

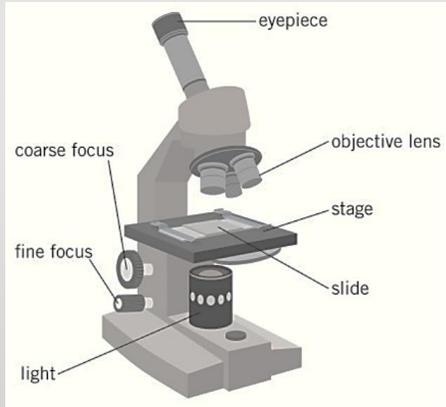
1) Characteristics of Living Things

- 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

Cells are the basic building blocks of all animals and plants. They are so small, you need a **light microscope** to see them.

Light microscopes use a series of lenses to produce a magnified image of an object.



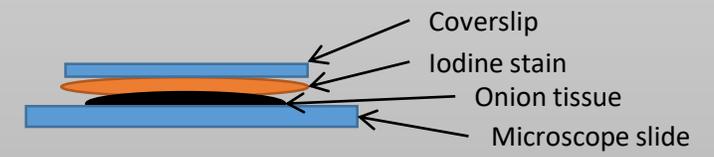
The **lowest powered objective lens** should be used first to give a **large field of view**.

The **coarse focus** is used to bring the object into view.

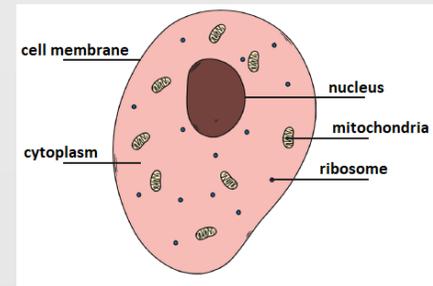
The **fine focus** is used to add more detail and remove blurriness.

Total magnification = eyepiece lens × objective lens

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**.



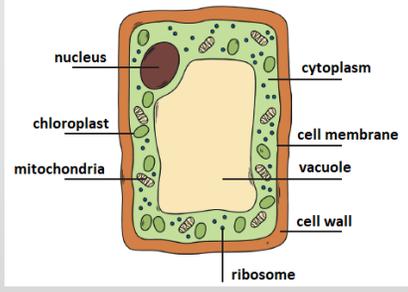
3) Animal Cells



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

4) Plant Cells

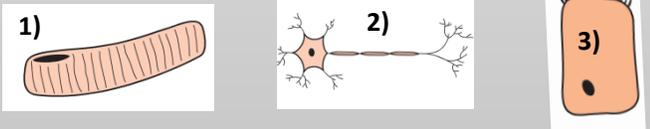


Plant cells contain the same 5 parts as an animal cell as well as:

Cell Wall: made of cellulose, provides support
Vacuole: contains cell sap, which keeps the cell firm
Chloroplasts: where photosynthesis takes place

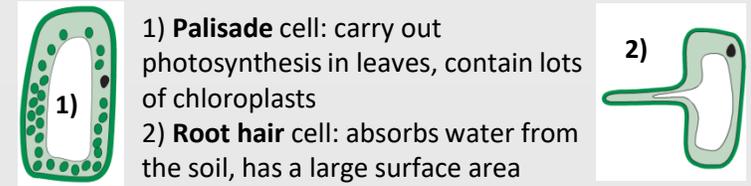
5) Specialised Cells in Animals

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



- 1) Muscle cell:** contracts to allow movement, contains lots of mitochondria
- 2) Nerve cell:** sends electrical signals around the body, long and thin
- 3) Epithelial cell:** wafts mucus out of the airways, has hairs called cilia that move

6) Specialised Cells in Plants

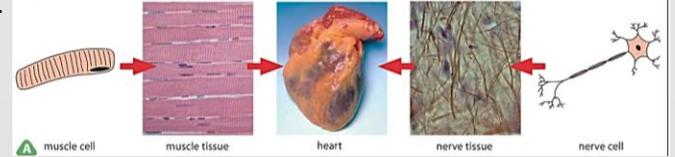


- 1) Palisade cell:** carry out photosynthesis in leaves, contain lots of chloroplasts
- 2) Root hair cell:** absorbs water from the soil, has a large surface area

7) Tissues, Organs and Organ Systems

- Tissue** – a group of the same type of cell working together
- Organ** – a group of different tissues working together
- Organ system** – a group of organs working together

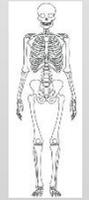
E.g. Lots of muscle cells together make a muscle tissue which can combine with other tissues to make an organ like your heart.



8) Skeletal System

Functions of the skeleton:

- Support
- Protection
- Movement (using muscles)
- Making red blood cells



Joints are where two or more bones meet. They are held together by **ligaments**.

9) Muscular System

Muscles move bones at joints by **contracting** (they get shorter and fatter). When they stop contracting they **relax**.

Muscles work in **antagonistic pairs** – this is where one muscle contracts whilst the other relaxes. E.g. the bicep and triceps working to bend the elbow.