

1 Answer questions (1) ~ (5).

(1) Choose the phrase that best represents the purpose of the following passage.

Lettuce is a versatile* and nutritious leafy vegetable commonly used in salads and sandwiches. A novel method of lettuce cultivation*, known as aeroponics*, has emerged as an innovative solution. Aeroponics involves growing lettuce without soil, where the plants' roots are suspended in a mist or nutrient-rich water solution. This technique offers numerous advantages, including faster growth rates, higher yields, and efficient resource utilization. By eliminating soil and using controlled misting or spraying systems, aeroponics minimizes water usage and reduces the risk of diseases transmitted through the soil. Moreover, aeroponics allows for year-round production and can be implemented in vertical farming systems, optimizing space utilization. With its sustainable approach and potential for increased lettuce production, aeroponics presents an exciting opportunity for the future of agriculture.

注) *versatile: can be used in many ways

*cultivation: farming

*aeroponics: plant cultivation without using soil

- a. To describe the various types of lettuce available
- b. To discuss the benefits of eating lettuce
- c. To explain the history of lettuce cultivation
- d. To introduce a new method of growing lettuce

(2) Choose the phrase that best represents the purpose of the following passage.

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注) *bills: documents requesting payment

*the dead of: the middle of

*warmer climes: places with warm climates

*discrepancy: difference

*mystified: completely confused

a. To explain why cooling is so cheap

b. To explain why heating is so expensive

c. To introduce a new source of energy

d. To introduce a question about heating and cooling

(3) Choose the answer that is most similar in meaning to the underlined phrase.

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- 注) *durable: remain in good condition despite heavy use
*Suction: pulling in air very strongly
*belt endurance: how long the belt on a vacuum cleaner will last
*agitator brush: the brush on a vacuum cleaner that lifts dirt from carpets
*hype: a lot of excitement and publicity in the news
- a. complete your tasks
b. gather information
c. take your pet to an animal doctor
d. vacuum your house

(4) Choose the sentence that best represents the main idea of the following passage.

Hibernation* may look like a deep form of sleep, but it's not sleep. As an animal hibernates, it chills its body and slows its heart rate and breathing. Metabolism* also slows. To do this, an animal must turn on and off certain genes* when they hibernate. Those genes do things like controlling whether an animal burns sugars or fats for fuel. Other genes are involved in keeping muscles strong.

Humans have many of these same genes. We don't use them to hibernate. But turning some of these genes on or off might allow humans to do something similar to hibernation, Grabek* says. Her company studies these genes and looks for drugs that can control them. Such drugs might allow people to hibernate without being really cold, she says.

注) *Hibernation: sleeping through the winter

*Metabolism: an animal's ability to convert food into energy

*genes: 遺伝子

*Grabek: the name of a scientist at a biology research company

- a. Hibernation is a kind of deep sleep.
- b. Humans may be able to hibernate in the future.
- c. In some animals, body temperature increases during hibernation.
- d. Only certain types of animals hibernate.

(5) Choose the best explanation of the underlined phrase.

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- 注) *Nonprofit organizations: organizations that do not aim to make a profit
*land seizures: taking away someone's land without their permission
*reforestation: planting new trees in forests that have been damaged or cleared

- a. Cutting down trees quickly.
- b. Finding rare animals.
- c. Protecting rainforests.
- d. Raising money for healthcare.

[出典]

- (2) “Heating Vs Cooling: Why Does It Take More Energy To Heat A Home Than To Cool One? ”, John Staughton, January 28, 2020, ScienceABC,
<https://www.scienceabc.com/eyeopeners/why-does-it-take-more-energy-to-heat-a-home-than-to-cool-one.html>
- (3) “5 Tips for Cleaning Up Pet Hair”, Sara Elliott, HowStuffWorks,
https://home.howstuffworks.com/home-improvement/household-hints-tips/cleaning-organizing/5-tips-for-cleaning-up-pet-hair.htm?srch_tag=jn6yfmewwll4oalfnqjl44j3ne6vzmr
- (4) “Humans might be able to hibernate during space travel”, Tina Hesman Saey, May 24, 2023, Science News Explores,
<https://www.snexplores.org/article/humans-hibernate-space-travel-cryobiology-suspended-animation>
- (5) “Saving the Amazon – level 2”, August 6, 2023, News in Levels,
<https://www.newslevels.com/products/saving-the-amazon-level-2/>

2 Read the following article and answer questions (1) ~ (5).

- [1] When you walk through a neighborhood, what do you see? In the United States, it will likely be a few trees and shrubs* amidst* large areas of grassy lawns*. These big green carpets might look pretty. But a plain expanse* of grass is an ecological wasteland. It's filled with just one type of plant — a species that doesn't support insects, birds or other wildlife the way a natural ecosystem would.
- [2] But increasingly, people are turning to alternatives — ones that better support nature and us.
- [3] Lawns as we know them started in England back in Medieval times*. At that time, most people had to grow their own food. A big expanse of grass would serve as a display of wealth; these people could afford to have land without crops. The grasses planted back then were native to England. They grew well with that nation's soils, ample* rains and cool temperatures.
- [4] Those same grasses now cover lawns across the world, from Europe and the United States to Australia. Although they did well in England, they're not as well adapted to places with different climates and levels of soil nutrients.
- [5] That means it can take a lot of work to maintain these yards. People tend to add fertilizers* to keep their lawns lush* and green. They water regularly, because these grass species can't handle hot summers or places with little rain. People may even use chemicals to keep out unwanted plants (weeds) and pests.
- [6] All those activities use up or pollute much-needed fresh water. Both are problems, especially in the face of ongoing drought*. A runoff* of pesticides* and fertilizers can also harm the ecosystems in streams.
- [7] That's why a growing number of people are rethinking lawns.
- [8] What does that mean? Allowing a greater variety of plants and animals to flourish* in these spaces could save water, experts say. It could also reduce chemical pollution. Yards planted with more diverse species could make for healthier ecosystems with more pollination* and pest control.
- [9] In the end, such changes should benefit people and wildlife alike.

[出典]

“Making yards more diverse can reap big environmental benefits”, Alison Pearce Stevens, June 1, 2023, Science News Explores, <https://www.snexplores.org/article/diverse-plantlife-lawns-yards-environmental-benefits>

- 注) *shrubs: woody plants that have several stems and are smaller than most trees
 *amidst: in the middle of
 *lawns: areas of cut grass in a park or garden of a house
 *plain expanse: a large area containing only one type of thing
 *Medieval times: from the 5th century to the 15th century
 *ample: a lot of
 *fertilizers: chemicals that make plants grow more
 *lush: healthy and growing well
 *drought: a severe lack of rain
 *runoff: unused liquid that flows to another place
 *pesticides: chemicals that kill insects
 *flourish: grow very successfully
 *pollination: 受粉

(1) In which paragraph does the author give a reason why rich people first created lawns?

- a. Paragraph 1
- b. Paragraph 2
- c. Paragraph 3
- d. Paragraph 4

(2) In which paragraph does the author describe how far some species of grass have spread around the world?

- a. Paragraph 2
- b. Paragraph 4
- c. Paragraph 5
- d. Paragraph 6

(3) In which paragraph does the author describe how people look after their lawns?

- a. Paragraph 1
- b. Paragraph 3
- c. Paragraph 5
- d. Paragraph 7

(4) According to this passage, why are people rethinking lawns?

- a. Traditional lawns are suitable for all climates.
- b. Traditional lawns help the local ecosystems.
- c. Traditional lawns require a lot of fresh water and harmful chemicals.
- d. Traditional lawns support a variety of insects, birds and other wildlife.

(5) What is the main idea of this passage?

- a. Lawns have a long and interesting history and should be preserved.
- b. Lawns have good and bad points, but overall they benefit the environment.
- c. Yards with a few trees and large areas of grass are more beautiful.
- d. Yards with a variety of plants and animals would improve ecosystems.

3 次の英文の要旨を、句読点も含め 80 字以内の日本語でまとめ、解答欄に書きなさい。

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[出典]

“Gabby, a 14-year-old bird, is crucial to survival of Michigan’s piping plovers”, Frank Witsil,
May 22, 2023, Newsela,
<https://newsela.com/view/clhfap6ky00073b69wj0qqbod/?levelId=clhfba2e95y5308n320mod>

注) *Gabby: ギャビー (チドリのニックネーム)

*plover: チドリ

*gravel: small rocks

*crustaceans: 甲殻類動物

*hatch: to emerge from an egg

*the U.S. Fish and Wildlife Service: アメリカ合衆国魚類野生生物局

*the Bahamas: バハマ諸島

*endangered: being in a situation where one is likely to be harmed

*the Great Lakes basin: 五大湖流域

4 Read the passage, and explain the main point in your own words. Write your answer in English within 30 words.

One strategy that has been heavily researched is storytelling. As Burton* (2019) tells us, our brain takes information and puts it in story form as it tries to make sense of the world. Research has uncovered the “chemical cocktail*” that occurs in the brain when we listen to or read a story. First, dopamine* is released as we derive pleasure from listening to the story. Small amounts of cortisol* are released when there is some distress or uncertainty as “the plot thickens*.” Finally, oxytocin* is released as we relate to the characters and learn the outcome. Dopamine is released again as a reward – that is, the satisfaction and pleasure derived from the solution to the problem or the outcome of the story.

What does storytelling have to do with relationships? Everything. It begins with your relationships with your students. Talking about yourself, your family, and your activities helps build rapport* with your students. Involving them in a problem and asking them to help provides a solution that connects them to you.

[出典]

Marilee Sprenger. *Social-Emotional Learning and the Brain: Strategies to Help Your Students Thrive*. ASCD, 2020, pp23-24.

注) *Burton: ロバート・バートン、神経科医・小説家

*chemical cocktail: 化学物質のカクテル（「化学物質が混ざり合ったもの」という意味）

*dopamine: ドーパミン

*cortisol: コルチゾール

*as “the plot thickens”: as the story becomes more complicated

*oxytocin: オキシトシン

*rapport: a close harmonious relationship

5 Which season do you like the best? Explain your reasons within 50 words in English.

6 Answer the following question in English within 50 words.

Artificial intelligence (AI) is the ability for a computer to think and learn.
Do you think Artificial Intelligence will improve our quality of life?