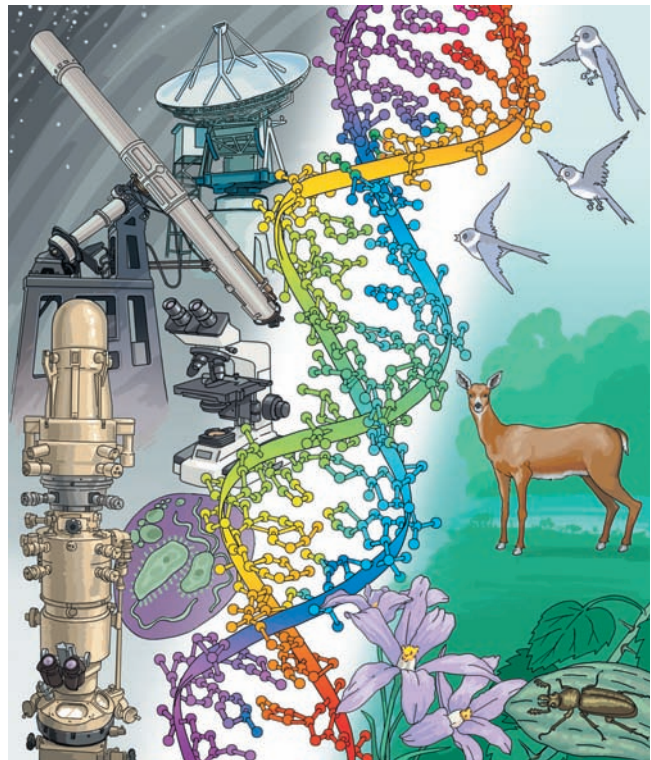


# Biology - an introduction

## Before you read

Discuss these questions with your partner.

- What can you see around you that is living?
- What can you see that is not living?
- What can living things do that non-living things can't?
- Can you classify living things?



## A Vocabulary

Match these words with their definitions.

- |                      |  |
|----------------------|--|
| 1 life cycle         | A characteristic   |
| 2 observation        | B from birth to death  |
| 3 property           | C develop an idea  |
| 4 successor          | D what you see   |
| 5 formulate          | E sb who follows   |
| 6 pollen             | F a fine yellow powder found in flowers                                      |
| 7 contribution       | G sth given to help progress   |
| 8 foundation         | H what is passed down from one generation to the next                        |
| 9 treat              | I give medical help  |
| 10 classify          | J process according to which only the strongest species survives             |
| 11 inheritance       | K academic   |
| 12 natural selection | L put into groups  |
| 13 field             | M basic idea   |
| 14 principle         | N academic area  |
| 15 advance           | O improvement  |
| 16 scholar           | P basis  |
| 17 genetics          | Q the study of how characteristics are passed from one generation to another |

## Reading 1

### Biology A short history

Biology means *the study of life* and it is the science which investigates all living things. For as long as people have looked at the world around them, people have studied biology. Even in the days before recorded history, people knew and passed on information about plants and animals. Prehistoric people survived by learning which plants were good to eat and which could be used for medicine. Farming would not have developed if they had not begun to understand which animals could produce food like milk and eggs.

In the past, more than 2000 years ago, people in the Middle East understood the part that insects and pollen played in the life cycle of plants. The ancient Egyptians studied the life cycle of insects and were particularly interested in the changes they went through as they grew from larvae to adult insects. The ancient Mesopotamians even kept animals in what were the earliest zoological gardens. The ancient Greeks, too, were greatly interested in understanding the world around them. Aristotle recorded his observations of plants and animals, and his successor, Theophrastus,

wrote the first books on plant life, which made a very important contribution to the study of botany.

After the fall of the Roman Empire, the centre of the scientific world moved to the Middle East. The Arab scholar Al-Jahiz wrote the *Book of Animals* in the 9<sup>th</sup> century. He was just one of a great number of Arabic, Persian and Turkish scientists who set out the foundations for the modern science of biology. Later still, in Europe, particularly in Germany, scholars such as Albertus Magnus discussed the properties of life. Magnus wrote seven books on plants and twenty-six on animals.

Modern biology really began in the 17<sup>th</sup> century. At that time, Anton van Leeuwenhoek, in Holland, invented the microscope and William Harvey, in England, described the circulation of blood. The microscope allowed scientists to discover bacteria, leading to an understanding of the causes of disease, while new knowledge about how the human body works allowed others to find more effective ways of treating illnesses. All this new knowledge needed to be put into order and in the 18<sup>th</sup> century, the Swedish scientist Carl Linnaeus classified all living things into the biological families we know and use today.

In the middle of the 19<sup>th</sup> century, unnoticed by anyone else, the Austrian monk Gregor Mendel created his Laws of Inheritance, beginning the study of genetics that is such an important part of biology today. At the same time, while travelling around the world, Charles Darwin was formulating the central principle of modern biology – natural selection as the basis of evolution.

It is hard to believe, but the nature of viruses has become apparent only within the last half of the 20<sup>th</sup> century and the first step on this path of discovery was taken by the Russian botanist Dmitry Ivanovsky in 1892.

In the 20<sup>th</sup> century, biologists began to recognize how plants and animals live and pass on their genetically coded information to the next generation. Since then, partly because of developments in computer technology, there have been great advances in the field of biology; it is an area of ever-growing knowledge.

## Pronunciation guide

**Albertus Magnus** /əɪ'bertəs 'mægnəs/

**Al-Jahiz** /el 'gʌhəz/

**Aristotle** /æri'stɒtl/

**Carl Linnaeus** /kɑ:rl lɪ'nɪəs/

**Dmitry Ivanovsky** /dɪmɪ'tri: ɪ:vɑ:nɒvski:/

**van Leeuwenhoek** /væn leivən'huk/

**Mesopotamian** /mesəpə'tæmɪən/

**Theophrastus** /θiə'fræstəs/

## B Comprehension

Read the text and decide if these statements are true or false.

- 1 The earliest people must have known about plants or they would have died. T  F
- 2 The Egyptians were interested in changing the way insects lived. T  F
- 3 Europeans learnt all they knew about biology from the Middle East. T  F
- 4 The microscope allowed biologists to treat illnesses. T  F
- 5 Darwin's theory was one of the most important in biology. T  F
- 6 The study of biology hasn't changed at all over the centuries. T  F

## Before you listen

Discuss these questions with your partner.

- Do you know what a germ is?
- What can you say about their size and shape?
- What do you know about the classification of germs?

## C Listening

Listen to this lesson about germs. Circle the correct word or phrase to make true statements.

- 1 The teacher believes people **rightly** / **mistakenly** / **rarely** think all germs are bad.
- 2 Germs don't live on **microbes** / **animals** / **people**.
- 3 **Some** / **all** / **few** germs are responsible for illnesses.
- 4 There are four basic types of **fungi** / **protozoa** / **germ**.
- 5 Germs are **only round** / **mostly long and thin** / **different shapes**.

## Before you read

Discuss these questions with your partner.

- What careers in biology can you think of?
- Do you like any of them? Which ones and why?
- Are there any areas of biology that you do not find interesting?
- What areas of biology do you consider the most important for human society nowadays? Why?

## D Vocabulary

Complete the sentences with words from the box.

- |               |                   |
|---------------|-------------------|
| ■ mammal      | ■ threatened      |
| ■ species     | ■ adapt           |
| ■ cell        | ■ diseases        |
| ■ environment | ■ crops           |
| ■ composition | ■ building blocks |

- 1 Unfortunately, the growth of cities often means wildlife is ..... with extinction.
- 2 A ..... is an animal that feeds its babies milk.
- 3 Farmers that grow ..... like cereals and vegetables normally have to work very hard.
- 4 The smallest basic structural and functional unit of life is a .....
- 5 Serious illnesses are known as .....
- 6 What something is made of is its .....
- 7 It's amazing how animals can ..... to changes in their living conditions.
- 8 There are many different ..... of butterfly.
- 9 Humankind's actions have often had a negative effect on the .....
- 10 The most basic parts of something can be called .....



## Reading 2

# Biology today

Dear Students,

I am writing this letter to welcome all of you who are about to begin your first year course in biology here at the university. You might think it is a little early for me to ask you to think about what you will do when you leave here in three years' time. However, our science, like any other, has so many different areas it is impossible for you to study them all. The first thing you will need to think about is specializing. This letter is to offer you some suggestions to think about for your future.

As you know, there are four main areas of biology that we shall concentrate on in the coming years. Biology can be divided into zoology, the study of animal life, and botany, the study of plant life. We shall also study molecular biology, the study of how the building blocks of living things, the cells, work. Another topic of interest is genetics, how biological information is passed on from one

generation to the next: that is, inheritance. You should specialize, but you will also need to know about all of these four areas of study. Plants and animals do not live separately from each other; all living things are made up of cells and one of the things genetics tells us is how plants and animals adapt to the conditions around them.

So what about after the course is over and you have graduated in biology? Can you have a career in biology? For those who choose to specialize in genetics or molecular biology there are important career opportunities in medicine. At the present time, there is a great deal of research going on in gene therapy where biologists are working with doctors and chemists to find new ways of treating diseases. Other biologists are looking at ways of changing the genetic composition of the plants we grow for food; of making them more able to fight diseases and at the same time produce more food.

We are experiencing a period of climatic change too, and this is having an effect on the way animals and plants live. The science of ecology is becoming more and more important; biologists who specialize in zoology are working in many parts of the world. Some are working to protect species like the tiger, which are seriously threatened by climate change. Others are investigating wildlife from the smallest insects to the largest mammals, trying to understand how they all live together. Botanists are looking at the effect new types of food crops have on the environment and how changes in that area can affect our general health. There is even a new area of biology called astrobiology, which is looking at the possibilities of life on other planets – but perhaps that is something for the more distant future.

Whatever you specialize in, as long as there is life on this (or any other) planet, there is work for a biologist.

Good luck and enjoy your studies!

Jean Shearer

Professor of Biology

## Pronunciation guide

**career** /kə'riə/

**climatic** /klaɪ'mætɪk/

**gene** /dʒi:n/

**genetics** /dʒi'netɪks/

**inheritance** /ɪn'herɪtəns/

**molecular** /mə'lekjulə/

**species** /spi:'fi:z/

## E Comprehension

Read the text and answer the questions in your own words.

- 1 What four areas can biology be divided into?
- 2 If you are interested in cells, which area should you study?
- 3 How can zoologists help animals in the wild?
- 4 In what way can botanists protect people and the environment?
- 5 What is astrobiology?

## Before you listen

Discuss these questions with your partner.

- What do you know about climate change?
- How do you imagine plants and animals are affected by global climates becoming warmer?

## F Listening

Listen to part of a TV programme about climate change. Then decide if the following statements are true or false.

- 1 The report suggests there are reasons for hope as well as worry. T  F
- 2 In the past, ice ages and droughts killed off all life. T  F
- 3 Temperatures are rising at five degrees every century. T  F
- 4 Some plants and animals move as climates become warmer. T  F
- 5 There are mountain animals that will die if temperatures rise. T  F

## G Speaking

Discuss these questions with your partner.

- How important do you feel the study of biology is for our world today?
- Would you prefer not to study it? Why?
- Are there any areas of biology which you think are more important than others?

### Task

Prepare a short presentation to answer the question: 'What is biology?'

Use the information in both texts.

Talk about:

- what the study of biology includes
- the four main areas of biology
- where biologists work
- what biology informs us about

First complete these notes. Use them in your presentation.

Biology: The study of .....

There are four main areas:

..... is about .....

..... is about .....

Molecular biology is about .....

..... is about inheritance.

Biologists work in .....,

..... and .....

In conclusion, biology is about .....

Remember to:

- read the texts again
- select information that is relevant
- add examples where you can

## Speaking tips

- ✓ Speak from notes.
- ✓ Don't write out everything you plan to say; use key words.
- ✓ Introduce each new idea clearly.

## H Writing

Write a letter to your tutor telling him or her which areas of biology you would like to specialize in and why. Use these notes to help you.

Dear Mr / Mrs (tutor's surname),

Writing to tell you choices I have made

Specialize in: (one or two of the main areas)

Reasons for choosing: interested in (plants / animals / laboratory work / latest ideas / your own ideas)

Possible career choices: what I hope to do when I graduate (medicine / ecology / agriculture / your own idea)

Offer to meet and discuss choices: I would like your advice and hope we can ...

Yours sincerely,

(your full name: first name + surname)

Write 100-150 words.