

1) Characteristics of Living Things

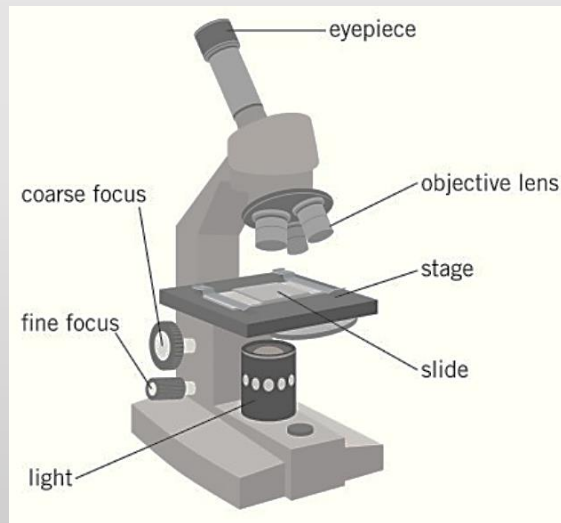
All living organisms can do the following:

- **Movement** - all living things move, even plants
- **Respiration** - getting energy from food
- **Sensitivity** - detecting changes in the surroundings
- **Growth** - all living things grow
- **Reproduction** - making more living things of the same type
- **Excretion** - getting rid of waste
- **Nutrition** - taking in and using food

2) Microscopes

All organisms are made up of **cells**. Cells are so small, you need a **light microscope** to see them.

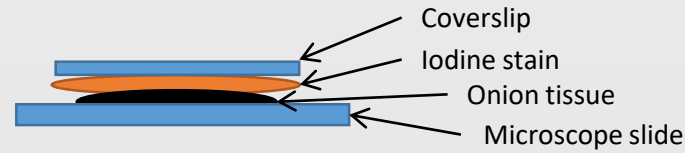
Light microscopes produce a magnified image of an object.



- The **lowest powered objective lens** should be used first to give a **large field of view**.
- The **coarse focus** is used to bring the object into view.
- The **fine focus** is used to add more detail and remove blurriness.

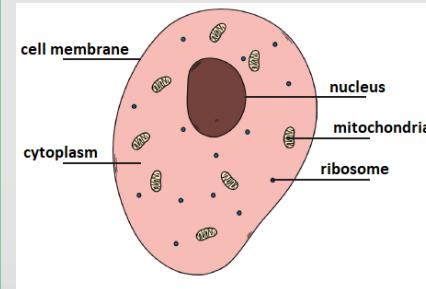
Total magnification = eyepiece lens × objective lens

3) Making Microscope Slides



Stains are used to add contrast to cells. Certain stains are used to stain specific cell structures. E.g. onion cells use **iodine stain** and cheek cells use **methylene blue**.

4) Animal Cell Organelles



Nucleus: carries genetic information and controls the cell.

Cell membrane: controls the movement of substances in and out of the cell

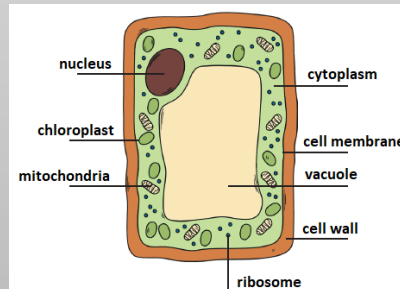
Cytoplasm: where chemical reactions take place

Mitochondria: where respiration takes place (energy)

Ribosome: where proteins are made

5) Plant Cell Organelles

Plant cells contain the same 5 organelles as an animal cell as well as:



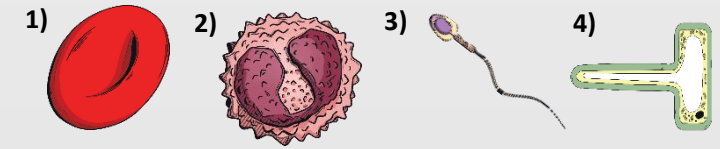
Cell Wall: made of cellulose, provides support

Vacuole: contains cell sap, which keeps the cell firm

Chloroplasts: where photosynthesis takes place

6) Specialised Cells

Specialised cells are ones with special features (adaptations) to help carry out their function (job).



1) Red blood cell: transports oxygen around the body, biconcave shape increases surface area, no nucleus

2) White blood cell: fights microorganisms which cause disease, can change shape, produces antibodies

3) Sperm cell: travel to and fuse with an egg cell, long tail for movement, lots of mitochondria to release energy for moving

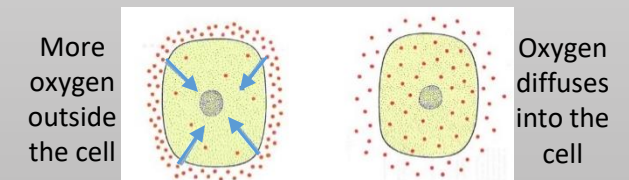
4) Root hair cell: absorbs water from the soil in plants, has a large surface area

7) Multicellular and Unicellular

- **Multicellular** organisms are those made up of **more than one cell**.
- Examples of multicellular organisms include animals and plants.
- **Unicellular** organisms are those made from **only one cell**.
- Examples of unicellular organisms are bacteria and Euglena

8) Movement of Substances in Cells

Diffusion is the movement of particles from higher to lower concentrations. Substances like **oxygen**, **carbon dioxide** and **glucose** move in and out of cells by diffusion.



Oxygen diffuses into the cell