



Track 1

Living organisms and their vital functions

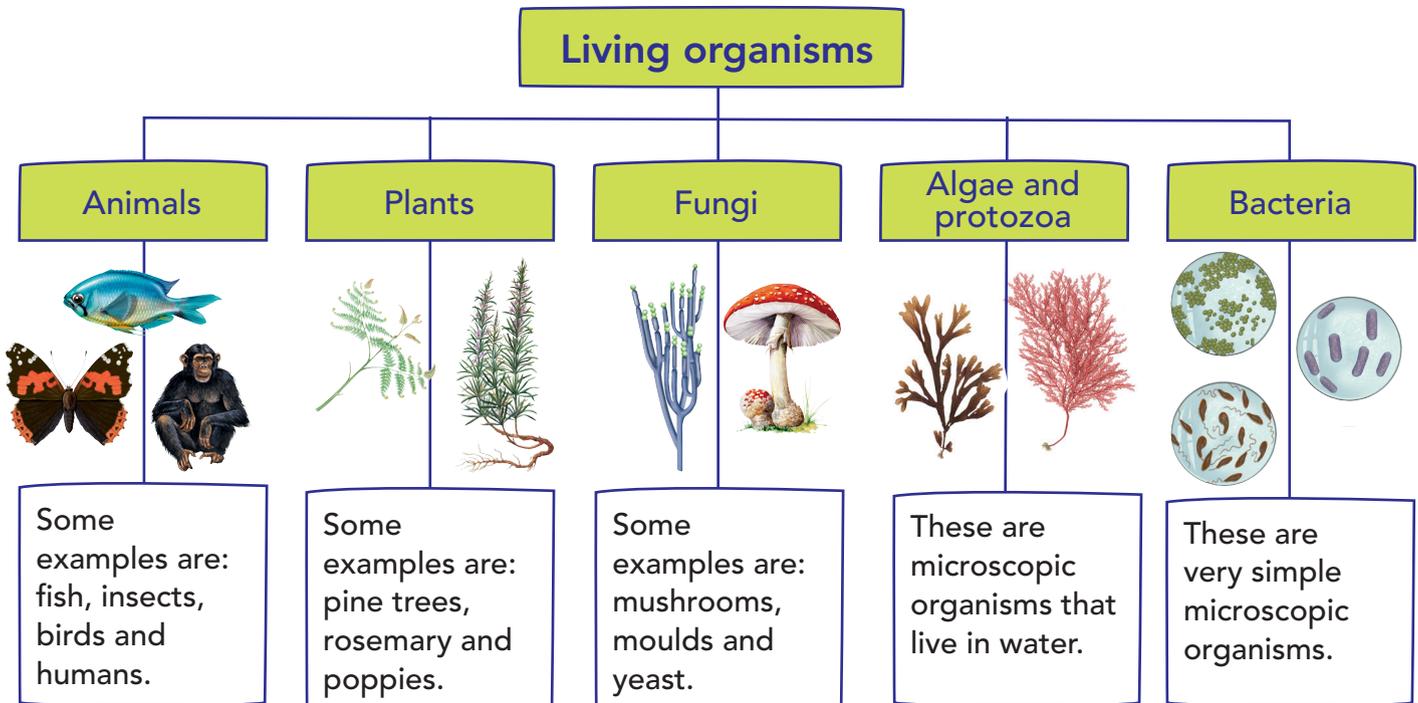
Our planet is full of living organisms, both on land and in the water. There are even some in the air, underground and inside other living organisms!

Biologists say that something is a living organism if it performs the three **vital functions** and is made up of **cells**. The three vital functions are:

- **Nutrition**, which is the process of getting food to obtain energy or to grow and release waste.
- **Interaction**, which is the reaction to changes in the environment.
- **Reproduction**, which is producing offspring.

Cells

Cells make up all living organisms. Each cell is able to perform the three vital functions. Cells are microscopic, exist in various shapes and are made up of a type of membrane. They function thanks to tiny particles found within a thick substance in this membrane.



1 What are the two factors that determine if something is a living organism?



Track 2

The nutrition function in plants

Like all living things, plants need to perform three vital functions: **nutrition**, **interaction** and **reproduction**.

Through the nutrition function, plants make their own food, breathe, distribute and use substances, and remove waste.

Plants make their own food

To make their own food, plants take simple substances from soil, air and light and perform the process of **photosynthesis**.

Plants absorb:

- **Water** and **minerals** from the soil through their roots. This mixture of raw sap called **xylem sap**, reaches the leaves via thin tubes inside the plant called the **conducting vessels**.
- **Carbon dioxide** from the air through tiny holes in their leaves.
- **Energy** from sunlight.

Plants perform photosynthesis

The process of photosynthesis uses the energy from sunlight combined with **carbon dioxide** and water to convert xylem sap into **phloem sap**, which feeds the plant, and expels **oxygen** as waste.

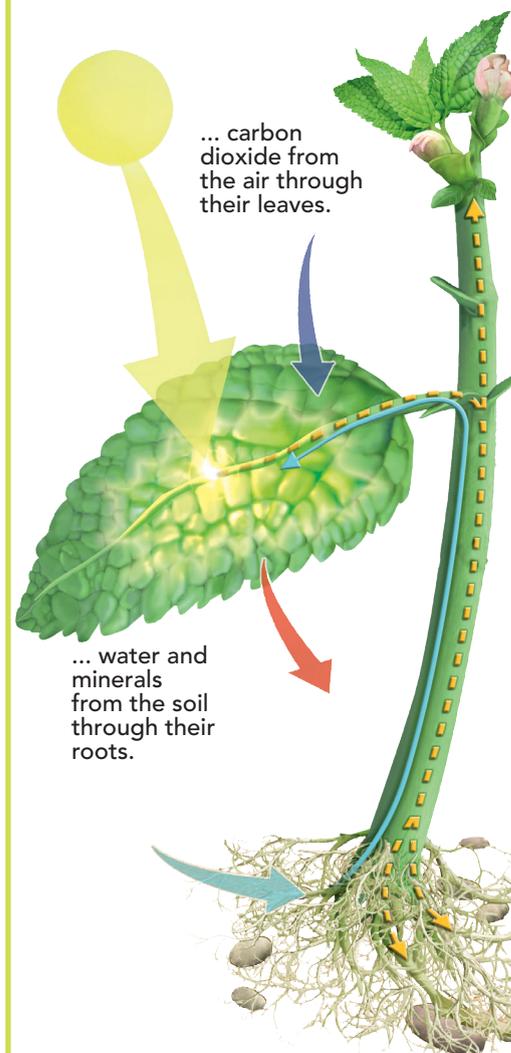
Plants are so important as humans and most animals need oxygen to breathe.

1 a) What substances do the roots of a plant absorb?

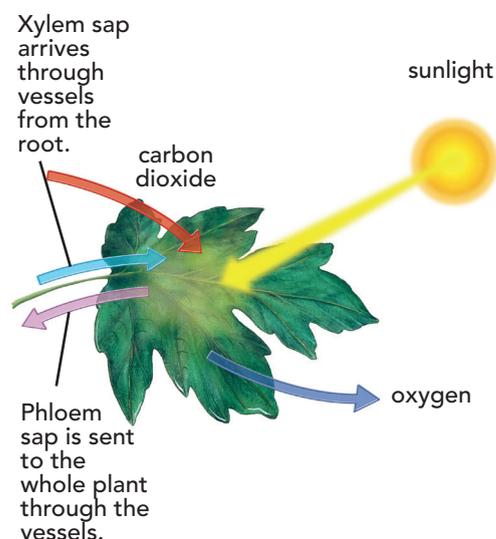
b) What is this mixture called?

2 Explain briefly what photosynthesis is.

Plants absorb...



Photosynthesis





Track 3

Plants respire

Just like animals, plants need oxygen and must **respire** in order to live.

To respire, plants absorb oxygen, and then release carbon dioxide. They do it in small amounts throughout the plant.

Plants use substances

Plants carry the food they produce, in the form of phloem sap, throughout the plant via the conducting vessels.

Plants use this food to grow and to obtain energy.

Some of the food is also stored in the roots, fruits and other parts of the plant.

Plants release waste

Plants release waste products into the environment. These products are released as:

- oxygen through photosynthesis.
- carbon dioxide through respiration.
- excess water in vapour form.

3 What do plants release when they respire?

4 What substance do plants produce and carry via the conducting vessels?

5 Where do plants store their food?

6 Answer these questions in your notebook:

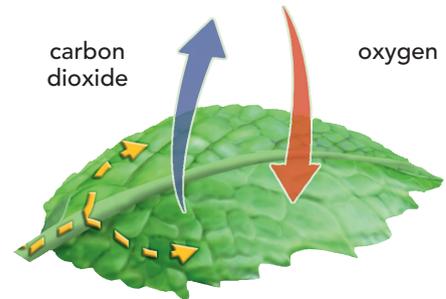
a) What three products do plants release as waste?

b) How are these products released?

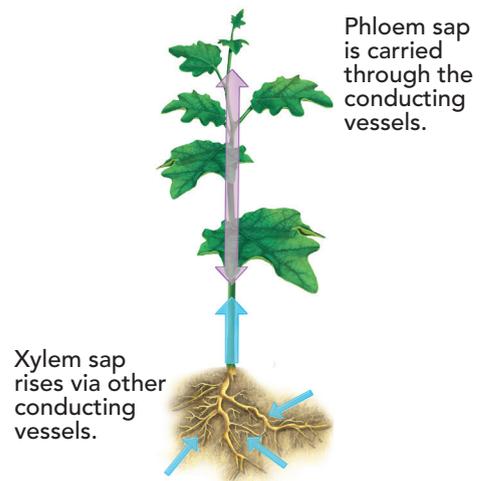


Now that you know how photosynthesis works, why do you think leaves are usually flat?

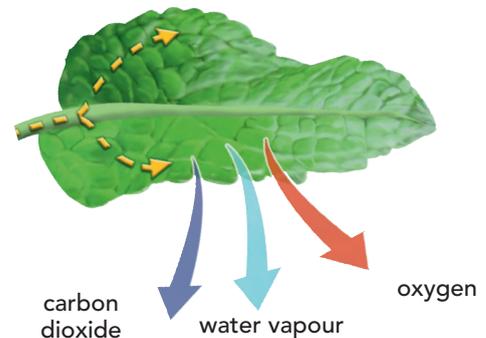
Nutrition function in plants



Respiration of plants



Distribution of substances



What plants release

Did you know...?

In one year, an average size tree produces enough oxygen for a family of four.



Track 4

The interaction function in plants

Through the interaction function, plants react and adapt to changes that occur in their environment.

- **Reactions to light.** Green stems grow towards their main source of light. The leaves and flowers of many plants slowly change their orientation to follow the Sun during the day. Many plants **bloom** or lose their leaves or flowers depending on the amount of daily sunlight they receive.
- **Reactions to water.** Roots grow in areas of soil that have the water they need.
- **Reactions to contact.** Stems of climbing plants can grow over and around any object they touch. Certain plants can produce toxic substances to stop attacking insects or other animals from eating them.

Plants and the seasons

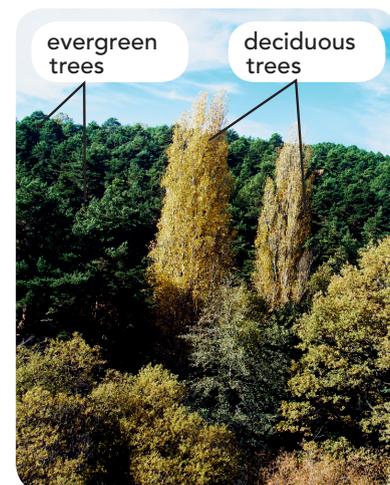
The seasons of the year can affect them greatly and produce major changes in plant activity and appearance.

- In spring there are more hours of daylight and it becomes warmer. This makes many plants grow **buds** and leaves. This is the time when plants begin to produce flowers or bloom. It is also when there is an increase in insect and bird activity.
- In autumn there are less hours of daylight and it becomes colder. Many trees begin to lose their leaves and plants lose their flowers to avoid damage from the cold. Trees that lose their leaves in winter are **deciduous**. Trees that keep their leaves are **evergreen**.

Seasonal changes to plants



Plants bloom in spring.



Plants lose their leaves in autumn.



1 How do plants react to light?

2 What kind of trees lose their leaves in autumn?

The reproduction function in plants

Through the reproduction function, plants produce offspring. Most plants reproduce via their flowers, through the stages of: **pollination, fertilisation, seed and fruit formation, and germination.**

Pollination

Pollination is the arrival of **pollen** from the stamens of one flower to the **pistil** of another flower of the same type.

In order to travel from one plant to another, pollen must be transported, by wind, water or animals, which are known as **pollinators.**

Plants that pollinate usually have lots of petals that together form the **corolla.** They also have bright flowers and produce sweet **nectar** to attract animals. Most pollinators are insects.

Fertilisation

Fertilisation in plants is the union of the pollen grain and the egg (**ovule**). This fertilised ovule forms an **embryo**, which develops into a seed.

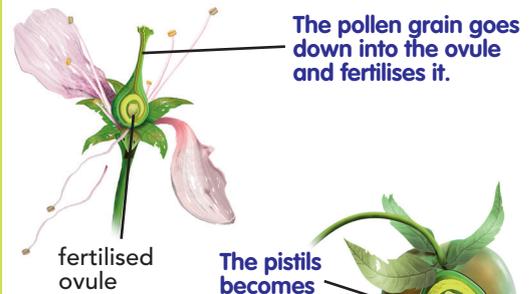
Seed and fruit formation

The embryo develops inside a layer of nutrients and the protective outer seed shell. The pistil changes shape and size and becomes the fruit that nourishes and protects the developing seeds inside.

Germination

Germination is the development of the embryo contained within the seed, to form a new plant.

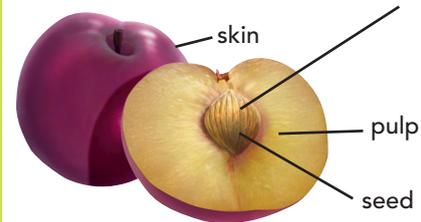
How plants reproduce



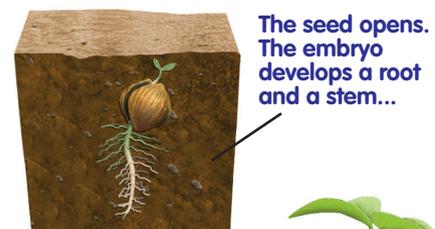
1 Fertilisation



The fertilised ovule becomes a seed.



2 Seed and fruit formation



... and becomes a new plant.

3 Germination



1 Draw a diagram showing the stages of reproduction in a plant.



Track 6

Water and living organisms

One of the reasons that there is life on the Earth is because there is water. Without water, life is not possible.

Every living organism on the Earth needs water for a variety of reasons.

- Water is part of a living organism's composition.
- Living organisms need water to perform their vital functions.
- Living organisms live in water.



Track 7

The water cycle and life

The majority of the Earth's surface is covered with water.

The circulation of water on Earth is known as the **water cycle**.

It takes place in the following three steps:

1 Water enters the atmosphere.

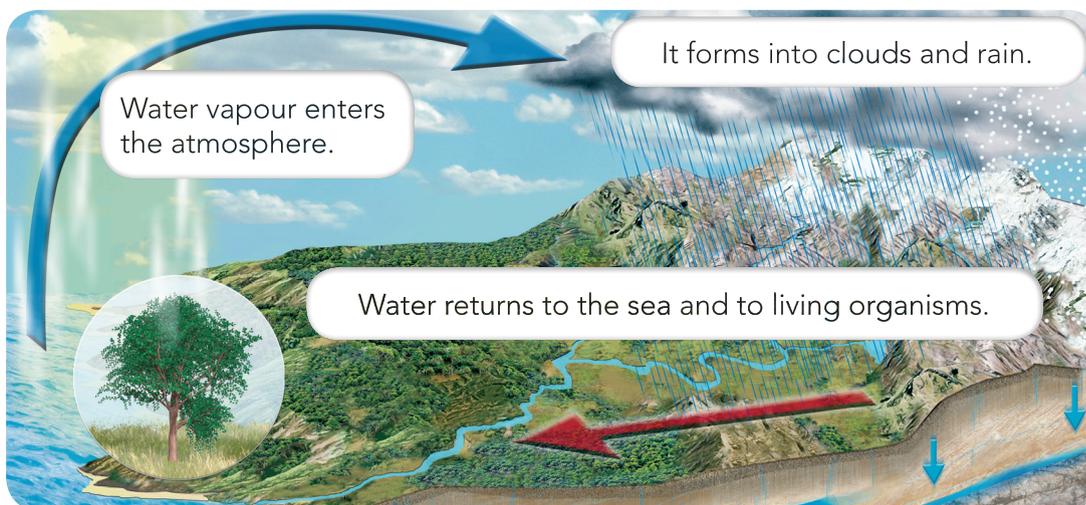
The heat of the Sun evaporates the surface water; this water transforms into water vapour and enters into the atmosphere.

2 Clouds form and precipitation falls.

The water vapour in the atmosphere cools and is transformed into water droplets that form **clouds**. The clouds are blown by the wind to areas where the water that they contain falls.

3 The water cycle begins again.

The water that falls from the clouds enters the rivers, lakes and sea and filters through the Earth forming **groundwater**. Living organisms incorporate this water into their bodies and use it to perform their vital functions.



1 Explain how the water cycle takes place.



Apply
your skills!

Project The importance of photosynthesis

The process of photosynthesis in plants is important for all living organisms on the planet. The main reasons being:

- Through photosynthesis, plants make and store food. These foods are used by animals, including humans.
- Plants absorb huge amounts of carbon dioxide. Carbon dioxide is a harmful gas to all animals and would accumulate in the air if there were no plants.
- Plants expel a large amount of oxygen. Oxygen is the gas that all living organisms need to breathe.
- Photosynthesis also produces a number of substances that we can extract from plants and use as fuel, medicines, fibres, etc.



- 1 Explain the relationship between plants, carbon dioxide and oxygen.
- 2 Study the picture. An aquatic plant has been placed in water, covered with a glass and exposed to the Sun. It has produced the small bubbles that can be seen in the picture.
 - 1 Why do you think this has happened?
 - 2 Why do you think these types of plants are used in aquariums?

Check what you know!

Work in your notebook

- 1 Name the five groups of living organisms.
- 2 Name three things plants react to.
- 3 Match the sentences halves in your notebook.

- 1 The embryo develops into...
- 2 The pistil changes and becomes...
- 3 Pollination is the union of the pollen and...
- 4 The fertilised ovule forms...

- a) ... the fruit.
- b) ... an embryo.
- c) ... a seed.
- d) ... ovule.



- 4 Look at pictures a-d. Follow the clues to find the names of the plants they came from.



Clue 1 Does the seed have fine hairs at the top? If yes, go to clue 2.

Does the seed have a flat wing? If yes, go to clue 3.

Clue 2 Does the seed have a stem with fine hairs at the top? If yes, it is a dandelion.

Is the seed joined directly to the fine hairs? If yes, it is a willow herb.

Clue 3 Does the seed have two wings? If yes, it is a sycamore.

Does the seed have one wing? If yes, go to clue 4.

Clue 4 Is the seed at the bottom of the wing? If yes, it is an ash.

My Word list

Vital function

cells
interaction
nutrition
reproduction

Nutrition function

carbon dioxide
conducting vessels
oxygen
phloem sap
photosynthesis
respire
xylem sap

Interaction function

bloom
buds
deciduous
evergreen

Reproduction function

corolla
embryo
fertilisation
germination
nectar
ovule
pistil
pollen
pollination
pollinators
seed and fruit formation

Water

clouds
groundwater
water cycle