

READING

READING PASSAGE 1

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

Green roofs

- A** Rooftops covered with grass, vegetable gardens and lush foliage are now a common sight in many cities around the world. More and more private companies and city authorities are investing in green roofs, drawn to their wide-ranging benefits. Among the benefits are saving on energy costs, mitigating the risk of floods, making habitats for urban wildlife, tackling air pollution and even growing food. These increasingly radical urban designs can help cities adapt to the monumental problems they face, such as access to resources and a lack of green space due to development. But the involvement of city authorities, businesses and other institutions is crucial to ensuring their success – as is research investigating different options to suit the variety of rooftop spaces found in cities. The UK is relatively new to developing green roofs, and local governments and institutions are playing a major role in spreading the practice. London is home to much of the UK's green roof market, mainly due to forward-thinking policies such as the London Plan, which has paved the way to more than doubling the area of green roofs in the capital.
- B** Ongoing research is showcasing how green roofs in cities can integrate with 'living walls': environmentally friendly walls which are partially or completely covered with greenery, including a growing medium, such as soil or water. Research also indicates that green roofs can be integrated with drainage systems on the ground, such as street trees, so that the water is managed better and the built environment is made more sustainable. There is also evidence to demonstrate the social value of green roofs. Doctors are increasingly prescribing time spent gardening outdoors for patients dealing with anxiety and depression. And research has found that access to even the most basic green spaces can provide a better quality of life for dementia sufferers and help people avoid obesity.
- C** In North America, green roofs have become mainstream, with a wide array of expansive, accessible and food-producing roofs installed in buildings. Again, city leaders and authorities have helped push the movement forward – only recently, San Francisco, USA, created a policy requiring new buildings to have green roofs. Toronto, Canada, has policies dating from the 1990s, encouraging the development of urban farms on rooftops. These countries also benefit from having newer buildings than in many parts of the world, which makes it easier to install green roofs. Being able to keep enough water at roof height and distribute it right across the rooftop is crucial to maintaining the plants on any green roof – especially on 'edible roofs' where fruit and vegetables are farmed. And it's much easier to do this in newer buildings, which can typically hold greater weight, than to retro-fit old ones. Having a stronger roof also makes it easier to grow a greater variety of plants, since the soil can be deeper.

- D** For green roofs to become the norm for new developments, there needs to be support from public authorities and private investors. Those responsible for maintaining buildings may have to acquire new skills, such as landscaping, and in some cases, volunteers may be needed to help out. Other considerations include installing drainage paths, meeting health and safety requirements and perhaps allowing access for the public, as well as planning restrictions and disruption from regular activities in and around the buildings during installation. To convince investors and developers that installing green roofs is worthwhile, economic arguments are still the most important. The term ‘natural capital’ has been developed to explain the economic value of nature; for example, measuring the money saved by installing natural solutions to protect against flood damage, adapt to climate change or help people lead healthier and happier lives.
- E** As the expertise about green roofs grows, official standards have been developed to ensure that they are designed, constructed and maintained properly, and function well. Improvements in the science and technology underpinning green roof development have also led to new variations in the concept. For example, ‘blue roofs’ enable buildings to hold water over longer periods of time, rather than draining it away quickly – crucial in times of heavier rainfall. There are also combinations of green roofs with solar panels, and ‘brown roofs’ which are wilder in nature and maximise biodiversity. If the trend continues, it could create new jobs and a more vibrant and sustainable local food economy – alongside many other benefits. There are still barriers to overcome, but the evidence so far indicates that green roofs have the potential to transform cities and help them function sustainably long into the future. The success stories need to be studied and replicated elsewhere, to make green, blue, brown and food-producing roofs the norm in cities around the world.

Questions 1–5

Reading Passage 1 has five paragraphs, **A–E**.

Which paragraph contains the following information?

*Write the correct letter, **A–E**, in boxes 1–5 on your answer sheet.*

NB You may use any letter more than once.

- 1 mention of several challenges to be overcome before a green roof can be installed
- 2 reference to a city where green roofs have been promoted for many years
- 3 a belief that existing green roofs should be used as a model for new ones
- 4 examples of how green roofs can work in combination with other green urban initiatives
- 5 the need to make a persuasive argument for the financial benefits of green roofs

Questions 6–9

Complete the summary below.

Choose **ONE WORD ONLY** from the passage for each answer.

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

Advantages of green roofs

City rooftops covered with greenery have many advantages. These include lessening the likelihood that floods will occur, reducing how much money is spent on **6** and creating environments that are suitable for wildlife. In many cases, they can also be used for producing **7**

There are also social benefits of green roofs. For example, the medical profession recommends **8** as an activity to help people cope with mental health issues. Studies have also shown that the availability of green spaces can prevent physical problems such as **9**

Questions 10 and 11

Choose **TWO** letters, **A–E**.

Write the correct letters in boxes 10 and 11 on your answer sheet.

Which **TWO** advantages of using newer buildings for green roofs are mentioned in Paragraph C of the passage?

- A** a longer growing season for edible produce
- B** more economical use of water
- C** greater water-storage capacity
- D** ability to cultivate more plant types
- E** a large surface area for growing plants

Questions 12 and 13

Choose **TWO** letters, **A–E**.

Write the correct letters in boxes 12 and 13 on your answer sheet.

Which **TWO** aims of new variations on the concept of green roofs are mentioned in Paragraph E of the passage?

- A** to provide habitats for a wide range of species
- B** to grow plants successfully even in the wettest climates
- C** to regulate the temperature of the immediate environment
- D** to generate power from a sustainable source
- E** to collect water to supply other buildings