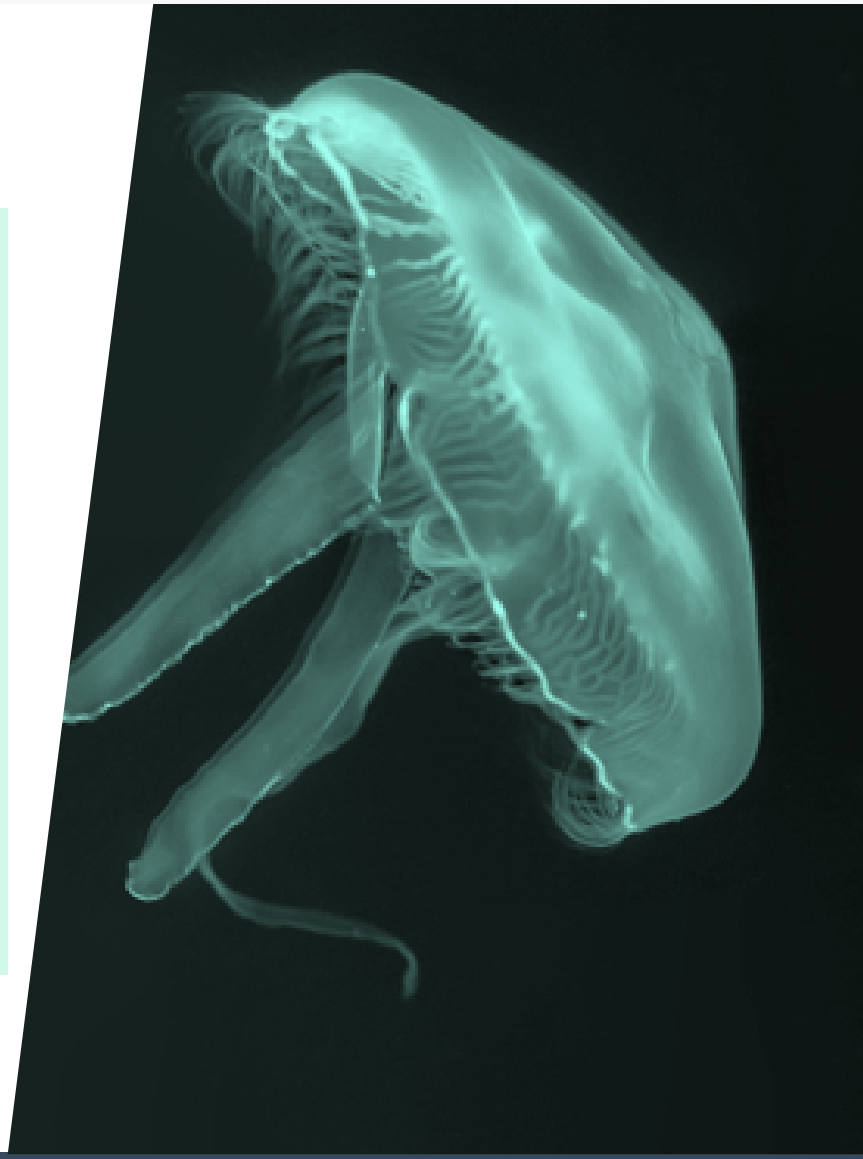
Biological immortality

READING

LEVEL	NUMBER	LANGUAGE
Advanced	C1_3053R_EN	English

Goals

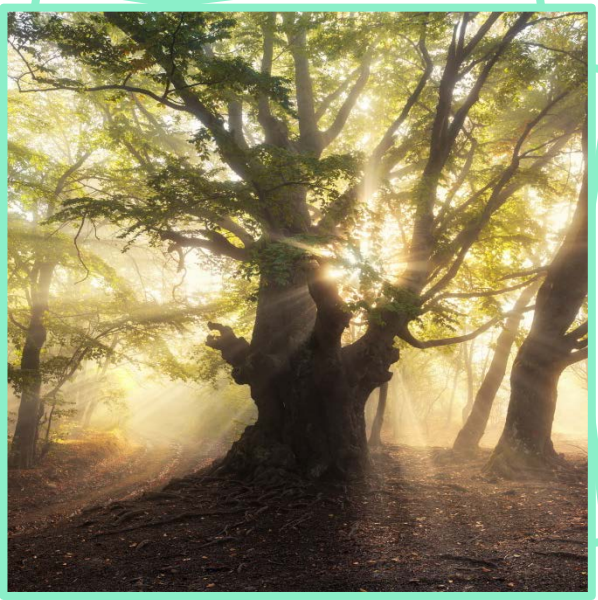
- Can read and understand a complex text about animals with negligible ageing.
- Can maintain an in-depth discussion about ageing and biological immortality.



Ageing is a natural process for human beings. But there are some creatures for which ageing and **immortality** are not part of the **natural order**.

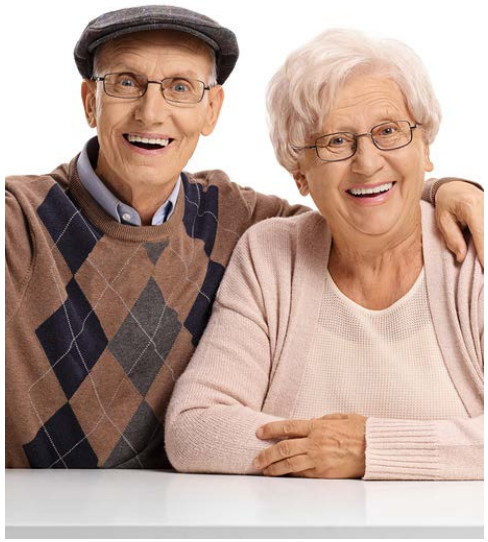
Plants and animals

What are some of the oldest plants or animals on Earth? Have you seen any of them in real life?



Speaking

Answer the questions below with your teacher or classmates.



1. What is the average life expectancy in your country?
2. What usually causes death in humans?
3. Are there any ways we can prolong our life?

Immortality in legends

Immortality was a theme in many ancient **legends**, particularly in Ancient Greece. Have you heard any of the stories?

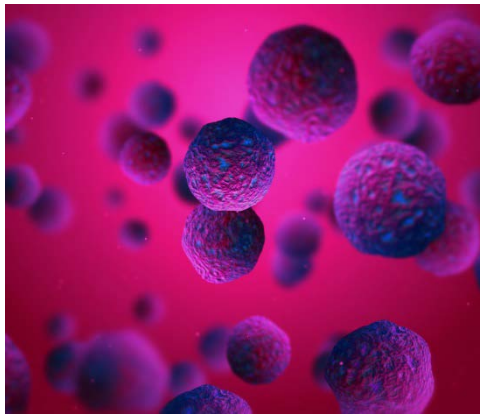
Biological immortality

What if I were to tell you that there are animals and plants alive on our planet today that are **immortal**? Would you think it were a **preposterous** idea?

The natural order of living things, assuming there is no intervention from accident or disease, is that we are born, we age and we die. This **phenomenon** is known in biological terms as **senescence**, or biological ageing, and it is premised upon the fact that, after we are born, our bodies begin moving towards **mortality**. However, it has long been accepted that we can slow this process, shown for example by **caloric restriction** in rats, which extends their **lifespans**. In truth though, in most species on Earth, there is a **measurable functional decline** and immortality is left to the spiritual side of life rather than the biological.

Biological immortality

This may be about to change with discoveries by scientists of **unicellular** and **multicellular organisms** which have **negligible senescence**. Put more simply, some species on Earth do not seem to age and are technically immortal. Scientists, however, are keen to stress that this immortality does not mean that they cannot die. While these species rarely die from ageing, they can be killed by accident or illness just like the rest of us.



Vocabulary

What is the difference between these pairs of words and phrases?

immortality
vs
mortality

senescence
vs
negligible
senescence

unicellular
vs
multicellular

preposterous
vs
accepted

Vocabulary

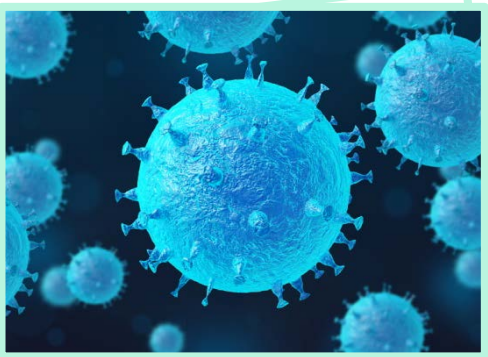
Fill in the gaps with vocabulary from the boxes.

immortality	**unicellular**	**measurable**	**senescence**	**natural**

1. Biological ageing is known as _____.
2. Both _____ and multicellular organisms are known to experience negligible senescence.
3. The idea that we are born, age and die is the _____ order of things.
4. In almost all species on Earth, including humans, there is a _____ functional decline as we age.
5. _____ is a biological phenomenon seen in several different organisms.

Immortal beings

You are going to read about these plants and animals in connection with biological immortality. Do you think they are immortal?



Biological immortality

We will start by looking at plants rather than animals, as it is probably easier for us to **grasp** immortality in this way. We already know that some trees are extremely old, but did you know that there are trees which are upwards of 5000 years old? **Bristlecone pine trees** may not look the same as they did in their youth, having been subject to storms, lightning strikes and many other natural phenomena, but a study of their pollen, seeds and **vascular tissue** showed no biological ageing. In other words, these trees seem to be able to live forever.

Moving on now to unicellular species, we can think about bacteria. Many unicellular organisms do age, as they start to divide more slowly with the passage of time. However, some bacteria **replicate** via **symmetrical division** i.e. the cell splits symmetrically to create two **daughter cells**. Through this process, the **original cell** is often restored back to its healthy, youthful state. Under the right conditions, this process can repeat itself forever.

Biological immortality

The jellyfish is one of the best known species which might be immortal, but we will first look at a species related to it, the **hydra**. You might recognise the name from the hydra of ancient mythology and this is no coincidence: the animal hydra was so named because it is able to use its **stem cells** to regrow its own body in case of an accident, much like the mythological hydra growing a new head. Scientists even believe that they have identified the **protein** within the hydra which is responsible for its **anti-ageing**, called the **Fox-O gene**, and they believe that this gene might be responsible for slowing ageing across the animal kingdom. This is a **ground-breaking** discovery.

Do you know what these words mean?

grasp

vascular tissue

symmetrically

stem cells

protein

ground-breaking

Living longer

The text says that some bristlecone pine trees are 5000 years old. Discuss with your teacher what it would be like to live that long and what kind of things you would have seen if you had lived for thousands of years.

A ground-breaking discovery

Why might the **discovery** of a **protein** responsible for anti-ageing be **ground-breaking**?

How could **scientists** use this discovery in the future?

Biological immortality

Back to the jellyfish. There is one particular jellyfish which is considered to be immortal because, when faced with danger in the form of environmental conditions, it can **sink** to the ocean floor and **revert to** an earlier phase in its life when it resembled only a **collection of cells**. It can then become a fully-formed adult jellyfish again once the danger has passed. This process can be repeated endlessly, meaning that the jellyfish will never die from **natural causes**.

Biological immortality

Finally we will look at lobsters, which are not considered to be immortal but certainly do not age in the same way that many other creatures do. Lobsters do not stop growing as they age, nor does their **reproductive ability** lower, and they are also able to **regenerate** lost limbs at relatively old ages. Scientists believe that this may be due to high amounts of an **enzyme** called **telomerase**, which can prevent cell ageing. Lobsters, however, do die eventually, with the demanding process of growing a new shell getting too much for older lobsters.

Vocabulary matching

Match the vocabulary on the left to the definitions on the right.

to sink	a chemical substance which causes reactions
to revert to	to grow again
reproductive ability	to go to the bottom of a liquid or soft substance
to regenerate	ability to have babies or young
enzyme	to return to something

Writing

Write a couple of sentences for each of the animals and plants mentioned in this lesson about how they relate to biological immortality. Use your own words.

lobster

bristlecone pine

Science and ageing

Read the sentences below and comment on them with your teacher or classmates. Do you agree? What might that science look like?

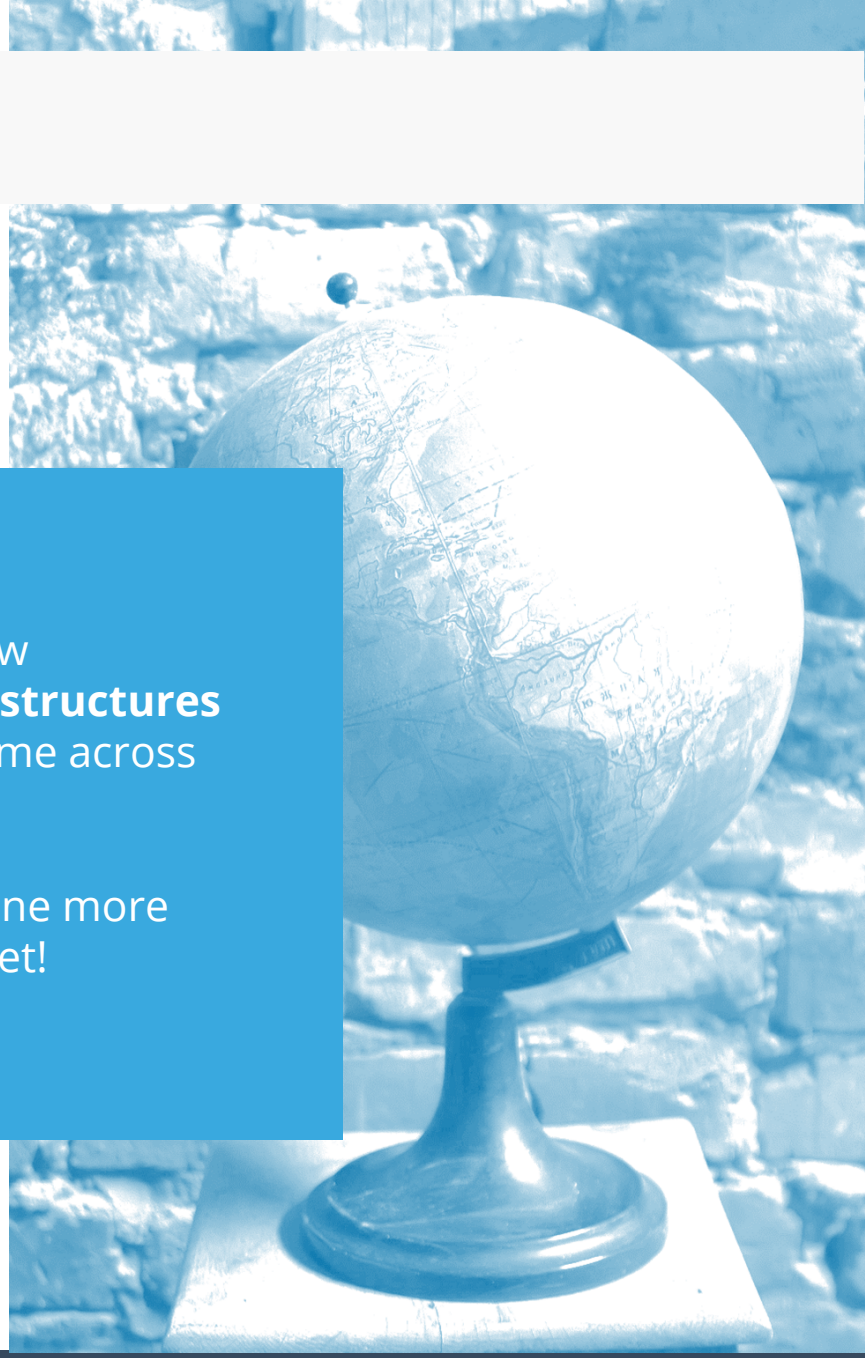
> The science of ageing is done. We now need to concentrate on the science of longevity.

Immortality in fiction

Have you seen any films or read any books about immortality?

How is immortality portrayed in fiction? Is it usually positive or negative?

Reflect on this lesson



Take a moment to review any new **vocabulary**, **phrases**, **language structures** or **grammar points** you have come across for the first time in this lesson.

Review them with your teacher one more time to make sure you don't forget!

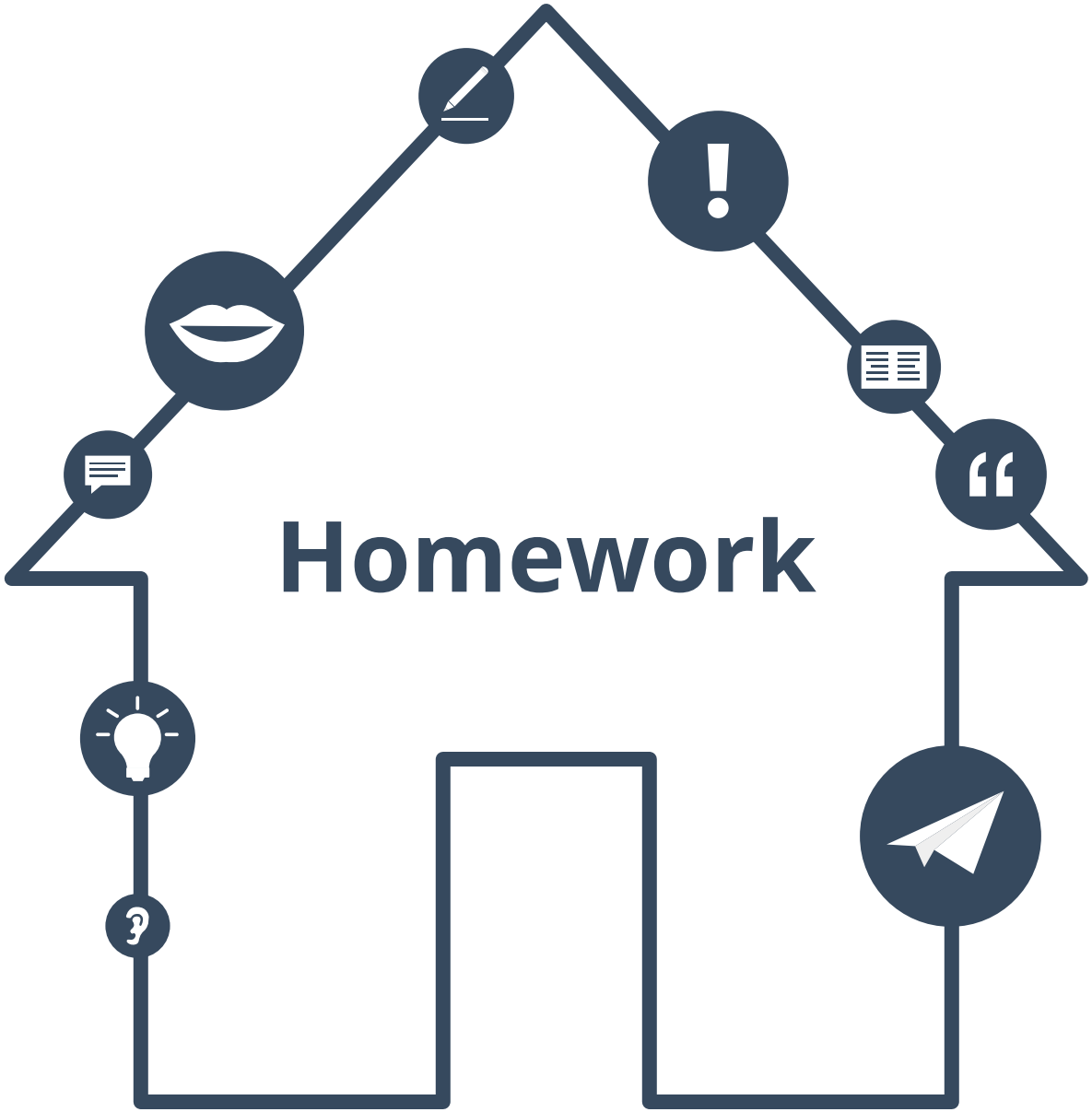
Answer key

Exercise p. 10

1. senescence, 2. unicellular, 3. natural, 4. measureable, 5. immortality

Exercise p. 19

sink: to go to the bottom of a liquid or soft substance
revert to: to return to something
reproductive ability: being able to have babies or young
regenerate: to grow again
enzyme: a chemical substance which causes reactions


Homework

Fill in the gaps

The natural _____ is that we are born and, because we are mortal, we age and then die. However, there are some plants and animals which are _____ and do not follow the pattern of _____ as most other living things do. One species of _____ can revert to a state of youth before growing back to being an adult many times over. There are also _____ trees which are over 5000 years old and which show no signs of ageing at all.

immortal

bristlecone pine

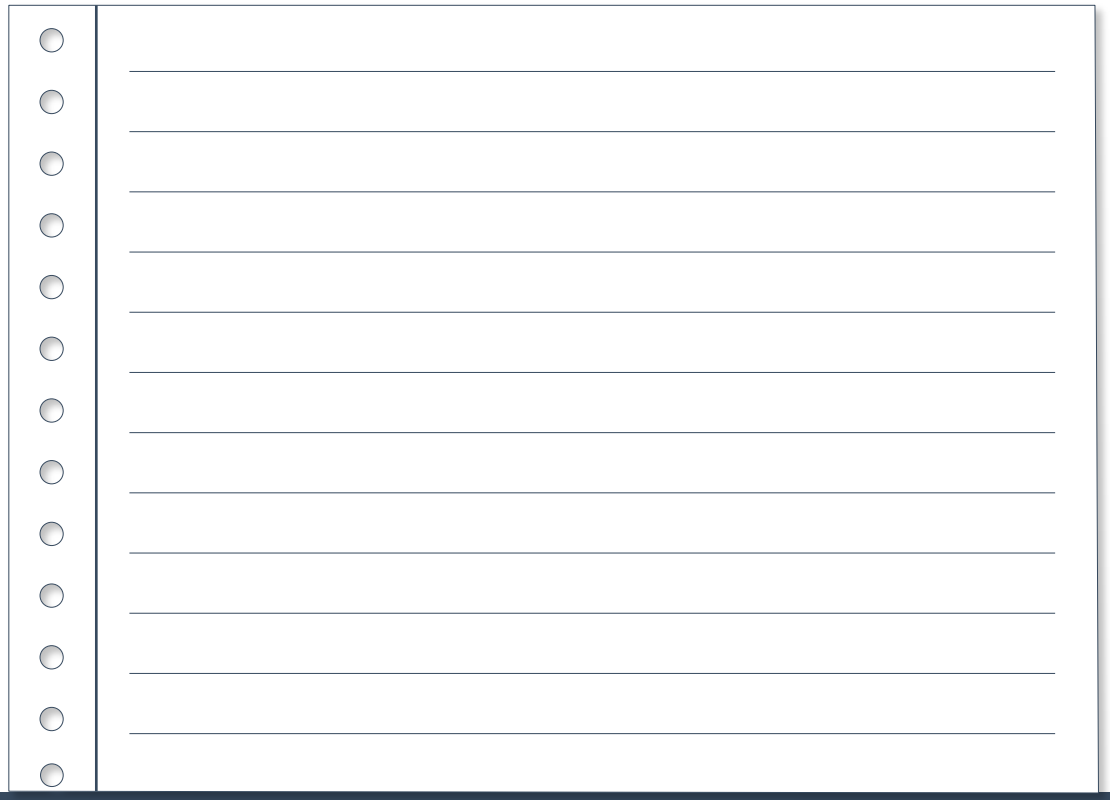
order

jellyfish

senescence

Writing

Find out about a plant or animal which is considered to be biologically immortal or which ages extremely slowly and write a short text about it here.



Homework answer key

Exercise p. 26

order, immortal, senescence, jellyfish, bristlecone pine

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