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The mural, a type of artwork that involves applying paint directly to a wall, was the earliest kind of painting. Murals could not be detached, but later, the technique of painting on panels was developed. LET'S MAKE IT HAPPEN Panel paintings were done on thin strips of wood that were later put together. This production process also made it possible to quickly take them apart later. Quick disassembly was a feature which made these paintings highly portable. In the 14th century, painters began painting on fabric canvas, which was easy to work with and transport as it was lightweight. The surface of canvas held paint much better than wood did and was not prone to warping and cracking. However, the woven fabric affected the surface of paintings in a way that Renaissance artists disliked. They wanted to attain a glossy finish, and therefore went to great lengths to smooth the texture of the painting so that it had a similar feel to a photograph.

Answer the questions below.

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

- 1 What characteristic made panel paintings easy to move?
- 2 What texture did Renaissance artists want to achieve?

mural n. tranh tường **detach** v. gỡ ra, tách ra **disassembly** n. sự tháo dỡ **portable** adj. có thể mang theo, có thể xách tay dễ dàng **lightweight** adj. nhẹ cân **prone to** phr. thiên về, dễ bị **warp** v. làm cong, làm vênh **glossy** adj. bóng loáng, láng bóng **finish** n. sản phẩm cuối cùng **go to great lengths** to phr. làm tất cả mọi thứ, nỗ lực hết sức **feel** n. cảm giác

2

Animals have an internal mechanism that responds rhythmically to environmental cycles. A cycle can operate according to many different time frames, but the most obvious among them are those related to lunar phases, seasonal patterns, and the 24-hour cycle. The mechanism, called a biological clock, functions to make an animal aware of upcoming environmental events and to regulate when it sleeps, mates, and feeds. The kind of biological clock an organism has generally depends on its genetics rather than on external stimuli. Creatures such as crabs innately regulate their behaviours according to the rise and fall of the tides. Meanwhile, in areas of the world where there are dramatic changes in the length of the day and night as the weather gets colder, most animals are influenced by seasonal patterns. For instance, a brown bear's biological clock will perceive that the days are getting shorter as winter approaches and respond by eating large quantities of food before entering a state of hibernation.

Answer the questions below.

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

- 3 What commonly determines the sort of biological clock animals have?
- 4 What causes some sea creatures to act differently according to its height?

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Short Answer HACKERS IELTS READING

internal adj. (thuộc) bên trong, phía trong mechanism n. cơ chế time frame phr. khung thời gian mate v. giao phối
genetics n. di truyền học, đặc tính di truyền brown bear phr. gấu nâu hibernation n. sự ngủ đông (động vật)

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3 In the early 1900s, astronomers noticed that an unknown object's gravity was affecting the orbits of Neptune and Uranus. They tentatively named whatever was responsible 'Planet X' and began their search for it. One of the scientists involved was Percival Lowell, and it was he that, through tireless calculations and observations, ultimately identified the area of the sky where this elusive celestial body would be found. When he died in 1916, other astronomers carried on his work; one of them, Clyde Tombaugh, systematically took photographs of various areas of the sky every few days and then analysed them using a machine called a blink comparator. This machine works by rapidly alternating from one image to the next, allowing users to find differences between any two photographs. He believed this technique would allow him to see if objects in the sky changed position. Finally, in 1930, he noticed a moving speck of light where Planet X had been predicted to be. Telescopic analysis over the ensuing months identified the object's orbit and confirmed its presence. Planet X was subsequently named Pluto, and it remained our solar system's ninth planet until it was recognised to be a dwarf planet.

Answer the questions below.

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

5 What device did Clyde Tombaugh study his photos with?

6 What kind of planet was Pluto later identified as?

orbit n. quỹ đạo Neptune n. Hải Vương Tinh Uranus n. Thiên Vương Tinh **tentatively** adv. tạm thời, có thể thay đổi
tireless adj. không mệt mỏi, không ngừng nghỉ **elusive** adj. khó tìm, khó nắm bắt **celestial** adj. (thuộc) vũ trụ
carry on phr. tiếp tục **blink comparator** phr. bộ so sánh mảng chấn (dụng cụ giúp các nhà thiên văn học tìm sự khác biệt giữa hai bức ảnh cùng chụp một bầu trời đêm) **alternate** v. chuyển đổi luân phiên **speck** n. đốm nhỏ
telescopic adj. (thuộc) kính viễn vọng **ensuing** adj. kế tiếp theo **dwarf planet** phr. hành tinh lùn
(một khái niệm để phân loại thiên thể trong hệ mặt trời)

4

In the simplest terms, a drone is an unmanned, remote-controlled aircraft. The idea of using drones originated in the 1850s, during Austria's war against Italy. During this conflict, drones appeared in the form of balloons filled with bombs. But now that they are available to the general public, people are finding extremely innovative uses for them that not only make everyday tasks easier but also improve society as a whole. Because they are equipped with the highly efficient architecture of a smart phone, they are able to capture videos, take pictures, and use their GPS capacities to transmit data wirelessly. Adding all of these features, in addition to their ability to fly makes it possible to monitor forest fires, flash floods, and traffic flow, optimise agricultural production, and keep international borders secure. It is also possible to equip drones with other machinery to broaden their capabilities. For example, hospitals have successfully attached containers to drones tasked with transporting medicine and supplies to difficult-to-access areas. Meanwhile, some drones are outfitted with thermal sensors. The uses for drones of this type are myriad but as of now, they are proving invaluable to parks and wildlife management authorities. Because they are able to pick up signs of life as sensitive as a heartbeat, drones help keep endangered species safe by locating poachers who enter protected areas.

With technology improving on a daily basis, the future possibilities for drones seems limitless, but it is optimistic to expect that they will only be used for good. It is therefore vital that the Federal Aviation Administration (FAA) closely implement new legislation governing drones. This includes the prohibition of their use in heavily populated or secure areas and the requirement that registration of each drone be completed after purchase.

Answer the questions below.

Choose ONE WORD ONLY from the passage for each answer.

- 7 What did the first drones resemble?
- 8 What do drones help find in order to protect animals?

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Short Answer HACKERS IELTS READING

unmanned adj. không người lái, vận hành tự động **flash flood** phr. lũ quét optimise v. tối ưu hóa, hoàn thiện hóa outfit v. trang bị **thermal sensor** phr. cảm biến nhiệt **myriad** adj. vô số, cực kỳ nhiều **as of now** phr. cho đến nay **poacher** n. kẻ săn trộm **optimistic** adj. lạc quan, tích cực **Federal Aviation Administration** phr. Cục Quản lý Hàng không Liên bang

5 The cocoa bean had enormous significance to the Aztec people. Unlike the chocolate we make with it today, it was mostly combined with chilli peppers or vanilla and used to make a spicy beverage during the time of the Aztecs. However, this was no dessert. Historical chronicles have noted that the beverage, often drunk at the end of a banquet and served with tobacco, could be incredibly intoxicating. This has caused some scholars to speculate that the drink was mixed with wine or that its contents underwent fermentation in order to turn it into alcohol. Perhaps it was this effect that made it valuable enough to be regarded as an acceptable form of currency. But it more likely had to do with the fact that the Aztecs believed that the cocoa tree was a bridge connecting heaven and Earth and that consuming cocoa beans instilled one with divine wisdom. For this reason, drinks made of cocoa were often included in ritual sacrifices to the gods, used to celebrate special occasions, and mostly limited to members of the upper echelons of society. But there was one problem. Cocoa would not grow at the Aztec court of Tenochtitlan, where the climate was too cool and dry. Luckily for the Aztecs, it could be acquired in conquered states. Under Aztec rule, these states were required to pay a tax in the form of goods and labour, called a tribute. When it came time to collect resources from these areas, cocoa beans were undoubtedly a top priority.

Answer the questions below.

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

- 9** What was often provided with a spicy drink at the end of a formal meal in Aztec culture?
- 10** What did the Aztecs believe could be gained by eating cocoa?
- 11** Which section of Aztec society were cocoa drinks associated with?

chronicle n. sử ký intoxicating adj. làm say speculate v. suy đoán fermentation n. sự lên men instill v. làm chở thấm nhuần divine adj. siêu phàm, thiêng liêng echelon n. tầng, bậc tribute n. vật cống nạp top priority phí ưu tiên hàng đầu

6

In early spring, frogs emerge from hibernation and make their way to aquatic breeding grounds. The males are the first to arrive and begin croaking out mating calls to announce their presence to females, who select mates based on the length of their songs. Their calls also serve as a warning to other males, with the hope of discouraging potential competitors from encroaching on their space. Successful males engage with females in an embrace known as an amplexus, the goal of which is for females to release eggs into shallow, still water and for males to simultaneously fertilise them with their sperm. These eggs, of which there can be thousands, are covered with a thick, nutrient-rich jelly that swells in the water. As the parents typically abandon the eggs at this point, this substance serves as a means of protection for the fragile embryos. As the embryos grow, they turn into tadpoles and, if they are lucky, they emerge from their soft encasements; a large percentage, up to 95 per cent, of frog eggs fail to hatch due to either predation or environmental damage, such as a sudden hard freeze or drought. During the early part of their lives, tadpoles have a diet that is made up primarily of algae. They must eat voraciously at this time as they require a great deal of energy to complete their metamorphosis. Like fish, tadpoles have gills that allow them to breathe underwater and tails that enable them to swim. However, within a few weeks, skin starts to grow over their gills, which eventually disappear, with lungs developing in their place. After about 6 to 9 weeks, the tadpoles start eating insects and less vegetation. Their arms and legs begin to form at this point, too, and their tails become increasingly smaller before eventually being completely absorbed by their growing bodies. They then resemble miniature adults and can leave the water. Depending on how much food is available, a frog will be fully grown between 12 and 16 weeks of age and ready to mate, beginning the whole cycle once again.

Answer the questions below.

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

- 12 What aspect of the male frog's call determines whether it will find a mate?
- 13 What is the main type of food eaten by a tadpole in its early life?
- 14 What do lungs replace as tadpoles become frogs?

breeding ground phr. nơi động vật đến sinh đẻ **encroach** v. xâm phạm **embrace** n. sự ôm chầm **amplexus** n. sự công ghép đôi (của ếch nhái trong mùa phát dục) **fertilise** v. thụ tinh **sperm** n. tinh trùng **swell** v. phình lên, nở ra **embryo** n. phôi thai **tadpole** n. nòng nọc **encasement** n. bọc, túi **algae** n. tảo **voraciously** adv. ngầu nghiến, phàm ăn **metamorphosis** n. sự biến chính hoàn toàn **gill** n. mang cá

1

What is GPS?

GPS, or Global Positioning System, is a navigation and tracking system used for determining one's precise location and providing a highly accurate time reference almost anywhere on Earth. Designed and controlled by the United States Department of Defense, it was originally intended for military use, but today it is commonly used in a wide variety of civilian devices such as automobile navigation systems.

It is divided into three segments: space, control, and user. The space segment comprises the network of GPS satellites, which circle the Earth twice a day in a very precise orbit and transmit signal information. Powered by solar energy, they are equipped with backup batteries to keep them running in the event of a solar eclipse. Small rocket boosters on each satellite keep them flying on the correct path.

The control segment consists of ground stations around the world that are responsible for monitoring the flight paths of the GPS satellites, synchronising the satellites' onboard atomic clocks and collecting and uploading data for transmission by the satellites. These ground stations utilise an automated process to measure the orbit of the satellites to ensure they are precise enough to transmit accurate GPS data. If the orbit of a satellite veers off course, the ground stations mark it 'unhealthy', which means it cannot be used until it corrects its orbit, at which point it will be marked 'healthy' again.

The user segment is comprised of GPS receivers, which are devices that can determine a user's exact location by using distance measurements from multiple satellites. A GPS receiver must be locked on to the signal of at least three satellites to calculate a two-dimensional position - showing latitude and longitude - and to track movement. With four or more satellites in view, the receiver can determine a user's three-dimensional position - latitude, longitude, and altitude. Once the user's position has been determined, a GPS unit can calculate other information, such as speed, bearing, and distance travelled.

Although GPS is now widely known as a tool for personal navigation, its applications are far more widespread. They include the fields of international trade, agriculture, disaster relief, tectonics, robotics, and many more. Militaries around the world also use GPS for navigation and reconnaissance, but since the technology is owned and operated by the United States, they can deny use to other countries, as occurred in the 1999 Kargil War between India and Pakistan. The most prevalent use is perhaps in mobile phones, where GPS is used not only for geo-location, but also for clock synchronisation and emergency calls.

Answer the questions below.

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

15 What type of energy powers GPS satellites? **MAKESAKE IT HAPPEN**

16 What are satellites labelled if they are considered to be on an incorrect path around the Earth? **VEER OFF COURSE**

17 What capability does GPS offer armies in addition to navigation? **DISASTER RELIEF**

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Short Answer HACKERS IELTS READING

civilian adj. (thuộc) dân sự **segment** n. phân đoạn **transmit** v. truyền phát **backup** adj. dự phòng **solar eclipse** phr. nhật thực **rocket booster** phr. tên lửa đẩy **ground station** phr. trạm trên mặt đất **synchronise** v. đồng bộ hóa **atomic clock** phr. đồng hồ nguyên tử **veer off course** phr. lệch hướng, xoay chiều **latitude** n. vĩ độ **longitude** n. kinh độ **altitude** n. độ cao so với mặt nước biển **bearing** n. phương hướng **disaster relief** phr. cứu hộ khi có thảm họa, cứu nạn **tectonics** n. kiến tạo học (địa chất) **reconnaissance** n. sự trinh sát, do thám **synchronisation** n. sự đồng bộ hóa