

READING

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-12, which are based on Reading Passage 1 below.

Invasive species

Britain's rivers and estuaries are being invaded at an alarming rate by a small furry-clawed crab all the way from China. So how did a crab travel so far and why are naturalists

so concerned? The mitten crab first arrived in Europe on ships sailing from Asia. It then spread rapidly from Portugal to Sweden and was first reported to be in the River Thames in 1935. From the Thames, it spread across the United Kingdom at a very rapid rate: by 1999 mitten crabs had spread across 448 km of British coastline, sometimes walking miles overland to reach the next river. A team from the University of Newcastle found that UK rivers are being invaded three times faster today than in 1935. And there's little wonder - a single female crab can carry between 250,000 and 1,000,000 eggs so mitten crab colonies expand very rapidly. Furthermore, cleaning up pollution from Britain's rivers is simply helping the invaders.

The mitten crab is one example



of many invasive species that have found their way from their original habitat into foreign lands. There are several ways invasive species move from country

to country: they may expand their territory naturally as their colony grows; but far more frequently an invasion is associated with human activity. The main causes include shipping, deliberate introduction for hunting or work, and the escape of pets into the wild. The introduction of the mitten crab to Europe was probably accidental: ships taking on water to use as ballast to keep the vessel steady on its journey from Asia to Europe also took on the unwanted guests and carried them to new areas to colonise. Elsewhere, invasive species have been purposefully introduced by man. In 1859, 24 rabbits were introduced into Australia by Thomas Austin so that he could hunt them for recreation. Unfortunately, like the mitten crab, rabbits are prolific breeders: a single

pair of rabbits are able to increase to 184 individual rabbits in just one and a half years and they spread at a rate of 130 km per year. Soon the population in Australia was out of control and had spread throughout the continent. Another domestic creature introduced from India into Australia in the 1800s was the dromedary camel. Camels were initially brought to work as pack animals to carry heavy loads across the hot desert interior of Australia. By 1920 it was estimated that around 20,000 camels were being used to transport goods. However, with the arrival of trains and cars, camels were released into the wild where their numbers had increased to around one million by 2008. Finally, the trade in animals as pets can enable a species to colonise areas far away from their native land.

Between 2000 and 2006 the U.S. Fish and Wildlife Service recorded 1.5 billion animal shipments made into America. 92% of these imported animals were then sold as pets, with the rest imported for research, education and zoos. While most of these animals were fish, the imports also included reptiles and mammals. When these pets escape and begin to breed, it can create serious problems. An example of this is in Florida, where in the 1990s a number of pet Burmese pythons - a snake native to south east Asia - escaped their outdoor enclosures when a major hurricane hit the state. Today, it is estimated that up 30,000 snakes inhabit the

wetlands of the Florida Everglades. Burmese pythons, which can grow up to 20 feet long, are thriving on their new diet of native species, including endangered creatures, and are more than capable of competing with the American alligator for food.

The impact of invasive species is not to be underestimated. Katherine Smith, a conservation biologist at Brown University in Providence, Rhode Island states that 'A huge amount of money goes into the myriad effects that invasive species have.' Smith continues, 'They destroy infrastructure. They cause public health threats. They harm livestock and native animals. They disrupt ecosystems. The dollar values really do increase quickly.'

When a non-native species finds its way into a new and vulnerable environment the damage can be more or less serious as the invader out-competes the local wildlife, brings in new disease or destroys the environment. The Australian dromedary camel, forming the largest herd of wild camels in the world, competes for food with native species and may have aided the local extinction of preferred species such as the quandong tree. The Australian government estimate that the camel is responsible for AUS\$10 million in damage to infrastructure and competition for livestock food every year. Even more damaging is the effect rabbits are having in Australia. Apart from the economic loss to the wool industry, estimated at AUS\$95

million annually, rabbits compete with sheep for food. The animals have a devastating environmental impact. Close grazing of grass leads to soil erosion and has significantly altered the composition of extensive areas of land. While the real impact of the mitten crab in the UK is not known at present, scientists have noted that the crab is causing riverbank erosion as it burrows into the mud, forming a network of tunnels that make the riverbanks unstable.

Invasive species are very difficult to

manage once they have become established. Various methods have been tried to keep the populations under control. In Australia, 85,000 were culled and various methods have been tried to keep rabbit populations under control including poison and destruction of their warrens or homes. The latest idea in the UK to control the mitten crab is even simpler: catch them and give them to restaurants to sell as a tasty meal.

Questions 1-3

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

TRUE	<i>if the statement agrees with the information</i>
FALSE	<i>if the statement contradicts the information</i>
NOT GIVEN	<i>if there is no information on this</i>

- 1 Mitten crabs originated in Vietnam.
- 2 Crabs need water to spread.
- 3 Making rivers Less dirty has aided the invasion of the mitten crab.

Questions 4-7

Look at the following items (Questions 4-7) and the list of reasons.

Match each item with the reason for their introduction.

Write the correct letter. A-E, next to Questions 4-7.

NB There are three more reasons than you will need.

Animal	Reason
4 mitten crab	A was introduced as a predator species to protect plants from pests
5 rabbit	B escaped while being used as a pet
6 dromedary camel	C escaped from laboratories conducting experiments on animals
7 Burmese python	D introduced by someone who enjoyed shooting
	E came with water used to balance ships at sea
	F were carried over by trains
	G used to carry large loads across inhospitable areas

Questions 8-11

Complete the summary below.

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

Write your answers in spaces 36-40.

The effects of the introduction of non-native species can bring them into 8.....with native animals. Dromedary camels may have helped the 9.....a native plant. Rabbits have led to the degradation of 10..... across large areas of Australia. At the moment, the impact of the mitten crab is 11.....

Question 12

Which of the following statements reflects the claims of the writer in the reading passage?

Choose the correct letter. A, B or C.

The writer of the article views invasive species as

- A a natural development.
- B a hard problem to manage.
- C a good business opportunity.

Test 1: Reading

READING PASSAGE 2

You should spend about 20 minutes on Questions 13-29, which are based on Reading Passage 2 below.



- A. It's a remarkable achievement: the question is no longer 'How can we send humans into space?' but 'How can we keep them there?' spaceflight is reaching a turning point where new technologies in engine development, better understanding of aerodynamics and materials for body construction are making spaceflight possible for private industry.
- B. The history of space exploration, until relatively recently, has been one of big government- backed projects like the space Shuttle, Mars Landers and Long March rockets. But the most recent launches to the International space station (ISS) have been very special for at least three reasons. Firstly, along with 450 kg of scientific equipment, food and clothes, the rocket was carrying ice cream for the three space station astronauts. Secondly, the rocket was

unmanned, being guided into docking position and back to earth again by remote control and automated systems. Finally, the rocket was commissioned from a private company by NASA.

- C. When the privately owned rocket delivered its goods to the ISS, it marked a milestone in the evolution of space flight and vindicated NASA's decision to delegate routine supply flights to the space station. The flight has been a long time in development. It started with President George W. Bush announcing his Vision for Space Exploration, calling for the ISS to be completed. Under the next President, America's Space Shuttles were retired leaving NASA with no other choice but to look for alternative methods of supplying the ISS. The initiative was part of an effort to commercialise the space industry in order to decrease costs and spread the investment in the industry across a wider group than governments.
- D. The initiative had many attractions for NASA. By outsourcing to the private sector the routine business of taking food and equipment to and from low-earth orbit, NASA can theoretically free up money to do things that it really wants to prioritise: missions such as sending astronauts to Mars and landing on asteroids by the 2030s. Now that the Space Exploration Technologies Corporation (SpaceX) has proved that private enterprise can be players in space exploration, firms are pouring money into developing new spacecraft built to transport cargo, to mine asteroids and to carry passengers into space.
- E. In the last half of the twentieth century only government-backed agencies like NASA and Russia's ROSCOSMOS were capable of running space programmes due to the gigantic investment costs and uncertain payoffs. However, SpaceX and similar companies are proving that the former conditions are no longer relevant as new solutions are coming to light. Commercial companies like Boeing are able to raise large sums of money to run these projects. Furthermore, as the firms are running cargo and taxi services to lower orbits, the break-even point is lower, the technology is cheaper and they have the benefit of years of experience in commercial aviation and space flight. Opening space programmes to the commercial sector has the additional advantage of generating more solutions to old problems. An analogy is the invention of the Internet: when the technology went into the commercial sector, no one could have envisioned the development of social network sites. Likewise, no one can predict where commercial enterprise will take the space industry.
- F. The uncertainty surrounding where the space industry will end up is a problem as well as an asset and it is unsettling private investors who like to invest in relatively certain prospects. At the moment the industry is dominated by big-spending billionaires like the owner of SpaceX. In addition, the relatively small number of companies in the area could pose a problem in

the future. The commercial space industry is still very new and there is no guarantee that progress will be smoother. For one thing, no one is sure that the business model is sound: government is still the major, if not only, customer available to the private space companies. The other problem is that space travel is high risk: the loss of space shuttles Challenger in 1986 and Columbia in 2003 illustrates that even the most carefully planned launches have unavoidable risks associated with them. The question is what would happen to the industry if another accident occurred. Finally, many space experts are doubtful that, even if private industry takes over the 'taxi' role for low-orbit missions, NASA will be able to achieve its ambitions, given its squeezed budgets and history of being used for political purposes. Furthermore, NASA may have created another space race, this time between government and private industry. If NASA doesn't go to Mars or the asteroid belt, its private competitors certainly have plans to do so.

- G. In spite of all of these risks, many argue that it is critical for the private sector and federal government to work together to push further into space.

Test 1: Reading

Questions 13-18

Reading Passage 2 has seven paragraphs, A-G.

Which paragraphs, A-F, contain the following information?

Write *the correct letter, A-F, next to Questions 13-18.*

- 13 NASA being able to spend money on important projects
- 14 events leading to the commercialisation of spaceflight
- 15 new developments that have made spaceflight more accessible
- 16 an automated rocket that successfully completed a mission
- 17 the great dangers of space travel
- 18 new answers being found to previous questions

Test 1: Reading

Questions 19-25

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

- 19 Which is NOT mentioned as making private space flight possible?
 - A new methods of constructing the rockets
 - B modern substances from which to build the rockets
 - C understanding better how air moves round objects
 - D new methods of making space suits
- 20 Why are the recent launches special?
 - A Their destination was the International Space Station.
 - B They carried clothes.
 - C They were not managed by a private company.
 - D The rocket is not owned by a government.
- 21 In order to make NASA Look for other spaceflight providers, the US government
 - A invested in private space companies.
 - B started to build the international space station.
 - C stopped using the Space Shuttle.

D allowed private companies to fly into space.

22 Private companies

A need to reduce the cost of space projects.

B have social network sites.

C are able to fly rockets at high orbits.

D act as ferries to and from the space station.

23 At present, the private space industry is characterised by

A uncertainty about how to make profits.

B companies controlled by individuals.

C companies too small to raise the amount of money needed.

D government interference.

Test 1: Reading

Questions 24-29

Complete the summary below.

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

Write your answers in spaces 26-29.

There are a number of problems with commercial space projects. To start with, the 24..... might not be sound. There is also great 25..... attached to space flight - what would happen if there was another 26.....? Experts doubt whether NASA can fulfill its 27..... as it has often been under 28..... pressure. Moreover, the development may lead to a 29..... between NASA and the private space industry.

READING PASSAGE 3

You should spend about 20 minutes on Questions 30-40, which are based on Reading Passage 3 on the following pages.

Questions 30-34

Reading Passage 3 has six paragraphs, A-F,

Choose the correct heading for paragraphs B-F from the list below.

Write the correct number, i-ix, next to Questions 30-34.

List of Headings

- I. Shielding the earth from the atmosphere
- II. Bouncing back the sun's rays from earth
- III. The effect of volcanoes on the atmosphere
- IV. Criticisms of geoengineering
- V. Trapping greenhouse gases
- VI. The root of the problem
- VII. Why attempt geoengineering?
- VIII. Protecting glaciers
- IX. The need for action

Example
Paragraph A

Answer >
ix

- | | |
|---------------|---|
| 30 Paragraphs | B |
| 31 Paragraph | C |
| 32 Paragraph | D |
| 33 Paragraph | E |
| 34 Paragraph | F |

Test 1: Reading

Engineering a solution to climate change

- A. Looking at the rate of climate change and the disastrous effects it is having on the world, scientists are concerned that we are acting too slowly. Many are now looking to geoengineering - large-scale human interventions to change the world's climate - to counteract global warming. The schemes range from the mundane to science fiction but all come from the same impulse: if we don't do something now, it may be too late to do anything.
- B. Climate change is now so rapid that, in the very near future, the Arctic will be ice-free during winter as less ice forms during winters and more melts in summer. Scientists say that tackling climate change isn't a problem we need to deal with in 10 or 20 years' time; we need to look at radical solutions now. A study has shown that the technologies to produce these geoengineering projects already exists and could be in place for around \$5 billion a year. This is a bargain when compared with the cost of reducing carbon dioxide emissions, a major greenhouse gas: that figure stands at somewhere between \$200 and \$2,000 billion.
- C. So what exactly are scientists planning to do to deal with global warming in the short term? Among the main schemes are shielding the earth from the sun's rays either at ground or atmospheric level, or capturing the carbon produced by industry and sinking it back into the ground or the sea. Shielding the world has produced ideas that range from simple science to science fiction. One suggestion has been to make the roofs of buildings and roads whiter to reflect the sun's rays back into space. While this has the advantage of simplicity, it simply won't make much difference, reflecting only 0.15 watts per square metre, averaged across the planet. To put this into perspective, to stop earth warming we need to increase heat loss by about 3.7 watts per square metre averaged over the world. Another idea is to protect the Greenland ice field by covering it in giant sheets of reflective material. If this works, it could help in the Antarctic where the giant Filchner-Ronne ice shelf is melting rapidly. If this glacier disappears completely, it would raise sea levels, causing catastrophic flood damage around the planet.
- D. If reflecting heat back from the ground has little effect, there are two alternatives: seeding clouds and replicating volcanic activity. The first idea is to make clouds whiter by increasing the amount of rain in them. Sending salt particles into clouds should 'seed' the clouds with more raindrops. Clouds carrying more raindrops would be whiter and better reflectors of sunlight. This could be good news for the earth and in addition could be stopped when necessary with the salt completely clear from the skies within ten years. Unfortunately, other research indicates that creating whiter clouds may have

unwanted side effects, producing adverse weather conditions in the region and changing ocean currents. A much older idea is to replicate the effect volcanoes have had on the atmosphere. A volcanic eruption sends large amounts of ash and sulphur into the air, which block the sun and create cooler conditions. For example, when Mount Pinatubo erupted in 1991, it produced a sulphur dioxide cloud, which reduced average global temperatures by one degree centigrade. Geoengineers have long put forward the idea of circulating particles of sulphur in the atmosphere to counteract global warming. The particles would be delivered by aircraft or balloons spraying them into the atmosphere. However, this also has unpredictable effects on the amount and pattern of rainfall. Furthermore, this method would delay the recovery of the ozone layer over the Antarctic by 30 to 70 years. More ambitious geoengineering projects have included placing billions of reflective balloons between the sun and the earth and putting giant mirrors into orbit. Scientists have criticised these approaches as 'science fiction' and say they are unlikely to happen due to the huge costs involved.

- E. Whatever actions we take to block or reflect the heat from the sun, we will still need to reduce the amount of carbon dioxide in the atmosphere. Various geoengineering projects have been proposed to do this. Carbon capture technologies range from planting trees, which naturally use carbon dioxide as they grow, to pumping carbon back into the earth and trapping it there. This is a good idea but would only account for about 0.5 watts per square metre. Carbon capture technologies are already in use at power stations where the greenhouse gas is taken at point of production and pumped underground into depleted gas and oil reserves. However, the technology to do this is not very efficient, other ideas for taking carbon out of the atmosphere include seeding the oceans with iron. This would increase the growth of plankton which, like trees, use carbon naturally. Unfortunately, this would only account for 0.2 watts per square metre.
- F. Proponents of geoengineering have never regarded the earth-changing engineering projects as a complete solution. Nevertheless, the concept as a whole attracts many criticisms. One is that the problem of climate change is of such huge scale and complexity that there will not be one single solution. All proposals so far have advantages and disadvantages. The biggest problem of all is that many of the projects are untested and any of the proposals may have unforeseen consequences. For example, we could not suddenly stop a geoengineering scheme; keeping temperatures artificially low for a period then taking away the cause of this would cause the temperature to rise again rapidly. Furthermore, global engineering solutions to the problem of climate change would need the agreement of all the world's leaders: having an American solution, a Chinese solution, a Brazilian solution, and so on simply wouldn't be politically acceptable. But the biggest downfall is that geoengineering projects could reduce the political and popular pressure for reducing carbon emissions,

as politicians point to geoengineering for an answer rather than tackling the real cause of climate change: human activity.

Test 1: Reading

Questions 35–40

Classify the following as typical of

A land-based reflection

B atmospheric reflection

C carbon capture

Write the correct letter, A, B or C, next to Questions 35–40.

35 removes carbon dioxide as soon as it is produced

36 increases the reflectivity of white clouds

37 cleans carbon dioxide from the air naturally

38 would increase the number of small plants and animals in the sea

39 may help prevent rising water levels

40 is similar to the effect volcanoes have on the atmosphere.