

Reading Passage 1

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

Gold

Paragraph A

Gold was the first metal widely known to our species. When thinking about the historical progress of technology, people often consider the development of iron and copper as the greatest contributions to our species' economic and cultural progress, but gold actually came first. Gold is the easiest of the metals to work. It occurs in a virtually pure and workable state, whereas most other metals tend to be found in ore-bodies that pose some difficulty in smelting. Gold's early uses were no doubt ornamental, and its brilliance and permanence linked it to deities and royalty in early civilisations.

Paragraph B

In virtually every culture around the world gold is prized, as it seems to be a natural law that things that are pretty and rare at the same time become valuable. Over time, this asset most precious to humans became a means of payment for a simple reason: it concentrates the highest value in a limited space. The more value is contained in a coin, the easier and cheaper storage and transactions become. Its reputation grew so strong that many times in history, gold was the world's number one currency. Of course, the fact that gold cannot be artificially produced or printed by any government helps immensely.

Paragraph C

Gold works in the opposite way to Wall Street products or most currencies, as gold appreciates when markets are in bad shape. In addition to this, there is a reasonably strong principle that when the US dollar is strong, the price of gold goes down and when the US dollar is weak, the reverse happens. Due to its stability and these trends, gold has been dubbed a safe haven. It enables investors and savers to weather a financial storm and then set out for more profitable investments after the storm is over. The nice side effect is that not only do they survive the storm, they also make a profit from it.

Paragraph D

Geologists have worked out that most of the gold that has been on Earth since its formation lies close to the Earth's core. This is because of its high density, which over time made it sink down, along with many other valuable metals. Gold found near the Earth's surface is theorised to have fallen to Earth approximately 3.8 million years ago, when the planet was hit by billions of tons of rock during a massive asteroid shower. As well as other minerals, there was gold in those asteroids and it has not had time to sink with the rest of the Earth's gold.

Paragraph E

One of the first records society has of gold mining is from the Greeks. The science may have

been primitive, but the Greeks learned much about the practicalities of gold mining. The Greeks mined gold from Spain to Egypt, and we find traces of their mines even today. From records, it can be learned that some of the mines were owned by the governments and some were worked privately with a duty paid to the state. The Roman Empire furthered the quest for gold. The Romans mined gold extensively throughout their empire, and advanced the technology of gold-mining considerably. They diverted streams of water to mine hydraulically, and built sluices and the first 'long toms'. They mined underground also, and introduced water wheels and the 'roasting' of gold-bearing ores to separate the gold from rock. They were able to efficiently exploit old mine-sites, and of course their costs were low, as their chief labourers were slaves. Finding gold can also start with an enthusiast in a river with a pan. The process basically consists of placing the material to be processed into a pan with water and shaking it in a left to right motion to cause the gold, which is heavy, to work its way down toward the bottom of the pan. At the same time, the lighter materials, which are worthless, are worked up to the surface of the gold pan, where they can be swept away. The process of shaking and sweeping is repeated until only the heaviest of materials are left, namely the gold and heaviest black sand. Gold on a large scale can be mined in different ways, but they all involve the removal of large amounts of rock and treating it to obtain any gold within. Large capacity earth-moving equipment is used to remove rock ore to a place where it is blasted to break it into sizes suitable for handling and transport to waste dumps or, in the case of the ore, to the crusher. Methods for extracting the gold from the crushed rock vary according to local conditions, but the processes can be highly toxic with the use of cyanide and hydrochloric acid.

Paragraph F

Gold has long been a medium of exchange and investment. However, although governments of most countries include holdings of gold as part of their monetary reserves, many are starting to reduce their holdings. Gold is an important material for jewellery, dentistry, and the adornment of buildings and for artistic purposes. In addition, its high electrical conductivity, malleability and ductility favour the use of gold in electronic and computer circuitry, radar equipment and satellites. An important and growing use is in the mechanism and circuitry of safety air bags in motor vehicles.

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Questions 1 - 6

The text on the previous pages has 6 paragraphs (**A – F**).

Choose the correct heading for each paragraph from the list of headings below.

Write the correct number (**i – viii**) in boxes **1 – 6** on your answer sheet.

- | | |
|------|--------------------------|
| i | Where Did it Come From? |
| ii | Greed Leads to War |
| iii | Man's Original Metal |
| iv | Extraction |
| v | How Gold Became Valuable |
| vi | Safety in the Bad Times |
| vii | Roles |
| viii | Legends of Lost Treasure |

- | | |
|---|-------------|
| 1 | Paragraph A |
| 2 | Paragraph B |
| 3 | Paragraph C |
| 4 | Paragraph D |
| 5 | Paragraph E |
| 6 | Paragraph F |

Write **NO MORE THAN TWO WORDS** from the text for each answer.

Write your answers in boxes **7 - 9** on your answer sheet.

- 7 Early civilisations associated gold with their gods and _____, because of its unique properties.
- 8 Gold has become known as a _____, because its value rises at times of economic instability.
- 9 Most of the Earth's original gold can be found near the _____ of the Earth.

Questions 10 - 13

Complete the table below.

Write **NO MORE THAN TWO WORDS** from the text for each answer.

Write your answers in boxes **10 - 13** on your answer sheet.

MINING GOLD	
The Greeks	* Mined from Spain to Egypt; remnants still exist. * Mines were run by the governments and privately (a (10) _____ was imposed on private mines).
The Romans	* Mined extensively and greatly improved mining (11) _____. * Used water and mined underground. * Work was done by (12) _____.
The Individual	* Traditionally done with a pan. * Water washes lighter materials away until only gold and sand is left.
Large Scale	* Different methods used, but large amounts of rocks are crushed and processed. * Pollution always a problem due to the (13) _____ substances used.

Reading Passage 2

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

Hundreds of volatile organic compounds are emitted from the human body, and the components of these compounds usually reflect the metabolic condition of an individual. Therefore, contracting an infectious disease often results in a change in body odour. A dog interprets the world predominantly by smell and, while a dog's brain is only one-tenth the size of a human brain, the part that controls smell is 40 times larger than in humans and they can sense the change in scent diseases can cause. The first publication of a dog detecting cancer was the case of a young female from the UK, who remarked to a dermatologist examining a suspicious mole on her leg, which her dog had been licking, nipping and barking energetically and persistently. There have been several studies now that have concluded that dogs can smell cancer in people, but why would a dog want to smell cancer?

Dogs have lived side by side with man, co-evolving for well over 100,000 years. Man provided shelter and food for the dog, and in turn, the dog warned man against impending danger, pointed towards prey and food, and eventually guarded his livestock and crops. Man provided for the dog, and the dog used his nose to help provide for, and protect, man. Smelling disease is part of this protection. If something is wrong with us, this will affect the dog. If we are sick, this could directly affect our ability to provide nourishment and shelter for the dog. The dog 'notices' small changes that could signify that we are in trouble. For example: if someone has a cut on his or her leg, under the jeans or socks, why does almost every dog find and sniff the cut? They are noticing a change, or something different. This small change can mean that we may become incapacitated in some way, which means the dog may suffer. Most prey that get caught and killed by predators are sick or injured in some way. The slowest, or sickest are easier to catch. Dogs have evolved learning to notice a 'sick' scent and this has been positively reinforced by the reward to eating the prey that was sick. Smelling disease helps the dog catch his own prey, as well as larger prey for man, and so the sick scent is very important for a dog's survival.

Dogs play an astonishing range of roles in human society. Many individuals are saved by rescue dogs when stranded in the wilderness or capsized in cold water. Others rely on guide dogs to get them safely to multiple destinations on a daily basis. Drug dogs, de-mining dogs and police dogs are trained and utilised as substance detectors, even in the face of competition from the latest technology. Now, the role of dogs smelling disease has arrived. One interesting part about this is that cancer actually has a smell. Most oncologists will tell you that humans can actually smell cancer in latter stages through a patient's breath. If humans can smell it at stage 3 or 4, then of course a dog would be able to detect the scent much earlier. Dogs can differentiate smells much better than humans and, while a human will smell something like spaghetti sauce as one smell, a dog smells each individual ingredient.

Specialist doctors have diverse reactions to the notion of dogs detecting cancer. While some are extremely enthusiastic, others are more guarded. Dr Miranda Tompkins explains her reservations. "Although the olfactory test appears to be a promising tool for the detection of cancer, the main challenge is to determine whether the test can sufficiently discriminate between patients at risk, patients with benign disease, and patients with malignant disease. We need to gain a deeper understanding before applying dogs as an assessment tool for cancer in clinical settings."

Training dogs to smell cancer is done in the same way that bomb and narcotics dogs are trained: pairing the target odour with a high value reward. With breath, however, things can get a little tricky. The odours of drugs and gunpowder can be isolated, but 'cancer scent' is one of the thousands of organic compounds within a human's breath. In order for the dogs to generalise the cancer scent, many samples with the common odour must be used. Also, the dogs must be trained to ignore healthy breath, and all other breath with diseases other than cancer. This means that very large numbers of samples have to be used for a dog's training. Cancer samples, disease controls and healthy controls are needed, and the order and specifics of the introduction of cancer through latter stage training is extremely specific in order for the dog to generalise the cancer scent.

Work toward the development of an 'electronic nose' for cancer detection has been underway for several decades. However, nothing has achieved the high sensitivity and specificity seen with dogs. Whether or not sniffer dogs actually make it into the continuum of diagnostic evaluation has yet to be seen, but if their image could be employed in public health screening, it may encourage people with worrisome symptoms to take earlier action. This on its own would be the definitive benefit for some sick people.

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Questions 14 - 20

Complete the notes below. Write **NO MORE THAN TWO WORDS** for each answer. Write your answers in boxes **14 - 20** on your answer sheet.

- * Human bodies exude smells that indicate their health and disease can alter this smell; dogs can smell this change.
- * A dog smelling cancer was first reported to a (14) _____ by a woman, whose dog showed interest in her mole.
- * Dogs and people have helped each other for a long time.
- * In the past, problems for people could lead to a dog losing food and (15) _____.
- * Noticing a sick smell has also helped dogs find (16) _____ to provide food for people and themselves.
- * Dogs' sense of smell has been used increasingly, even with (17) _____ from technology.
- * Dogs can often smell each (18) _____ in a scent, as their sense of smell is much more sensitive than humans.
- * The use of dogs to detect cancer has received varied (19) _____ from doctors.
- * One expert says more work must be done before dogs are used as an (20) _____.

Questions 21 – 25

Complete the summary below.

Write **NO MORE THAN THREE WORDS** from the text for each answer.

Write your answers in boxes **21 - 25** on your answer sheet.

The Training and Use of Dogs

Training sniffer dogs always involves associating a smell with a (21) _____. A cancer smell is one of many (22) _____ creating a smell in people's breath and so many different (23) _____ are needed, including lots of control specimens. Electronic noses have been developed, but the dogs' (24) _____ and extreme precision has not yet been matched. Dogs may or may not be used clinically, but, even if they are part of (25) _____ initiatives, this could save some people's lives.

Question 26

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

Write the correct letter in box **40** on your answer sheet.

26 What is the best title for the text in Section 2?

- A Sniffer Dogs and Crime
- B New Sickness in Dogs
- C The Story of Dog and Man
- D A New Possible Role for Dogs

Reading Passage 3

You should spend about 20 minutes on **Questions 27 - 40**, which are based on Reading Passage 2 below.

Bats and Wind Turbines

Wind energy production is one of the fastest-growing industries in the world and represents an important step towards reducing dependence on non-renewable sources of power. However, widespread deployment of industrial wind turbines is having unprecedented adverse effects on certain species of bats.

Dead bats are being found beneath wind turbines all over the world. Bat fatalities have now been documented at most wind facilities in the US and Canada, and it is estimated that tens to hundreds of thousands die at wind turbines in North America each year. This anticipated issue has moved to the forefront of conservation efforts towards this poorly understood group of mammals, particularly due to the concurrent effects of a new bat disease, white-nose syndrome.

Although the key question of why bats die at industrial wind turbine sites remains unsolved, potential clues can be found in the patterns of fatalities. Foremost, the majority of bat fatalities at industrial turbines are species that migrate long distances and rely on trees as roosts throughout the year. Tree bats compose more than three quarters of the bat fatalities observed at wind energy sites. The other striking pattern is that the vast majority of bat fatalities at wind turbines occur during late summer and autumn. This seasonal peak in fatalities coincides with periods of both autumn migration and mating behaviour of tree bats. Environmentalist, Lindsay Dutton, summarises the conclusion. "Seasonal involvement of species with shared behaviours indicates that behaviour plays a key role in the attraction of bats to wind turbines, and that migratory tree bats might actually be drawn to turbines."

Bats are beneficial consumers of agricultural insect pests and migratory species of bats provide free pest-control services across ecosystems and international borders. The value of the pest-control services to agriculture provided by bats in the US alone ranges from a low of \$3.7 billion to a high of \$53 billion a year. "Bats eat tremendous quantities of flying pest insects, so the loss of bats is likely to have long-term effects on agricultural and ecological systems", said Justin Cramer, a researcher with the University of Pretoria. "Consequently, not only is the conservation of bats important for the well-being of ecosystems, but it is also in the best interest of national and global trade." The loss of the one million bats in the Northeast has probably resulted in between 660 and 1320 metric tons of insects no longer being eaten each year by bats in the region. "We hope that our analysis gets people thinking more about the value of bats and why their conservation is important", said Gary Bradman, a University of Tennessee professor. "The bottom line is that the natural pest-control services provided by bats save farmers a lot of money."

Over the past decade, scientists and their research partners have been studying bat deaths at wind turbines, with the ultimate goal of understanding why they are happening, so solutions can be developed. In addition to synthesising existing information, research has focused on better understanding aspects of tree bat ecology that might offer important clues to their susceptibility. This work has shed new light on the migratory movements, mating behaviours, and feeding habits of migratory tree bats, which may help explain their disproportionate

representation among turbine fatalities.

Continuing on the same research trajectory, scientists have built an active research program to investigate the causes and consequences of bat fatalities at wind turbines. In collaboration with scientists at four different science centres, as well as universities and conservation organisations, the specific focus is to better identify the seasonal distributions, habitat needs, and migration patterns of species showing the greatest susceptibility, continue to assess the potential roles of mating and feeding behaviours in turbine collisions, use motion sensor video for studying and monitoring bats and birds flying around wind turbines at night, and test whether bats are attracted to turbines.

One solution has already been presented by the scientists involved. Scientist Petra Greenway explains. "Some studies have demonstrated that bat fatalities occur primarily on nights with low wind speed and typically increase immediately before and after storm fronts, which is a time of high activity for bats. Weather patterns are therefore a probable predictor of bat activity and fatalities, and mitigation efforts that focus on these high risk periods may reduce bat fatalities substantially." Scientists have proposed, therefore, that bat fatalities could be lowered substantially by reducing the amount of turbine operating hours during low wind periods when bats are most active. This can be done by increasing the minimum wind speed, known as the inception velocity, at which the turbine's blades begin rotating to produce electricity. Three studies worldwide have tested whether or not increasing the minimum turbine cut-in speed reduces bat fatalities. These studies demonstrated that bat fatalities were reduced by 50 to 87 per cent. Jon Dyson, another of the scientists involved, followed up his proposition with a possible problem. "While these studies indicate that reduction in bat fatalities can be achieved with a modest reduction in power production, if it is to be successful, the companies who operate the wind farms need to be sounded out about this solution, so that they can analyse its cost-effectiveness and decide whether they might agree."

Whilst most people accept that a focus on renewable sources of energy is vital, it is hard to come to terms with the destruction of so many of an innocent and valuable species. Only through further research will we make progress toward minimising the impact of this new form of sustainable energy on the planet's wildlife.

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Questions 27 - 32

Look at the following statements (questions 27 - 32) and the list of people below.

Match each statement with the correct person's initials.

Write the correct initials in boxes 27 - 33 on your answer sheet.

- 27 The farming industry will suffer from fewer bats in the environment.
- 28 Firms running the wind turbines might object to operating restrictions that lose them money.
- 29 It is possible that some bats are attracted to wind turbines.
- 30 Preserving bat populations is important even for international economies.
- 31 Knowing the weather forecast can help predict bat behaviour.
- 32 Farmers benefit from the bats eating pests on their farms.

LD	Lindsay Dutton
JC	Justin Cramer
GB	Gary Bradman
PG	Petra Greenway
JD	Jon Dyson

Questions 33 - 36

Do the following statements agree with the information given in the text?

In boxes **33 – 36** on your answer sheet write:

TRUE *if the statement agrees with the information*

FALSE *if the statement contradicts the information*

NOT GIVEN *if there is no information on this*

- 33 The concern for bats is high, as they are already suffering from sickness.
- 34 The bats most affected are those that live near wind turbines all year round.
- 35 The US government has allocated funds for research into this problem due to worries from the agricultural lobby.
- 36 A research program will conduct new studies into how bat mating is related to fatalities at wind turbines.

Questions 37 - 40

Answer the questions below.

Write **NO MORE THAN THREE WORDS** from the text for each answer.

Write your answers in boxes **37 - 40** on your answer sheet.

- 37 With what technology are scientists planning to monitor bats flying around wind turbines at night?
- 38 Before and after what weather features are bats particularly active?
- 39 What term is used to describe the speed the wind must be for a wind turbine's blades to start moving?
- 40 What will the companies who operate wind farms need to consider if the solution regarding power generation reduction is to succeed?