

Celluloid can be repeatedly softened and reshaped by heat, and is known as a thermoplastic. In 1907, Leo Baekeland, a Belgian chemist working in the USA, invented a different kind of plastic, by causing phenol and formaldehyde to react together. Baekeland called the material Bakelite, and it was the first of the thermosets—plastics that can be cast and moulded while hot, but cannot be softened by heat and reshaped once they have set. Bakelite was a good insulator, and

was resistant to water, acids and moderate heat. With these properties it was soon being used in the manufacture of switches, household items such as knife handles, and electrical components for cars.

Soon chemists began looking for other small molecules that could be strung together to make polymers. In the 1930s British chemists discovered that the gas ethylene would polymerize under heat and pressure to form a thermoplastic they called polythene. Polypropylene followed in the 1950s. Both were used to make bottles, pipes and plastic bags. A small change in the starting material—replacing a hydrogen atom in ethylene with a chlorine atom—produced PVC (polyvinyl chloride), a hard, fireproof plastic suitable for drains and gutters. And by adding certain chemicals, a soft form of PVC could be produced, suitable as a substitute for rubber in items such as waterproof clothing. A closely related plastic was Teflon, or PTFE (polytetrafluoroethylene). This had a very low coefficient of friction, making it ideal for bearings, rollers, and non-stick frying pans. Polystyrene, developed during the 1930s in Germany, was a clear, glass-like material, used in food containers, domestic appliances and toys. Expanded polystyrene—a white, rigid foam—was widely used in packaging and insulation. Polyurethanes, also developed in Germany, found uses as adhesives, coatings, and—in the form of rigid foams—as insulation materials. They are all produced from chemicals derived from crude oil, which contains exactly the same elements—carbon and hydrogen—as many plastics.

The first of the man-made fibres, nylon, was also created in the 1930s. Its inventor was a chemist called Wallace Carothers, who worked for the Du Pont company in the USA. He found that under the right conditions, two chemicals—hexamethylenediamine and adipic acid—would form a polymer that could be pumped out through holes and then stretched to form long glossy threads that could be woven like silk. Its first use was to make parachutes for the US armed forces in World War H. In the post-war years nylon completely replaced silk in the manufacture of stockings. Subsequently many other synthetic fibres joined nylon, including Orion, Acrilan and Terylene. Today most garments are made of a blend of natural fibres, such as cotton and wool, and man-made fibres that make fabrics easier to look after.

The great strength of plastic is its indestructibility. However, this quality is also something of a drawback: beaches all over the world, even on the remotest islands, are littered with plastic bottles that nothing can destroy. Nor is it very easy to recycle plastics, as different types of plastic are often used in the same items and call for different treatments. Plastics can be made biodegradable by incorporating into their structure a material such as starch, which is attacked by bacteria and causes the plastic to fall apart. Other materials can be incorporated that gradually decay in sunlight—although bottles made of such materials have to be stored in the dark, to ensure that they do not disintegrate before they have been used.

SECTION 2: QUESTIONS 14-26

Questions 14-20

Complete the table below

Choose **NO MORE THAN THREE WORDS** from the passages for each answer

Write your answer in boxes **14-20** on your answer sheet.

| Name of plastic | Date of invention | Original region | Property | Common use |
|-------------------------|-------------------|-------------------------|--|--|
| Celluloid | 1860s | US | | 14 <input type="text"/> |
| 15 <input type="text"/> | 1907 | US | Can be cast and moulded but cannot be softened by heat | 16 <input type="text"/> household items and car parts |
| Polythene | 1930 | 17 <input type="text"/> | | Bottles |
| Rigid PVC | | | 18 <input type="text"/> | |
| Polystyrene | 1930s | Germany | 19 <input type="text"/> | Food container |
| Polyurethanes | | Germany | 20 <input type="text"/> foams | Adhesives, coatings and insulation |

Questions 21-26

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

In boxes **21-26** 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

21 The chemical structure of plastic is very different from that of rubber.

22 John Wesley was a famous chemist.

23 Celluloid and Bakelite react to heat in the same way.

24 The mix of different varieties of plastic can make the recycling more difficult.

25 Adding starch into plastic can make plastic more durable.

26 Some plastic containers have to be preserved in special conditions.

READING PASSAGE 3

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

Global Warming in New Zealand

For many environmentalists, the world seems to be getting warmer. As the nearest country of South Polar Region, New Zealand has maintained an upward trend in its average temperature in the past few years. However, the temperature in New Zealand will go up 4°C in the next century while the polar region will go up more than 6°C. The different pictures of temperature stem from its surrounding ocean which acts like the air conditioner. Thus New Zealand is comparatively fortunate.

Scientifically speaking, this temperature phenomenon in New Zealand originated from what researchers call "SAM" (Southern Annular Mode), which refers to the wind belt that circles the Southern Oceans including New Zealand and Antarctica. Yet recent work has revealed that changes in SAM in New Zealand have resulted in a weakening of moisture during the summer, and more rainfall in other seasons. A bigger problem may turn out to be heavier droughts for agricultural activities because of more water loss from soil, resulting in poorer harvest before winter when the rainfall arrive too late to rescue.

Among all the calamities posed by drought, moisture deficit ranks the first. Moisture deficit is the gap between the water plants need during the growing season and the water the earth can offer. Measures of moisture deficit were at their highest since the 1970s in New Zealand. Meanwhile, ecological analyses clearly show moisture deficit is imposed at different growth stage of crops. If moisture deficit occurs around a crucial growth stage, it will cause about 22% reduction in grain yield as opposed to moisture deficit at vegetative phase.

Global warming is not only affecting agriculture production. When scientists say the country's snow pack and glaciers are melting at an alarming rate due to global warming, the climate is putting another strain on the local places. For example, when the development of global warming is accompanied by the falling snow line, the local skiing industry comes into a crisis. The snow line may move up as the temperature goes up, and then the snow at the bottom will melt earlier. Fortunately, it is going to be favorable for the local skiing industry to tide over tough periods since the quantities of snowfall in some areas are more likely to increase.

What is the reaction of glacier region? The climate change can be reflected in the glacier region in southern New Zealand or land covered by ice and snow. The reaction of a glacier to a climatic change involves a complex chain of processes. Over time periods of years to several decades, cumulative changes in mass balance cause volume and thickness changes, which will affect the flow of ice via altered internal deformation and basal sliding. This dynamic reaction finally leads to glacier length changes, the advance or retreat of glacier tongues. Undoubtedly, glacier mass balance is a more direct signal of annual atmospheric conditions.

The latest research result of National Institute of Water and Atmospheric (NIWA) Research shows that glaciers line keeps moving up because of the impacts of global warming. Further losses of ice can be reflected in Mt. Cook Region. By 1996, a 14 km long sector of the glacier had melted down forming a melt lake (Hooker Lake) with a volume. Melting of the glacier front at a rate of 40 m/yr will cause the glacier to retreat at a rather uniform rate. Therefore, the lake will continue to grow until it reaches the glacier bed.

A direct result of the melting glaciers is the change of high tides the serves the main factor for sea level rise. The trend of sea level rise will bring a threat to the groundwater system for its hyper-saline groundwater and then pose a possibility to

decrease the agricultural production. Many experts believe that the best way to counter this trend is to give a longer-term view of sea level change in New Zealand. Indeed, the coastal boundaries need to be upgraded and redefined.

There is no doubt that global warming has affected New Zealand in many aspects. The emphasis on the global warming should be based on the joints efforts of local people and experts who conquer the tough period. For instance, farmers are taking a long term, multi-generational approach to adjust the breeds and species according to the temperature.

Agriculturists also find ways to tackle the problems that may bring to the soil. In broad terms, going forward, the systemic resilience that's been going on a long time in the ecosystem will continue.

How about animals' reaction? Experts have surprisingly realized that animals have unconventional adaptation to global warming. A study has looked at sea turtles on a few northern beaches in New Zealand and it is very interesting to find that sea turtles can become male or female according to the temperature. Further researches will try to find out how rising temperatures would affect the ratio of sex reversal in their growth. Clearly, the temperature of the nest plays a vital role in the sexes of the baby turtles.

Tackling the problems of global warming is never easy in New Zealand, because records show the slow process of global warming may have a different impact on various regions. For New Zealand, the emission of carbon dioxide only accounts for 0.5% of the world's total, which has met the governmental standard.

However, New Zealand's effort counts only a tip of the iceberg. So far, global warming has been a world issue that still hangs in an ambiguous future

SECTION 3: QUESTIONS 27-40

Questions 27-32

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

Write the correct letter in boxes 27-32 on your answer sheet.

27 What is the main idea of the first paragraph?

- A The temperature in the polar region will increase less than that in New Zealand in the next century.
- B The weather and climate of New Zealand is very important to its people because of its close location to the polar region.
- C The air condition in New Zealand will maintain a high quality because of the ocean.
- D The temperature of New Zealand will increase less than that of other region in the next 100 years because it is surrounded by sea

28 What is one effect of the wind belt that circles the Southern Oceans?

- A New Zealand will have more moisture in winds in summer.
- B New Zealand needs to face droughts more often in hotter months in a year.
- C Soil water will increase as a result of weakening moisture in the winds
- D Agricultural production will be reduced as a result of more rainfall in other seasons

29 What does "moisture deficit" mean to the grain and crops?

- A The growing condition will be very tough for crops.
- B The growing season of some plants can hardly be determined.

- C There will be a huge gap between the water plants needed and the water the earth can offer.

- D The soil of the grain and crops in New Zealand reached its lowest production since 1970s.

30 What changes will happen to skiing industry due to the global warming phenomenon?

- A The skiing station may lower the altitude of skiing
- B Part of the skiing station needs to move to the north.
- C The snowfall may increase in part of skiing station.
- D The local skiing station may likely to make a profit because of the snowfall increase.

31 Cumulative changes over a long period of time in mass balance will lead to

- A Alterations is the volume and thickness of glaciers.
- B Faster changes in internal deformation and basal sliding.
- C Larger length of glaciers.
- D Retreat of glacier tongues as a result of change in annual atmospheric conditions.

32 Why does the writer mention NIWA in the sixth paragraph?

- A To use a particular example to explain the effects brought by glacier melting.
- B To emphasize the severance of the further loss of ice in Mt. Cook Region.
- C To alarm the reader of melting speed of glaciers at a uniform rate.
- D To note the lake in the region will be disappear when it reach the glacier bed.

Questions 33-35

Complete the summary below.

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

Write your answer in boxes **33-35** on your answer sheet.

Research data shows that sea level has a closely relation with the change of climate. The major reason for the increase in sea level is connected with **33** . The increase in sea level is also said to have a threat to the underground water system, the destruction of which caused by rise of sea level will lead to a high probability of reduction in **34** . In the long run, New Zealand may have to improve the **35** if they want to diminish the effect change in sea levels.

Questions 36-40

Do the following statements agree with the claims of the writer in Reading Passage 3?

In boxes **36-40** 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

- 36** Farmers are less responsive to climate change than agriculturists.
- 37** Agricultural sector is too conservative and resistant to deal with climate change.
- 38** Turtle is vulnerable to climate change.
- 39** The global warming is going slowly, and it may have different effects on different areas in New Zealand.
- 40** New Zealand must cut carbon dioxide emission if they want to solve the problem of global warming.

TEST Answer Keys:

- 1 C
- 2 A
- 3 D
- 4 A
- 5 B
- 6-9 A,B,E,G
- 10 NO
- 11 NOT GIVEN
- 12 NOT GIVEN
- 13 YES
- 14 photographic film
- 15 Bakelite
- 16 switches
- 17 Britain/UK
- 18 fireproof
- 19 clear and glass-like
- 20 rigid
- 21 FALSE
- 22 NOT GIVEN
- 23 FALSE
- 24 NOT GIVEN
- 25 FALSE
- 26 NOT GIVEN
- 27 D
- 28 B
- 29 A
- 30 C
- 31 A
- 32 A
- 33 high tides
- 34 agricultural production
- 35 coastal boundaries
- 36 NOT GIVEN
- 37 NOT GIVEN
- 38 NO
- 39 YES
- 40 NO

Vocab

Reading- ants could teach ants

1. Presumably- probably
2. Bidirectional- functioning in two directions
3. Deliberately- intentionally, consciously
4. Flee- escape
5. Superseded- replace, displace
6. Constraints- limitations
7. Derive- obtain, acquire
8. Indestructible- impossible to destroy or break
9. Deficit- deficiency, shortage
10. Resilience- the capacity to recover quickly from difficulties
11. Ambiguous- debatable, arguable
12. Vulnerable- unsafe, unprotected