

Starting up

- How often do you eat fish?
- How often do you eat meat?
- Have you made any changes to your diet because of the climate emergency? Or do you think you will?

Vocabulary 1 – humans and the environment

Match each word in bold (1–10) with the correct meaning (a–j).

- 1 The **consumption** of meat increases as countries become wealthier. In other words, people who have more money eat more meat.
 - 2 Teachers **monitor** their students closely, working with them in class and reading their work carefully.
 - 3 Our **dependence** on oil has increased. We need it in every area of our lives.
 - 4 In most places, **land-based proteins** such as beef and chicken are an important part of the diet.
 - 5 **Humanity** is having a great effect on the earth. But people can also create good solutions.
 - 6 **Environmentalists** are working to keep earth's air and water clean.
 - 7 As **sustainability** increases, pollution and waste decrease.
 - 8 **Aquaculture** will help feed the world. In other words, fish farms are becoming more important.
 - 9 **Sensors** in the water check the temperature and pressure.
 - 10 Whales and penguins are **endangered** animals. It's possible that they will all die.
- a a strong need for something
 - b the act of eating or drinking
 - c food that comes from animals that live on land rather than in water
 - d to carefully watch and check a situation
 - e people who are concerned about protecting the natural world
 - f the activity of keeping fish for food
 - g people in general
 - h a piece of equipment used for discovering the presence of light, heat, movement etc
 - i having a strong possibility of not existing
 - j the situation or action of being able to continue something without damaging the environment

Reading 1

Read through the article quickly. Are the sentences true (T) or false (F)?

- 1 New technology is being developed to help the fishing industry find new types of fish.
- 2 The technology will identify and monitor fish.
- 3 The main purpose of the technology is to improve the sustainability of fish consumption.
- 4 Tidal is Alphabet's only project related to sustainability.

Google parent Alphabet invents fish recognition system

The advanced research lab at Google's parent company Alphabet, is taking aim at an unlikely new target for its technologies: fish.

In an attempt to boost the use of fish farms, and reduce the world's consumption of wild fish and meat, Alphabet's X Development has invented a system that will eventually recognise and monitor every individual fish in farms that hold hundreds of thousands.

The three-year-old project, dubbed Tidal, is working with farms in Europe and Asia. It pairs underwater cameras with ¹AI techniques such as computer vision to track species including salmon and yellowtail.

The hope, according to Astro Teller, the director of X, is to reduce the world's dependence on land-based proteins, such as beef, and to free the oceans from damaging fishing practices.

"The oceans are falling apart thanks to us, thanks to humanity. So something has to change," he said, discussing Tidal publicly for the first time. "No more [eating] fish isn't really ²on the cards any time soon. What can we do to make it as good for the planet as possible?"

Grace Young, a research engineer on Tidal, added: "Developing technology for the underwater environment is really hard: it's dark, it's cold, it's ³unforgiving, saltwater kills electronics, the ⁴pressure is ⁵crushing, the temperature can ⁶shift from above boiling to below freezing in a matter of minutes."

The team of around a dozen X staff had to build a fresh data set of fish to train its ⁷algorithms, initially by filming in a paddling pool at its Silicon Valley headquarters. Its stereo camera ⁸rig, which is lowered into a farming ⁹enclosure, is able to track fish through their development, using their particular shapes and movements.

"Some of these signals are happening in milliseconds," said Neil Davé, who leads the Tidal project. "You'd be unable to see it with the human eye."

Data and insights collected from Tidal's system are sent to farmers to help them optimise feeding, reduce waste and maintain healthy fish, in the hopes of easing some environmentalists' concerns about overuse of antibiotics.

"Really what we are hoping to do is provide these tools to farmers so that they can move their operations towards more sustainability," said Mr Davé. "There may be an opportunity there to relieve some pressure on wild fishing if we made aquaculture very ¹⁰compelling from an operational and environmental perspective."

The sensors Tidal develops for fishing could also be used for more general ocean monitoring, where researchers often struggle to keep track of endangered species such as whales and penguins in the wild.

The research team formerly known as Google X is best known for its work on self-driving cars, internet balloons and delivery drones.

Environmental concerns have risen higher on X's agenda in recent years, Mr Teller said, even though Alphabet last month shut down its power-generating kites venture Makani. Its other efforts related to sustainability include domestic geothermal power, storing energy in salt and using drones to monitor farming on land.

While Tidal is still early in its development, Mr Teller said he hoped it could become a "substantial business", as well as delivering environmental benefits. "There are several trillion dollars a year at stake in the oceans and in humanity's relationship with the oceans," he said.



Vocabulary 2 – vocabulary in context

Choose the best word(s) to complete the definitions of the words in bold in the article.

- 1 *artificial intelligence* / *Alphabet invention*
- 2 *going* / *not going* to happen
- 3 *easy* / *difficult*
- 4 force of the weight of *fish* / *water*
- 5 very *strong* / *weak*
- 6 *change* / *not change*
- 7 *power* / *instructions* for a computer
- 8 *memory card* / *equipment*
- 9 *closed area* / *ocean*
- 10 *impossible* / *possible*

Reading 2

Choose the best answer to each question.

- 1 What will the new technology be able to identify?
a) single fish
b) types of fish
c) fish farms
- 2 What does Astro Teller hope to reduce the consumption of?
a) fish
b) beef
c) protein
- 3 How does the system track individual fish?
a) By sound.
b) With small computers inside each fish.
c) Their shape and the way they move.
- 4 How will the data help fish farmers?
a) It will identify the most delicious fish.
b) It will help to deliver antibiotics.
c) It will help them care for the fish.
- 5 According to the article, what other areas has Google X done research and development in?
a) whale farming
b) making electricity
c) flying cars
- 6 Where does Astro Teller say a lot of money can be made?
a) ocean-related technology
b) managing endangered species
c) fishing

Grammar – present simple and continuous

Complete the sentences with the correct form (present simple or continuous) of the verb in brackets.

- 1 Alphabet has many projects. At the moment the company (develop) technology for monitoring fish.
- 2 The world's consumption of fish (increase), so we need to manage fish farms efficiently.
- 3 The new technology (combine) underwater cameras with artificial intelligence.
- 4 The company (want) to reduce the world's dependence on land-based proteins.
- 5 According to Astro Teller, people (destroy) the oceans.
- 6 Fish farms (do) less damage to the environment than fishing.
- 7 Astro Teller says that as Tidal develops the product, he (think) of both the financial and the environmental benefits.
- 8 Right now, Alphabet also (work) on self-driving cars and alternative sources for power.

Further discussion

Astro Teller wants to help to produce food that doesn't harm the environment. How does food production harm the environment? What other sustainable food sources do you know about?

Group work

Work together to answer these questions.

- 1 Astro Teller says that we won't soon stop eating fish. What are your 'must-have' foods – things that you really wouldn't want to stop eating?
- 2 Tidal is working to make fish farming sustainable. Does your employer have a policy on sustainability? Is it doing anything specific to help protect the environment?
- 3 What other changes do you think businesses or industry need to make to address the climate crisis?

ANSWER KEY**Starting up:**

Students' own answers

Vocabulary 1

1 b	6 e
2 d	7 j
3 a	8 f
4 c	9 h
5 g	10 i

Reading 1

1 F	3 T
2 T	4 F

Vocabulary 2

1 artificial intelligence	6 change
2 going	7 instructions
3 difficult	8 equipment
4 water	9 closed area
5 strong	10 possible

Reading 2

1 a	4 c
2 b	5 b
3 c	6 a

Grammar

1 is developing	5 are destroying
2 is increasing	6 do
3 combines	7 's thinking
4 wants	8 is working

Further discussion

Students' own ideas and answers. Raising animals for food produces methane and CO₂, both of which contribute to global warming. A lot of food production uses chemicals that enter rivers and lakes and harm wildlife. Some companies now produce a product that is almost identical to meat, but is made by people.

Group work

- 1 Students' own answers
- 2 Students' own answers
- 3 Students' own answers

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