

## 第1講

## 自然・環境



## 演習問題 A

1 次の英文を読んで、下の各問いに答えなさい。(目安時間8分)

When we throw away food that we didn't eat, or that is past its best before date, we are creating food waste. We may not realize the size of the problem when we do so, but every year about 1.3 billion tons of food becomes food waste. That is as much as one-third of all the food that is produced. When food goes uneaten, everything that went into making it also becomes wasted. This  
5 includes valuable natural resources like water and farmland as well as energy like electricity and fuel. If we waste less food, we can save our limited resources. (ア), we can reduce greenhouse gases that come from producing food or from \*landfills in which food waste ends up.

One way to reduce food waste is to find another way to use the food that people would have otherwise thrown away. Dutch \*entrepreneurs Elzelinde van Doleweerd and Vita Broeken  
10 founded Upprinting Food, a company that tries to do (イ) just that. Van Doleweerd and Broeken were studying industrial design at university. They came up with a way to make complex shapes from \*leftover food using 3D printing. Their method works like this:  ウ

Upprinting Food mostly works with luxury restaurants. They print unique designs such as company logos using food waste as ink. \*Clients can use a recipe Upprinting Food has already  
15 created, or create a new recipe with the help of Upprinting Food. Van Doleweerd says they are also working with a company in Beijing, China, to develop designs using food that is most often thrown away in China — rice and sweet potatoes.

However, 3D food printing is a new technology, and there are still some issues. For example,  
(エ) 3D printers may not be fast enough to print a lot of products at once. Also, some food may get  
20 stuck in the printer causing bacteria to grow. These issues still need to be solved. In the future, it is hoped that 3D food printing will be widely used both by companies and at home. Unwanted food, such as vegetables that are not the right shape or leftovers, can then be easily changed into attractive dishes. In this way, we can reduce food waste. (約410語)

[注] landfills: 埋め立て地 entrepreneur: 起業家 leftover: 食べ残し client: 取引先

(1) (ア)に入れるのに最も適切な語句を、①～④から1つ選びなさい。

① On the other hand ② For example ③ At the same time ④ Even so ( )

(2) 下線部(イ)の具体的な内容を日本語で答えなさい。

(3)  ウ には次の文が入ります。Upprinting Food の作業工程を表すように、適切な順に並べかえなさい。

① Then, the products are baked and dried so they last longer.

② First, bread is dried and made into a powder.

③ This is then made into shapes using a 3D printer.

④ Vegetables and fruits are mixed with this bread powder. ( → → → )

(4) 下線部(エ)を日本語に訳しなさい。

2 次の英文を読んで、下の各問いに答えなさい。(目安時間8分)

One of the biggest problems the world faces today is global warming. Global warming can cause \*droughts, the rising of sea levels, and the mass \*extinction of \*species. So how can we (ア) this (イ) happening? When we talk about fighting global warming, we often focus on reducing \*carbon dioxide \*emissions — like driving less or using energy-efficient lightbulbs. However, it's just as important to remove the carbon dioxide that has already been released into the atmosphere. Plants do this by \*absorbing the carbon dioxide in the air and storing it. Every year, 11 billion tons of carbon dioxide goes into the atmosphere, but only about 4.7 billion tons of this remains there. Thanks to plants, the amount of carbon dioxide that stays in the atmosphere is reduced to less than half.

10 Because of this important role plants play, (ウ) trees and forests are often referred to as our planet's "lungs." We are not letting our lungs breathe properly when we cut down trees for fuel or when we clear forests to create farmland. Efforts are now being made to plant trees both in areas where trees had been cut down previously and in areas where there weren't any trees before. However, (エ) (these / grow / take / it / for / years / young / trees / to / will) into mature trees that 15 can absorb enough carbon dioxide to affect climate change.

According to Professor Moomaw of Tufts University, one effective way to fight climate change is to simply let old and middle-aged forests grow naturally. Not only do older trees absorb more carbon dioxide, but also natural forests have complex ecosystems with a variety of living things. So, leaving these forests as they are would also help protect the \*diversity of species. This 20 movement for protecting existing forests is called proforestation. Moomaw points out that less than 7% of forests in the U.S. are over 100 years old. (オ) planting new trees is important, it is these older forests that can make the most difference in terms of reducing carbon dioxide in the next several decades — all we need to do is leave them alone. If we can do this, then we may be able to create a better future for our planet. (約370語)

[注] drought : 干ばつ    extinction : 絶滅    species : 種    carbon dioxide : 二酸化炭素  
emission : 排出, 放出    absorb : ~を吸収する    lung : 肺    diversity : 多様性

(1) (ア), (イ)に入れるのに最も適切な語の組み合わせを、①～④から1つ選びなさい。

① allow / of    ② hold / on    ③ prevent / from    ④ stop / for ( )

(2) 下線部(ウ)のように言う理由を日本語で説明しなさい。

(3) 下線部(エ)が意味の通る英語になるように( )内の語を並べかえなさい。

(4) (オ)に入れるのに最も適切なものを、①～④から1つ選びなさい。

① Although    ② However    ③ Since    ④ Unless ( )

(5) 本文の内容と一致するものを、①～⑤から1つ選びなさい。

- ① Professor Moomaw suggests we focus on finding new ways to fight climate change.
- ② Older forests provide other benefits besides removing and storing carbon dioxide.
- ③ Proforestation encourages planting new trees in areas that used to be forests.
- ④ Out of all the forests in the U.S., only 7% are old enough to absorb carbon dioxide.
- ⑤ Older trees should be left alone because younger trees are better suited for wood products. ( )

## 演 習 問 題 B

次の英文を読んで、あとの各問いに答えなさい。(目安時間 16 分)

When you look around you, you'll probably notice many products made out of plastic. Plastic is used in almost every area of modern society including product packaging, \*textiles, buildings, and construction. However, did you know that it was only after the 1960s that plastic came to be so widely used? In 1950, the global production of plastic was still only about 2 million tons — by 2015, that amount grew almost 200 times to 381 million tons. The use of plastic spread because of its many advantages such as being lightweight, strong, easy to shape, and \*affordable.

Although there are various benefits to using plastic, there is a major disadvantage, too. Plastic takes a very long time to break down — about 400 years. And only around 9% of all the plastic ever produced has been recycled. As time goes ( ア ), large plastic pieces break down into smaller and smaller pieces. These, along with tiny balls of plastic called \*microbeads, which are found in some \*cosmetics and toothpastes, are called \*microplastics. Because microplastics are so small, they end up in the air, the water, and the soil.

Once microplastics are in the environment, it is very hard to get rid ( イ ) them. They also end up in human bodies through water, air, and food. How does this affect our health? People have only recently become aware of the \*vast amount of microplastics around us. Many of the effects of microplastics are still unclear, including the effects on our health. However, recent studies show that microplastics in human bodies can cause allergic reactions as well ( ウ ) cell death, among other health issues. Researchers who looked at \*pregnant mothers have also found microplastics in the \*placenta — the organ that delivers blood and oxygen to the baby.

How can we stop microplastic pollution? Cleaning the river is a good start. A study in 2015 found that about 8 million tons of plastic trash ends up in the oceans every year. One invention to fight plastic pollution in the water was made by Anne Marieke Eveleens from the Netherlands. Her method uses a tube with holes. By placing this tube on the bottom of the river and pumping air through the tube, it creates a bubble curtain in the river. Those air bubbles force plastics in the river to move to the riversides, where they can be collected. Her method, called Bubble Barrier, works with plastics larger than 1 mm.

Another invention was made by Fionn Ferreira, a chemistry student at the University of Groningen in the Netherlands. From a young age, he was concerned about plastic trash polluting the beach near his home. He came up ( エ ) an idea to collect plastics in the ocean using a \*magnetic liquid called “ferrofluid.” Ferrofluid he invented gathers plastics of all sizes, leaving the water free of them. It is tested to be 87% effective.

Ferreira's invention won the Google Science Fair competition of 2019, and Ferreira received a scholarship of \$50,000. He was happy that after winning the competition, other scientists did not see him as a child with a toy any longer. Ferreira is now working on a device small enough to fit into waterpipes so microplastics can be removed as water flows through them. It can prevent people from getting microplastics in their drinking water, and it can also help prevent microplastics from entering the oceans in the first place. He's also working on a system that can be installed on ships to collect microplastics in the ocean. Ferreira stresses the importance of giving young inventors a chance. He says that a lot of people did not trust his idea at first because of his age. Ferreira thinks the world needs more imaginative solutions to its problems and that young inventors can look at things from a fresh new \*perspective.

Although Ferreira's and Eveleens' inventions show a lot of hope, it is not enough just to remove

the microplastics that are already in the environment. To fight microplastic pollution, we must stop them before they go into the environment, which means reducing the use of plastic itself.

45 One way to do so is to introduce measures and policies that restrict the use of plastic. For example, some countries have banned the use of microbeads and single-use plastics. Increasing people's awareness can also be effective. When people know they may be harming their own health or the environment, they will use less plastic. For example, they may bring their own reusable shopping bags instead ( オ ) buying plastic bags every time they shop. Creating a

50 sustainable environment will benefit all of us on this planet. (約 770 語)

[注] textile : 布地      affordable : 手ごろな, 安価な      microbeads : 微粒子      cosmetics : 化粧品  
microplastic : マイクロプラスチック(微細なプラスチック粒子)      vast : 膨大な  
pregnant : 妊娠した      placenta : 胎盤      magnetic liquid : 磁性液体      perspective : 視点

(1) ( ア ) ~ ( オ ) に入れるのに最も適切な語を①~④からそれぞれ選びなさい。同じ番号を2度使ってよい。

① as      ② by      ③ of      ④ with

(ア)(      ) (イ)(      ) (ウ)(      ) (エ)(      ) (オ)(      )

(2) 下線部(カ)を日本語に訳しなさい。

(3) 次の A ~ E の文に続くもの、または質問の答えとして最も適切なものを、①~④から1つずつ選びなさい。

A Plastic is used

- ① mainly for packaging and bags.
- ② less today than in the 1950s.
- ③ for multiple purposes across many fields.
- ④ for its convenience rather than for its cost. (      )

B The problem with plastic is that

- ① its durability also works as a disadvantage.
- ② it is hard to shape.
- ③ it takes a long time to recycle.
- ④ we need a lot of oil to keep producing it. (      )

C Which is NOT true about microplastics?

- ① They have not been researched very much.
- ② They are put into some cosmetics.
- ③ They are found in the air around us.
- ④ They can be easily gathered. (      )

D What is a difference between Bubble Barrier and ferrofluid mentioned in the article?

- ① Ferrofluid is cheaper to make.
- ② Ferrofluid can collect microplastics of all sizes.
- ③ Bubble Barrier uses a complex new technology.
- ④ Bubble Barrier can be used inside waterpipes. (      )

E Ferreira thinks the world needs more

- ① experienced scientists.
- ② young teachers.
- ③ creative minds.
- ④ innovative transportation methods. (      )