BBC LEARNING ENGLISH

6 Minute English
Food made in space

This is not a word-for-word transcript

Neil
Hello. This is 6 Minute English from BBC Learning English. I'm Neil.

Georgina
And I'm Georgina.

Neil
Last November Nasa launched a very unusual home delivery service – a rocket carrying four tonnes of supplies to the ISS - the International Space Station.

Georgina
Among the scientific equipment were twelve bottles of red wine from the famous Bordeaux region of France.

Neil
The astronauts might have wanted a glass of wine with dinner, but the real purpose of the bottles was to explore the possibility of producing food and drink in space – not for astronauts but for people back on Earth.

Georgina
In today's programme we'll be finding out how growing plants in space can develop crops which are more productive and more resistant to climate change here on Earth.

Neil
And we'll hear how plants can grow in environments with little or no natural light. But first, today's quiz question: what was the first food grown in space? Was it:
a) potatoes
b) lettuce, or
c) tomatoes?

Georgina
Well, in the film, *The Martian*, a stranded astronaut grows potatoes on Mars. I know it's only a film but I'll say a) potatoes!

Neil
OK. We'll find out the answer later. Now, you might be wondering how it's possible to grow plants without natural light. British company *Vertical Future* has been working on this problem by developing indoor farming methods in partnership with Nasa.

Georgina
Here's their Head of Research, Jen Bromley, explaining the process to BBC World Service programme, *The Food Chain*:

Jen Bromley
Basically we use LED lighting and we use **LED lights** that are tuned to a specific **wavelength.** So, if you image what the rainbow looks like, the reason a plant looks green is because it's not using all the green light – it actually reflects a lot of that back. So the reason why it looks pink in here is because we're actually only using red light and blue light to grow the plants, and that essentially tailors the light diet so that the plants look black when you look at them because they're not reflecting any light– they're being super-efficient, they're using up every **photon** that hits them.

Neil
The lack of natural light in space means that plants are grown using **LED lights** – LED is an abbreviation of 'light emitting diode' - an electronic device that lights up when electricity is passed through it.

Georgina
On Earth plants look green because they reflect back any light travelling at a certain **wavelength** - the distance between two waves of light which make things appear to us in the various colours of the rainbow.

Neil
But when scientists control the wavelengths being fed, plants are able to absorb every **photon** – particle of light energy, making them appear black.

Georgina
Each particle of light that hits the leaves is absorbed and through photosynthesis is converted into plant food. Nasa found that different colour combinations, or light recipes, can change a plants' shape, size and even flavour.

Neil
But the lack of natural light isn't the biggest obstacle to growing food in space. Here's Gioia Massa, chief plant scientist at the Kennedy Space Centre in Florida, to explain:

Gioia Massa
Microgravity is really challenging but plants are amazing! They can adapt to so many different environments – we call this **plasticity** because they can turn on or off their **genes** to really adapt to all sorts of conditions and that's why you see plants growing in different areas on Earth - the same type of plant may look very different because it's adapting to the environment in that specific location.

Georgina
On Earth, plants use gravity to position themselves – shoots grow up, roots grow down. But this doesn't apply in space because of **microgravity -** the weaker pull of gravity making things float and seem weightless.

Neil
Plants can only survive in these conditions due to their **plasticity –** the ability of living organisms to adapt and cope with changes in the environment by changing their biological structure.

Georgina
Plants adapt themselves to being in space by manipulating their **genes** - chemicals and DNA in the cells of plants and animals which control their development and behaviour.

Neil
In the low-gravity atmosphere of space, plants become stressed but they adapt genetically.

Georgina
And as a result they're stronger and more resilient to other, less stressful events when they return home to Earth.

Neil
Like those bottles of red wine orbiting Earth as we speak. The effects of microgravity on the wine's organic composition will be studied and could hopefully offer solutions for growing food in Earth's changing climate.

Georgina
So, Neil, if it wasn't red grapes, what *was* the first food grown in space?

Neil
Ah yes, in today's quiz question I asked what the first plant grown in space was.

Georgina
I said, a) potatoes.

Neil
But in fact it was… b) lettuce - grown over fifteen months on the ISS, then eaten in fifteen minutes in the first ever space salad.

Georgina
Today we've been discussing the possibilities of growing plants in space using **LED lights** – devices that use electricity to produce light.

Neil
The energy needed for plants to grow is contained in **photons** – or light particles, travelling at different **wavelengths** – distances between light waves which make things look different colours.

Georgina
Plants have evolved over millennia using the strong gravity on Earth. But this changes in space because of **microgravity** – the weaker gravitational pull making things in space float and seem weightless.

Neil
Luckily plants use their **genes** – the chemicals in DNA responsible for growth - to adapt to new environments by changing their biological structure – a process known as **plasticity.**

Georgina
All of which makes it possible for astronauts to enjoy a glass of wine and green salad in space.

Neil
And genetically stronger plants specimens to study back on Earth.

Georgina
That's all for today but join us again soon at 6 Minute English. Bye for now!

Neil
Bye!

VOCABULARY

LED light
electronic device that lights up when electricity is passed through it - abbreviation of 'light emitting diode'

wavelength
the distance between two waves of light which makes things appear to us in the different colours of the rainbow

photon
single unit of light

microgravity
weaker pull of gravity in space, making things float and seem weightless

plasticity
ability of a plant to adapt to and cope with changes in the environment by changing its biological structure

genes
chemicals and DNA in the cells of plants and animals which control their development and behaviour