Explanation V5T4

Reading Passage 1: The history of pencil

1. tree	The history of the pencil started with a violent thunderstorm. When some particularly ferocious weather struck the Lake. District in North West England in the sixteenth century, locals in the village of Borrowdale discovered large **uprooted tree**. **Underneath the tree** lay **an unknown black substance** which we now easily, was slightly shiny and smooth to the touch. And it left a black smear on the hands of all who touched it.
2. sheep	**Initially, the local farmers used the newly discovered material** as a handy way **to identify their sheep**. However, others quickly realised the potential for using this intriguing substance to write on paper.
3. soft	.. Initially, the local farmers used the newly discovered material as a handy way to identify their sheep. However, others quickly realised the potential for using this intriguing substance to write on paper. When it was **untreated** the material **was very soft**, which meant that it was **messy to handle**.
4. rope	. To make it fit for use with paper, people **enclosed a thin core of the substance in** stiff **sheep hides** or **rope**.
5. mines	In addition to its value to the armed forces, **the government** quickly realised the commercial potential of the graphite **at Borrowdale**, and **assumed control of all the mines** there during the sixteenth century,
6. steal	The **graphite** was so valuable that **the locals**, who called it Wadd, **started to steal it**. As a deterrent, an act of parliament in 1752 made this offence punishable by time in prison.
7. TRUE	**The Italians originally invented the wooden casing to hold a thin rod of plumbago firmly in place for ease of writing**. Italian
8. Not given	
9. Not given	… At the same time Nicolas- Jacques Conte, a French officer in Napoleon Bonaparte's army during the late 1700s, developed a **method of mixing powdered graphite and clay together** for firming in a kiln. **Adding more clay to the mixture** helped **make the pencil harder, sharper, and more precise in its mark**. More graphite helped make a pencil mark that was softer, thicker and darker.
10. Not given	The varying quality of pencil leads eventually gave rise to **a system for categorizing the fineness of the pencil mark**. **Pencil manufactures all over the world still use this so-called HB grading system today**.
11. False	Nowadays the highest grade of graphite at Borrowdale is totally

	exhausted, although other grades can still be found, and **England's pencil industry continues to thrive in the nearby town of Keswick.**
12.True	Americans overlooking the practical advantages of pencils in zero gravity is merely fiction. In actual fact, both **American** and Russian **astronauts were equipped with pencils in their respective country's first space flights**.
13.False	A private company later developed pens for writing in zero gravity. In fact, astronauts of every nation now use pens. But no matter - **pencils remain in use in every classroom, every planning, building and drawing office, and in every art studio in the world**. And **there is nothing to suggest that we are likely to invent anything better than graphite to use in our Pencils**.

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Reading Passage 2. What is an unfair advantage in sport?

14 vii	. But suddenly he too began to struggle, and as the frontrunners moved up a gear, a gap opened up. Clarke remembers nothing of his last lap which he ran in 90 seconds 'Normally I would run it in 64,' he explains. He stumbled across the line in sixth place and collapsed, he was administered oxygen and stretchered off the track.
15 vi	Australian sports authorities that complaining was regarded as bad sportsmanship. **As it turned out, he had good reason to do so. Cleary, the link between athletic performance and altitude needed further investigation.**
16 ix	The record books confirm how entrenched this pattern has become. **The names of the seven fastest men in history over 5, 000 metres are Bekele, Gebrselassie, Komen, Kipchoge, Sihine, Songkok and Chereno. They are all from either Kenya or Ethiopia.** Between 1997 and 2011 the 10,000 metres men's world record was smashed five times, dropping from 26:31.32 to 26: 17.53. **Each time, the record was broken by a Kenyan or an Ethiopian. While there is a complex mix of economic, political, social and cultural explanations for the preeminence of east Africans, one factor is surely that many of these athletes have lived most of their lives in thin air.**
17 iv	**At high altitudes, a number of physiological alterations occur, most importantly. More red blood cells and haemoglobin are produced. This, in tum, increases the capacity of the blood to carry oxygen, which feeds the muscles and which gives an advantage to the athletes when they return to sea level.** However,
18 ii	… Around two decades ago, two different scientists had the same exciting thought. **If they could artificially control the atmosphere within a confined space, they could simulate the effects of high altitude and save an athlete at sea-level from the time and expense of travelling to higher ground. Altitude tents have improved over the years: they're not as hot or as noisy as the early prototypes, and are much cheaper too. They are also perfectly lawful. Five years ago, when the tents were investigated by Wada (the World Anti-Doping Agency), it was ruled that they did not violate the spirit of distance running. It is now routine for athletes to sleep in them in preparation for an event.**
19 viii	, which reduces drag and improves buoyancy. **The LZR was initially**

	sanctioned by Fina, the international swimming body. But as better suits were produced by Speedo and other manufacturers, and more records were broken, they became increasingly controversial. In a 2009 ruling, Fina changed its mind. banning all suits made with this high-tech fabric.
20 iii	And the only way minute changes of 0.0001 of a second. **But when a new technology is invented, the relevant sports authority has to consider whether to embrace or reject it.** In some cases, athletes are granted permission to use the technology: in others, it is banned. **But whatever the outcome, rulings should not appear arbitrary: arguments have to be examined and weighed and the rules of logic ought to apply in every case.**
21 B	That the altitude would have an impact on the Games was predicted, **Clarke had raised the issue himself, but had been told by the Australian sports authorities that complaining was regarded as bad sportsmanship.** As it turned out, he had good reason to do so. Cleary, the link between athletic performance and altitude needed further investigation.
22 D	Yet the race was being conducted at a relatively leisurely speed: **the halfway time was the slowest since the Paris Olympics of 1924 with two laps to go. Clarke was in the leading pack.** 'I'd
23 spirit	they're not as hot or as noisy as the early prototypes, and are much cheaper too. They are also perfectly lawful. Five years ago, when **the tents** were investigated by **Wada (the World Anti-Doping Agency)**, it was ruled that **they did not violate the spirit of distance running**. It is now routine for athletes to sleep in them in preparation for an event.
24 drag	The vast majority achieved by competitors wearing **the new Speedo LZR Racer suit These suits** use a high-tech fabric tested in Nasa's wind tunnels, which **reduces drag** and **improves buoyancy**.

Reading Passage 3 – Theories of planet formation questioned

27 F	Quinn and his colleagues **recently analysed** the standard core-accretion model of planet formation and investigated whether not **giant planets**
28 B	. Both **theories for planet formation** start with the same reservoir of planet-making materials. The spinning cloud of gas, dust and ice rapidly fattens into disk-like shapes known as proto-planetary disks: and, as time goes by, gravity causes material in these disks to clump into planet- sized objects. **However, it is the speed of the clustering, and the size of the initial clumps, that provide the disparity in the two models for planet formation.**
29 H	Nevertheless, the gravitational-instability model **has problems of its own**, as it is **mathematically complicated and requires sophisticated computer use**. Therefore, **no one has studied the simulations long enough to establish conclusively that the model allows for the formation of massive planets**.
30 I	response, Mayer says that he and his team have described the results of an extensive simulation based on the gravitational-instability model. **They spent two years refining calculations to track what would happen to a proto-planetary disk over one thousand years, which is more than any other simulation had done**. In addition, over a decade previously **Mayer and his team had made simulations of the formation and evolution of galaxies. In doing this, they had already developed a fast computer code that could run in parallel on machines with hundreds of processors, and this knowledge assisted them in investigating their gravitational-instability theory.**
31 A	**The traditional view of astronomy has been that Planets form slowly as material congeals within the disk of gas, dust and ice known to surround young stars. First,** gravity gathers together bits of dust that merge to form boulder-sized bodies, which themselves coalesce into bigger and bigger objects. **In about a million years,** these
32 D	… Mayer asserts that most stars in the Milty Way form in dense clouds of gas, dust and ice. **Their temperatures are very intense and the ultraviolet light they send into space can evaporate a proto-planetary disk in less than 100,000 years**. In the core-accretion model, that is not enough time for a Jupiter-like planet to form.
33 B	… **The traditional view of astronomy has been that** planets form slowly as material congeals within the disk of gas, dust and ice known to surround young stars. First, gravity gathers together bits of dust that

	merge to form boulder-sized bodies, which themselves coalesce into bigger and bigger objects. **In about a million years, these form rocky planets like Earth and Mar over the next few million years, gas from the disk settles around some of these solid bodies and they grow far larger, becoming giants like gaseous Saturn and Jupiter.** This theory
34 F	That is several million years too long **in the opinion of Lucio Mayer** of Zurich University. Direct telescope sightings suggest that the proto-planetary disks do not last more than about seven million years, and studies of the environment in which stars form suggest that **many disks may evaporate in much less time,** Mayer asserts that **most stars in the Milty Way form in dense clouds of gas, dust and ice.** Their temperatures are very intense and the ultraviolet light they send into space **can evaporate a proto-planetary disk in less than 100,000 years.**
35 C	Thus, **Thomas Quinn of the University of Washington concludes that if a 'gas giant' planet cannot form quickly, it will probably never form.**
36 D	Quinn and his colleagues recently analysed the standard core-accretion model of planet formation and investigated whether not **giant planets could form quickly**. They looked at the work of **Gerard Kuiper** who, in the 1950s, proposed that **they could**.
37 E	They looked at the work of Gerard Kuiper who, in the 1950s, proposed that they could. **Alan P Boss of the Carnegie Institute** did more extensive work on the subject in the late 1980s. Using computer simulations, he was surprised to find that **ratty could cause a proto-planetary disk after a few orbits of its parent star to break into clumps as big as an average- sized planet**.
38 F	According to the core-accretion model, the making of Jupiter required **the initial formation of a solid core** five to ten times Earth's mass. It would have taken about a million years to achieve this. Most astronomers believe that **the large core then had enough gravity to attract a huge amount of gas from the** proto-planetary **disk** to
39 A	Recent computer simulations show that when individual **stars** form, the **gravitational pull between them can result in the outer gaseous parts of the proto-planetary disks being destroyed** in 100 000 years or less.
40 D	Mayer asserts that most stars in the Milty Way form in dense clouds of gas, dust and ice. **Their temperatures are very intense** and the **ultraviolet light** they send into space **can evaporate a proto-planetary disk in less than 100,000 years**. In the core-accretion model, that is not enough time for a Jupiter-like planet to form.

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