Cells and organisation

The seven common processes of living organisms

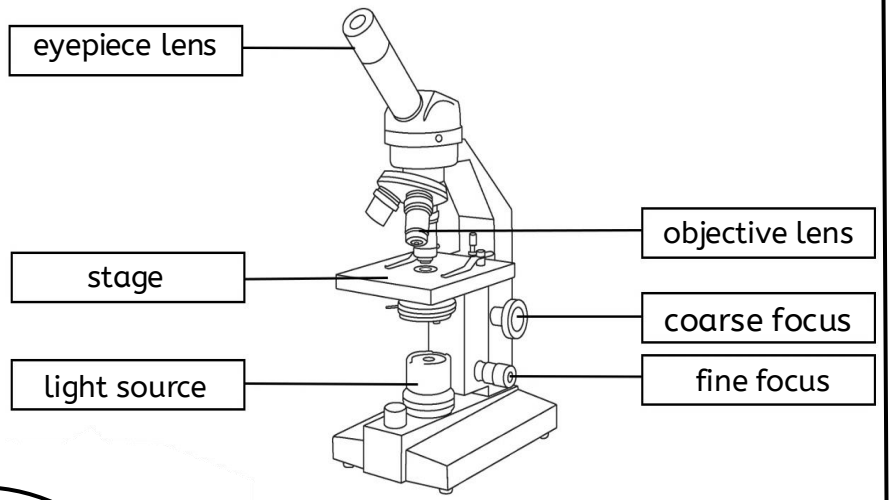
Process	Definition
movement	moving itself or its parts to change position or location
reproduction	producing offspring of the same kind
sensitivity	sensing and responding to changes in their surroundings
growth	increasing in size and repairing parts that are damaged
respiration	using oxygen and glucose (a sugar) to provide energy
excretion	removal of waste substances that are no longer needed
nutrition	using food or other nutrients like water to stay alive

Levels of organisation

cell → tissue → organ → organ system

cell	the smallest living building block of organisms
tissue	a group of similar cells that work together to perform a specific function
organ	a structure made up of different types of tissues that work together to carry out a specific function
organ system	a group of organs that work together to perform a common function

The parts of the microscope

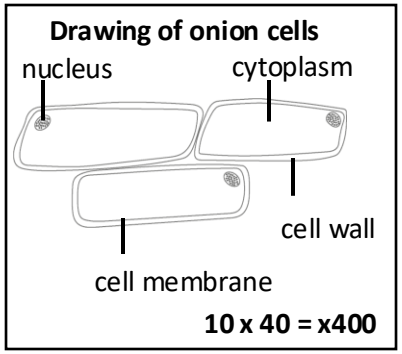


total magnification = eyepiece x objective

Using a microscope

1. Turn the **objective lens** to the **lowest magnification**.
2. Secure the slide on the **stage** using the clips.
3. Move the **stage** up to the **objective lens** by turning the **coarse focus**.
4. Look down the **eyepiece lens,** and move the stage away by turning the **coarse focus**.
5. To make the image sharper and clearer, turn the **fine focus.**
6. Rotate the **objective lens** to get a higher magnification.

Rules for scientific drawings of cells

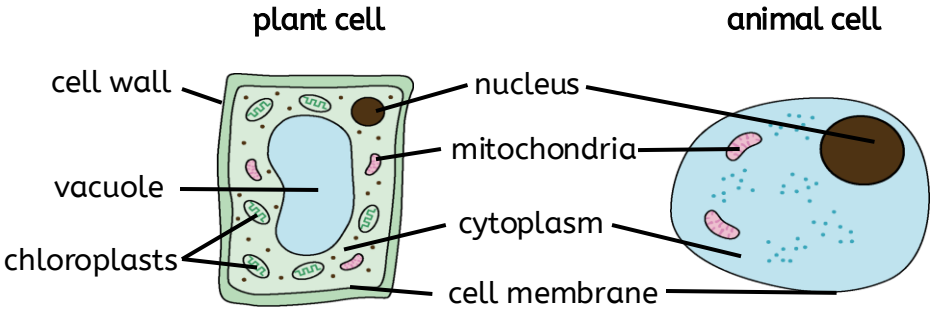


- smooth continuous lines
- large, with the same proportions
- stippling
- a few cells
- title and label
- total magnification

Cells and organisation

Cell organelles and their functions

nucleus	contains the genome that controls the cell's activities
cytoplasm	where the chemical reactions of the cell take place
mitochondria	where energy is released in respiration
cell membrane	controls which substances enter or leave the cell
vacuole	stores a watery sap
cell wall	strengthen and support the cell
chloroplasts	where light is trapped for photosynthesis to happen



Cells are three dimensional (3D).

The rate of diffusion

The rate of diffusion means how fast diffusion happens. Three factors that can affect the rate of diffusion are **temperature**, the **concertation** of particles and **surface area**.

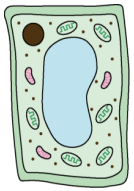
- The higher the temperature, the faster the rate of diffusion.
- The bigger the difference in the concentration of particles, the faster the rate of diffusion.
- The larger the surface area, the faster the rate of diffusion.

Needs of plants and animals for survival

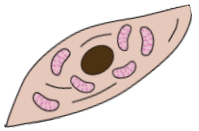
- Plants need, oxygen, water, light, carbon dioxide, minerals, a suitable temperature and space to grow.
- Animals, including humans, need water, oxygen, nutrients and the right temperature to survive.
- Plants and animals need these to keep all the cells that make them up alive and functioning properly.

Oxygen and **glucose** (a sugar) are needed for **respiration** to take place in cells, to provide energy to keep cells alive. These useful substances enter the cell by **diffusion.** Waste products of respiration are carbon dioxide and water. Waste products leave the cell by diffusion and need to be removed from cells to keep them alive.

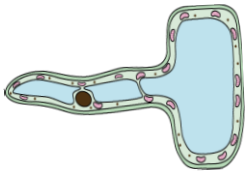
Specialised cells are adapted to carry out a specific function



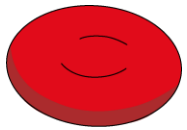
A **palisade cell** has **lots of chloroplasts** that absorb light for photosynthesis and a **column shape** to pack more in the leaf.



A **muscle cell** has **lots of mitochondria** to release energy for contraction.



A **root hair cell** has a **long cell membrane** that provides a large surface area to absorb more water and minerals.



A **red blood cell** has **no nucleus** for extra space to carry more oxygen.