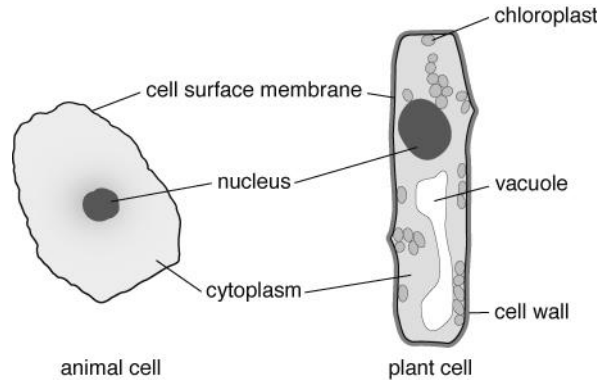


Cells, tissues, organs and organ systems

All **organisms** carry out **seven life processes** (movement, reproduction, sensitivity, growth, respiration, excretion, nutrition). All organisms are made from **cells**:



Cell part	Function
cell surface membrane	keeps cell together and controls what goes into and out of the cell
nucleus	controls the cell
cytoplasm	where activities happen, including respiration (which occurs in mitochondria)
chloroplast	contains chlorophyll to trap sunlight for photosynthesis
cell wall	made of cellulose and provides support
vacuole	storage space

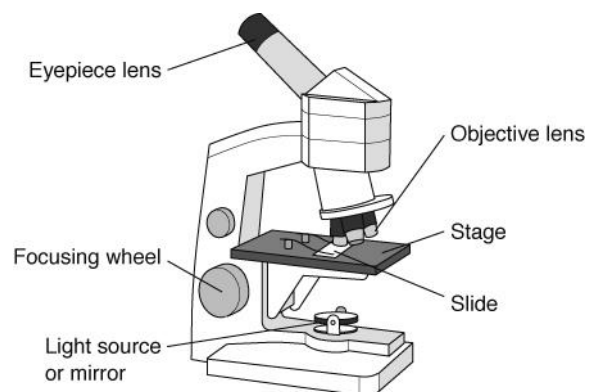
A **microscope** is used to **magnify** tiny things such as cells.

total magnification = magnification of **objective lens** × magnification of **eyepiece lens**.

The object you look at is the **specimen**. It has to be thin to let light get through it. It is placed with a drop of water onto a **slide**. A **coverslip** is carefully lowered on top, to stop the specimen drying out, hold it flat and stop it moving. A **stain** can be used to help you see parts of the cell.

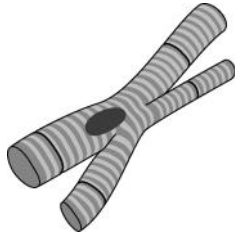
To use a microscope:

- A** Place the smallest objective lens over the hole in the stage.
- B** Turn the focusing wheel to move the objective lens close to the stage.
- C** Place the slide on the stage.
- D** Adjust the light source or mirror.
- E** Look into the eyepiece lens.
- F** Turn the focusing wheel until what you see is in focus.

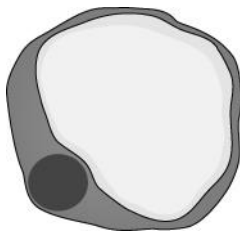


Some cells are specialised and have special **functions**.

In animals

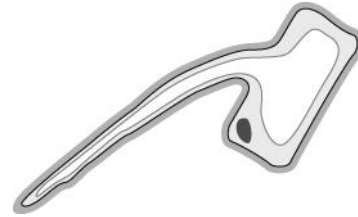


Muscle cells shape to move things.

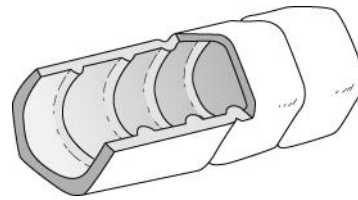


Fat cells in animals store fat.

In plants



Root hair cells take in water.



Xylem cells carry water.

A group of cells that are the same, all doing the same job, is called a **tissue** (e.g. muscle tissue).

A group of different tissues working together to do an important job is an **organ**. For example, the **heart** is an organ and is made of muscle tissue and nerve tissue. Organs have important functions.

leaf traps sunlight to make food for the plant
stem carries substances around the plant a supports the leaves and flowers



Root holds the plant in place. Roots also take water and small amounts of other substances from the soil.

Organs often work together in **organ systems**.

Organ system	Organs	Job
breathing system	windpipe (trachea), lungs	takes air into the body and gets rid of waste gases
circulatory system	heart, blood vessels	carries oxygen and food around the body
digestive system	mouth, gullet, stomach, intestines	breaks down food
nervous system	brain, spinal cord, nerves	carries signals around the body
urinary system	bladder, kidneys	gets rid of waste
locomotor system	muscles, bones	allows movement
water transport system (plants)	roots, stem, leaves	carries water up a plant