

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

## **READING**

### **INSTRUCTIONS**

You have 90 minutes to complete this part of the exam. It contains **THREE** exercises. No extra time is given. Use a pencil, not a pen. If you mark more than one answer per question, your answer will be considered incorrect.

**EXERCISE A** (© www.ideas.ted.com)

You are studying biology at an Australian university and one of your lecturers has asked you to read the article below for one of your subjects. Read the text and answer questions **1-9** on page 7 by choosing the correct answer (**A**, **B** or **C**). We have prepared one example (**0**) to help you.

## **Bees can remember human faces and 7 other surprising facts about these important insects**

Most people know bees for two things: their sweetness (in the form of honey) or their stings. But they're so much more than that. Honeybees, for example, live in highly structured social groups where each bee has a role to play. Some bees are solitary and can chew holes in wood. Others can be blue or white or green. In fact, there are more than 20,000 species of bees worldwide.

Importantly for humans, bees are crucial to our planetary health and survival — as pollinators, they are responsible for about a third of the food we eat. Yet bee populations worldwide are declining, largely due to climate change. Carbon emissions are resulting in temperature extremes that are causing habitat loss, a rise in parasites and predators that thrive in warmer temperatures, and increased pesticide use to deal with these new pests. All of these factors impact bees in both big ways (colony collapse disorder) and small (shifting winds make bees less efficient).

Here are 8 surprising facts you didn't know about these amazing insects, and how you can help protect them.

### **Bees put the honey in honeymoon**

There may be more than 20,000 bee species, but only members of the genus *Apis* (11 known species) make honey. We may owe bees — and ancient Norse drinking habits — for the term “honeymoon.” The syrupy sweetener was an ingredient in the earliest known alcoholic beverages, including mead, a fermented honey drink. Mead played an important role in Nordic marriage rites as early as the 5th century. It's believed that it was a tradition for newlywed couples to consume copious amounts of mead during the first full moon cycle, or month, of marriage. The practice is one of several proposed origins of the honeymoon's etymology.

### **Some bee species defend their hives with giant balls of heat**

Like all insects, bees are cold-blooded, which means their body temperature is typically similar to their surrounding environment. But within the hive, where the developing bees live, they maintain a steady temperature of around 30 degrees Celsius year-round. Using their wings, bees can fan hot air out of the hive or vibrate their flight muscles to heat it.

As a changing climate brings new predators their way, some bee species have taken their thermoregulation abilities to the next level. Scientists have observed Japanese honeybees counterattack the hive-invading, bee-eating Asian giant hornets (a large wasp also known as murder hornet) that cross their threshold. Together they create a giant ball around the hornet and use the same hive-heating techniques to cook the invader alive.

### **Bees help farmers grow better food**

Bees are highly efficient pollinators and are essential to plant diversity. When bees are employed to pollinate crops such as avocados, blueberries and cucumbers, fruit yields and weight increase dramatically compared to crops grown in the absence of bees or other pollinators. But climate change could threaten our food systems.

As weather patterns continue to shift, many animal species will move to more ideal climate conditions when their previous habitats become less favorable. But experts fear that bees aren't adapting to shifting temperatures like some other species, which could lead to rapid population decline. In some areas, flowers are also starting to bloom earlier with warming temperatures, and it's unclear how bees will adapt to these seasonal changes. This could spell big trouble for both wild and farmed crops. "With the declining numbers of bees, the cost of over 130 fruit and vegetable plants that we rely on for food is going up in price," says Noah Wilson-Rich, biologist and CEO of Best Bees.

### **There are bees that can age backwards — really**

Some honeybees have the remarkable ability to age in reverse. When there's a lack of young worker bees, older bees can revert to their more energetic, younger selves to take on the task. In fact, these bees end up living longer to make up for others' job. This incredible phenomenon is currently under investigation by researchers to better understand the underlying mechanisms and potential applications for age-related dementia in humans.

### **Scientists use bees to study serial killers**

Criminologists developed a statistical technique called geographic profiling (GP) in order to study repeat-offense crimes, like serial killings and burglaries. Based on the locations of the crimes, police can make educated guesses about where a suspect might live or visit regularly. That's because in general, repeat offenders avoid committing crimes close to where they live so they can avoid detection — but they remain close enough to home for convenience. It turns out bees' feeding patterns are similar.

Bees avoid detection by predators and parasites by creating a distraction zone — they leave flowers closest to their nest entrance untouched and feed further away from the hive. In 2008, a team of researchers observed bees visiting different flowers, and attempted to locate their hive based on existing GP techniques. They found that bees' foraging patterns were as reliable and predictable as humans'. Criminology experts can now use insights from bee patterns to refine geographic profiling methods.

### **Honeybees live according to a strict hierarchy**

There are three types of honeybees: queens, workers and drones. There's only one queen, and she's typically the largest and longest-living individual within a hive. Worker bees are all female and the only bees with stingers. When a bee stings, it dies, leaving behind a banana-like scent that warns the other worker bees of danger. And while workers are genetically identical to the

queen, only the queen can lay eggs. In fact, queen bees can release over 1,000 eggs each day for years. These eggs are fertilized with sperm from dozens of male drones whose only function is to fertilize the queen during a once-in-a-lifetime mating flight (the drones die after mating.)

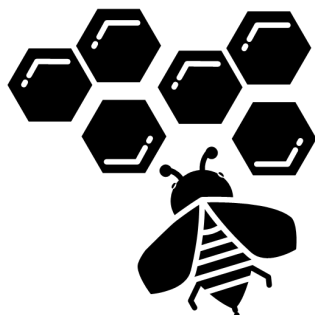
### **Bees can remember human faces — sort of**

Bees may have brains the size of poppy seeds, but they're able to pick out individual features on human faces and recognize them during repeated interactions. In one study, scientists paired images of human faces with a drop of sugar and found that bees recognized and remembered faces associated with the sweet reward — even when the reward was absent. Actually, what bees really saw were strange flowers, since they have developed this keen perception chiefly to recognize and return to flowers that produce more pollen.

### **Is it too late to save bees?**

Fortunately, you can take action to help bees where you live. With just a smartphone and a willingness to learn, you can contribute to various citizen science projects. A citizen science effort in Michigan, for example, helped researchers discover that certain types of bees that live on the floor and that pollinate pumpkins are more successful on farms where the soil is not trampled or tilled — this finding has real implications for our food systems. Other ongoing programs help researchers collect baseline data on wild bee populations, including North America-based BeeBlitzes, the University of Illinois' BeeSpotter, Australia's Wild Pollinator Count and Canada's Bumble Bee Watch.

Your own backyard is another place to start. Plant more wildflowers, don't use pesticides that harm bees and apply them before flowering begins. If you live in the city, set up or join a community rooftop garden. Interestingly, bees can have higher survival rates and produce more honey in the city compared to the crop-dotted countryside, Wilson-Rich says. And, if you want to really get in on the buzz, consider keeping your own honeybee hive — you'll bolster your local bee population and reap some sweet rewards.



0. According to the text,  
A. all bees are mostly the same among species.  
B. there is a wide variety of bees.  
C. hives may be more than 20,00 individuals.
1. Bees are disappearing  
A. because of various factors.  
B. chiefly in warmer areas.  
C. due to changes in human food consumption.
2. Mead is a fermented Norse drink which  
A. can be obtained from virtually any type of bee.  
B. might be at the origin of the word "honeymoon".  
C. stands for "honeymoon" in English.
3. Bees use thermoregulation to  
A. attract other insects to their hives.  
B. communicate with other bees.  
C. cool their hives when necessary.
4. The survival of bees  
A. depends on crops such as avocados, blueberries and cucumbers.  
B. is thought to depend on their ability to migrate and their adaptability to flowering times.  
C. may cause an unprecedented rise in the cost of over 130 fruit and vegetable plants.
5. The reverse ageing patterns of bees  
A. are causing problems in the work balance of hives.  
B. makes them more energetic but also shortens their lives.  
C. may help understand certain human diseases.
6. Scientists claim that bees  
A. feed far from their hives on purpose.  
B. remain close to their hives when feeding.  
C. some criminals have studied bees to avoid being caught.
7. According to the text,  
A. drones die when they sting.  
B. queen bees live as much as drones.  
C. workers do not participate in egg fertilization.
8. One experiment has proved that bees  
A. can remember which flowers produce more pollen.  
B. drop sugar when they recognize human faces.  
C. produce more pollen if they see familiar human faces.
9. The author thinks that  
A. a combination of science and human awareness can still save bees.  
B. city bees will disappear faster than countryside bees.  
C. there are not enough research projects devoted to studying bees.

**EXERCISE B** (© www.ideas.ted.com)

You are studying a Degree in Sport Medicine and one of your lecturers has asked you to read the article below for your subject of Biochemistry. Five paragraphs have been removed from the article. Choose from the paragraphs on page 13 (A-F) the one which fits each gap (1-5). There is one extra paragraph which you do not need to use.

## Why does running give you a high? A look at the science

The runner's high is often used as a call for reluctant exercisers, described in terms that can strain credulity. In 1855, Scottish philosopher Alexander Bain described the pleasure of a fast walk or run as "a species of mechanical intoxication" that produces an exhilaration akin to the ancient ecstatic worship of Bacchus, the Roman god of wine. Trail runner and triathlete Scott Dunlap sums up his running high this way: "I would equate it to two Red Bulls and vodka, three ibuprofen, plus a \$50 winning Lotto ticket in your pocket."

1. \_\_\_\_\_

But this side effect is not exclusive to running. Pleasure can be found in any sustained physical activity, whether that's hiking, swimming, cycling, dancing or yoga. However, the high emerges only after a significant effort. It seems to be the brain's way of rewarding you for working hard. Why does such a reward exist? The latest theory about the runner's high makes a bold claim: Our ability to experience it is linked to our earliest ancestors' lives as hunters, scavengers and foragers.

2. \_\_\_\_\_

David Raichlen, an anthropologist at the University of Southern California, was familiar with the idea that natural selection favored traits that allowed humans to run. His own work in graduate school helped establish the theory (including a 2005 academic paper titled "Why is the human gluteus so maximus?"). Still, he kept thinking about the problem of motivation. A skeleton that makes running easier is not enough to create an endurance athlete. What would make early humans willing to exert so much effort? If anything, humans seem predisposed to conserve energy. It's a caloric risk to travel all day, using up energy reserves in the hopes of catching something big. Raichlen, a recreational runner, began to think about the runner's high. Maybe early humans got high when they ran so they wouldn't starve.

3. \_\_\_\_\_

These alleviate pain and boost mood, which fit the requirements that the scientist described for rewarding physical labor.

Earlier research hinted that exercise might trigger a release of these chemicals, but no one had ever documented it during running. So Raichlen put regular runners through treadmill workouts of differing intensities. Before and after each run, he drew blood to measure endocannabinoid levels. Walking slowly for 30 minutes had no effect, nor did running at maximum effort. Jogging, however, tripled the runners' levels of endocannabinoids — and the elevation in endocannabinoids correlated with the runners' self-reported high.

Raichlen's intuition was correct: The runner's high is a buzz. Why did jogging increase endocannabinoids, but walking slowly and running at an exhausting pace did not? Raichlen speculates that our brains reward us for exercising at intensities similar to those used for hunting and foraging two million years ago.

What does all this mean for today's recreational exerciser? For one, it suggests that the key to unlocking the runner's high is not the physical action of running but its continuous moderate intensity. Scientists have documented a similar increase in endocannabinoids from cycling, walking on a treadmill at an incline, and outdoor hiking. If you want the high, you just have to put in time and effort.

There's no objective measure of performance you must achieve, no pace or distance you need to reach that determines whether you experience an exercise-induced euphoria — you just have to do something that is moderately difficult for you and stick with it for at least 20 minutes. That's because the runner's high isn't a running high; it's a persistence high.

Persistence is key to experiencing a high while exercising, but maybe that's not the best way to think about it. We don't persist so we can get a neurochemical reward; the high is built into our biology so that we can persist. Natural selection has provided us with a way to chase our goals and keep going even when it's hard.

#### 4. \_\_\_\_\_

Neuroscientists describe endocannabinoids as the “don't worry, be happy” chemical. Areas of the brain that regulate the stress response, including the amygdala and prefrontal cortex, are rich in receptors for endocannabinoids. When endocannabinoid molecules lock into these receptors, they reduce anxiety and induce a state of contentment. Endocannabinoids also increase dopamine in the brain's reward system, which further fuels feelings of optimism.

As it turns out, the chemistry of a runner's high also primes us to connect. In a 2017 review of how the endocannabinoid system works in the brain, scientists identified three things that reliably amp it up: cannabis intoxication, exercise and social connection. The three psychological states most strongly linked to low levels of endocannabinoids? Cannabis withdrawal, anxiety and loneliness.



Endocannabinoids aren't just about not worrying and being happy; they are also about feeling close to others. Higher levels of them increase the pleasure you derive from being around other people. They also reduce the social anxiety that can get in the way of connecting. Blocking the reception of these brain chemicals in rats makes them less interested in socializing with other rats. In mice, it makes new mothers neglect their pups.

5. \_\_\_\_\_

When I came across the research linking endocannabinoids with social connection, I thought about something anthropologist Herman Pontzer had told me about how early humans adapted to a changing landscape and how running is not the only factor that helped them survive. "If you had to pick one behavior that marks the beginning of hunting and gathering, that is the game changer," he said. "It's sharing."

Hunting and gathering is a division of labor. Some members of the group go out hunting, while others forage for plants. "You bring those together at the end of the day, and you share and everyone has enough to eat," Pontzer said. Groups who were better at sharing were more likely to survive, and natural selection started favoring not just traits that enhance physical endurance, like longer leg bones, but also traits that encourage within-group cooperation. By priming you to connect, the runner's high should also make sharing the spoils with your tribe more rewarding.

Whether chasing down dinner, pushing a stroller up a hill or running errands for a neighbor, we can take joy in the effort. And the more physically active you are, the more rewarding these experiences become. Science has proved that the neurobiological reward that kept our ancestors from starving may now save us from a more pressing modern problem: sedentarism.





Now, choose from the paragraphs below (A-F) the one which fits each gap (1-5). There is one extra paragraph which you do not need to use.

**A.** A runner's high does the opposite: It helps us bond. Many people have told me they use running as an opportunity to connect with friends or loved ones. I've heard from people who rely on a daily workout to be more caring parents or partners. As one runner notes, "My family will sometimes send me out running, as they know that I will come back a much better person." One study found that on days when people exercise, they report more positive interactions with friends and family.

**B.** Such a neuro-reward would have to do two things: Relieve pain and induce pleasure. Scientists have speculated that endorphins are behind the runner's high, and studies show that high-intensity exercise causes an endorphin rush. But Raichlen had in mind another candidate for such positive effects, a class of brain chemicals called endocannabinoids.

**C.** For many, the experience of persevering is part of what gives movement meaning and what makes the experience rewarding. This is the least mentioned but perhaps most lasting side effect of the persistence high: You get to experience yourself as someone who digs in and keeps going when things get tough.

**D.** In the fourth and last experiment of the series, Raichlen asked some students to play an economic game that required contributing money to a communal pool. He found that participants who exercised for 30 minutes before playing the game shared more than when they played the game without exercising.

**E.** Others liken it to a spiritual experience. In *The Runner's High*, Dan Sturn describes tears streaming down his face during mile seven of his morning jog. "I flew closer and closer to the place mystics and shamans and acidheads all try to describe. Each moment became precious. I felt simultaneously all alone and completely connected."

**F.** Researchers like biologist Dennis Bramble and paleoanthropologist Daniel Lieberman, for example, have hypothesized that the neurochemical state which makes running gratifying may have originally served as a reward to keep early humans hunting and gathering. But let's analyze the facts in support of this theory.

**EXERCISE C** (© theconversation.com)

You are studying a Degree in Social Work and one of your lecturers has asked you to prepare a presentation on feminism. Since you are interested in Asian feminism, you have chosen to speak about women in Saudi Arabia. In your research for the presentation you have found the article below by feminist activist Sophie Alkhaled. Read her text and say whether sentences **1-8** below are **TRUE** (V in your answer sheet) or **FALSE** (F in your answer sheet), and copy the **FIRST FOUR WORDS** of the sentence that justifies your answer. Remember that sentences start after full stops (.) and that words like “he’s”, “user-friendly” or numbers count as one single word. We have prepared one example (0) to help you.

## In Saudi Arabia, women are turning to business as a form of ‘quiet activism’ in their feminist movement

Saudi Arabia is a notoriously difficult place to be a woman. The kingdom enforces a strict interpretation of Islamic law that sees the separation of men and women as a defining aspect of an Islamic society. It also puts men in charge of their female relatives. Under this “guardianship system,” as it’s known, Saudi women must get permission from male chaperones to travel, study and marry. Domestic abuse is difficult to report and rarely punished. Of course, women can be easily imprisoned if found guilty of offending Islamic law.

Prominent Saudi women’s rights activist Loujain al-Hathloul was released from prison on February 10, 2021 after 1,001 days in custody. Al-Hathloul, a leading campaigner for women’s rights in Saudi Arabia, had been sentenced to five years and eight months in prison in 2018 for pushing a foreign agenda and using the internet to harm public order.

One of al-Hathloul’s crimes was to be part of a campaign for women to be allowed to drive. The first of these protests was in November 1990 when 47 activists took to the wheel of their family cars. In response, the women were arrested, punished and publicly shamed.

In June 2011 – inspired by the Arab Spring – a number of female activists launched the Women2Drive campaign, again being punished with arrest and imprisonment. And, despite the ban being lifted in June 2018, some of these women remain in prison for their activism.

Once you recognise the fate of so many “explicit” feminist activists in a country such as Saudi Arabia, it underlines the importance of other forms of lower-risk social movements in which they may be engaging. One legitimate platform for women to engage in sociopolitical change is the entrepreneurial space.

Saudi women are highly educated and control much of the wealth in the country. The kingdom has been advocating for female entrepreneurship in its National Development Plans for more than a decade. This is part of a plan to encourage economic diversification and private sector investments beyond the oil industry – something echoed in the country’s Vision 2030 reform strategy.

Saudi women entrepreneurs are estimated to have SAR45 billion (£8.6 billion) in cash holdings. They currently account for 39% of the total number of registered business owners in the kingdom – up from 4% ten years ago.

### **Feminist activism through entrepreneurship**

Growing up in Saudi Arabia as a Muslim woman of British-Syrian descent meant I was fascinated with the diversity of gender systems across the places I called home. I by no means argue that gender equality has been achieved in the UK, or indeed in any country in the world. But the position of women in Saudi is unique, in a classic patriarchal society with traditions deeply embedded within a history of its tribal system.

So their situation needs to be understood within its own context in order to appreciate their everyday activism. That is, feminist activism should not need to take place in an overtly western manner in order to be recognised for its ability to lead to lasting socio-political change.

My decade-long study, which began in 2010, explores how while some women have been explicit in their activism, and prosecuted for it, some Saudi women have engaged in a more quiet, (dis)organised and protracted form of activism.

In particular, I focus on women who have used their entrepreneurial space not just for empowerment and economic wealth creation for themselves, but as a legitimate platform for political engagement and social change for women through everyday “solidarity practices”. These allow them to quietly take the floor in the forbidden political space.

Over the decade it became evident to me that this activism “quietly” developed over time through a three-step process. First, the women entrepreneurs aimed to empower women within their organisations by providing women-only office space, on-site daycare and safe transport to and from work, particularly before women could drive.

The second step in the process was to develop a feminist consciousness within their business and larger entrepreneurial network. That is, provide them with opportunities to step outside of their traditional and conservative roles and the traditional gendered view of how a Saudi woman “should be”.

Finally, as the women gained momentum with their “silent” feminist movement, they began to feel empowered to confront authorities refusing to support their business affairs.

### **‘We will get there’**

In 2013, the late King Abdullah issued a royal decree granting women at least 30 seats in the consultative assembly, the Shura Council, as members, which represents one-fifth of its 150 seats. In 2015, women were able to vote and stand as candidates in the 2015 municipal elections.

Ameera, who runs a management consultancy is one of the council members. She told me: “Of course there are some power struggles and some discomfort from the men – but isn’t this everywhere in the world? Even America was not ready for a woman to be president ... We will get there.”

This sort of “quiet” solidarity is an illustration of how the western vision of activism in democratic contexts does not represent women’s feminist movements around the world. For example, the recent #metoo movement saw women (and men) marching the streets, side by side, calling their governments for policy reforms for gender equality. While I acknowledge this has not led to enough change, it also did not result in imprisonment.

Such explicit activism protest is dangerous for women in a country such as Saudi Arabia – as the experience of Al-Hathloul and others has shown. But this has not stopped women from engaging in less overt ways of activism. Therefore, feminist organising for political change should be explored and understood within its own context, if we are going to fully appreciate women’s bravery and its global political potential.



Now, say whether sentences **1-8** below are **TRUE** (V in your answer sheet) or **FALSE** (F in your answer sheet), and copy the **FIRST FOUR WORDS** of the sentence that justifies your answer. Remember that sentences start after full stops (.) and that words like “he’s”, “user-friendly” or numbers count as one single word. We have prepared one example (**0**) to help you.

- 0.** In Saudi Arabia, men can legally prevent women from studying.

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0	<input checked="" type="radio"/> V <input type="radio"/> F	under this “guardianship system,”		<input type="radio"/>	<input type="radio"/>

- Al-Hathloul is a renown activist for women’s rights in Saudi Arabia.
- In Saudi Arabia it is still illegal for women to drive.
- Most women in Saudi Arabia do not have access to education or money.
- According to the author, Saudi women should follow UK feminists to achieve gender equality.
- Segregating women in their jobs is seen as something beneficial.
- The number of women allowed in the Shura Council is limited to 30.
- The author thinks that feminism displays various forms depending on the context.
- Adopting western attitudes towards feminism can be harmful for Saudi women.