Living things and Cells

Living things:

• All living things must contain some of the following characteristics:

1. Nutrition
2. Movement
3. Response
4. Excretion
5. Growth
6. Reproduction
7. Respiration

All of the above must be present in a living thing. However sometimes a characteristic may not be obvious, e.g. movement in plants.

Different types of living things

• Some of the main groups of living things:

1. Plants
2. Animals
3. Bacteria
4. Fungi

The cell

A **cell** is the smallest working unit of a living organism.

- All living things are made up of cells - they are essentially the building blocks of life.

Robert Hooke

- In 1665, Hooke observed cells of cork wood using a microscope.
- Cells must be described as tiny and can only be seen by using a microscope.

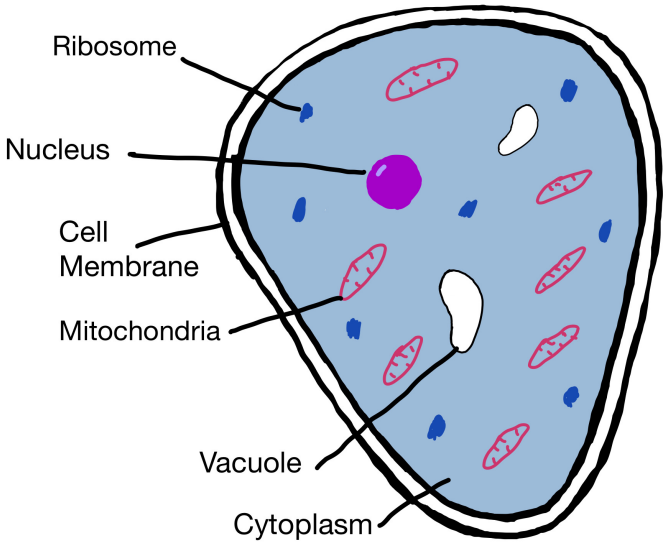
Cells

- When we draw cells they are 2d but in reality they are 3d.
- There are many types of cell:
    - Red blood cell
    - Sperm cell
    - Body cell

- There are **only** two cell types that you need to know in detail:

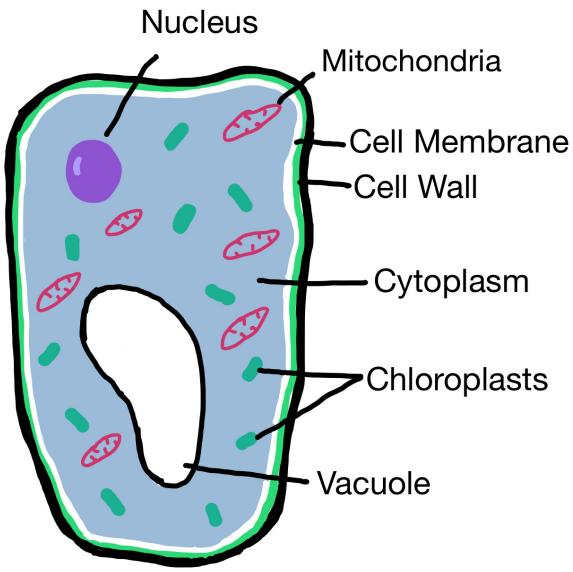
1. Plant cells
2. Animal cells

The animal cell



Cell organelles:	Function:
Cell membrane	• Controls what enters and leaves the cell. • Oxygen and nutrients enter the cell. • Carbon dioxide and waste leave the cell.
Nucleus:	• Control centre of the cell. • Contains chromosomes which contain genes (DNA).
Cytoplasm:	• Suspends the cell organelles.
Vacuole:	• Stores food and water. • **Note:** The vacuole is found in plant and animal cells. However the plant cell vacuole is much bigger than the animal vacuole.
Mitochondria:	• Power house of the cell. • Respiration occurs here (release of enemy from food)
Ribosome	• Produces proteins

The plant cell

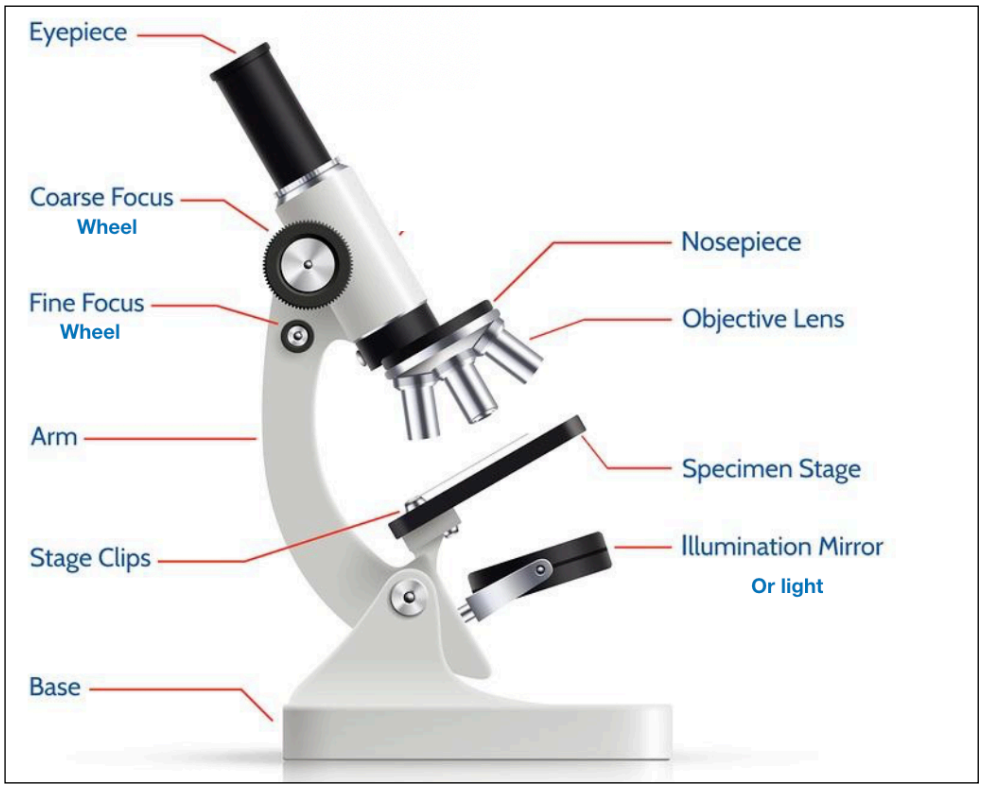


Organelle:	Function:
Cell membrane	• Controls what enters and leaves the cell. • Oxygen and nutrients enter the cell. • Carbon dioxide and waste leave the cell.
Nucleus:	• Control centre of the cell. • Contains chromosomes which contain genes (DNA).
Cytoplasm:	• Suspends the cell contents.
Vacuole:	• Stores food and water.
Mitochondria:	• Power house of the cell. • Respiration occurs here (release of enemy from food)
Ribosome	• Produces proteins
Cell wall	• Provides shape and support only.
Chloroplasts	• Photosynthesis. • Contains green pigment **chlorophyll.** • Chlorophyll traps the sunlight & makes glucose.

Plant and animal cell comparison

Plant cells	Animal cells
Cell wall present	No cell wall
Chloroplast present	No chloroplast
Large vacuole	Small vacuole

The Microscope



Part:	Function:
Eye piece	• Allows you to see the specimen.
Stage	• Holds the glass slide.
Course focus wheel	• Brings object roughly into focus.
Fine focus wheel	• Brings object into sharp focus.
Nosepiece	• Allows use of different lenses.
Objective lens	• Magnifies an image.
Mirror/light	• Provides light to see the object on the stage.

Chemicals to highlight the cells:

- **Iodine** is a chemical used to make **plant** cells clearer.
- **Methylene blue** is a chemical used to make **animal** cells clearer.

Cell organisation

- Cells do not work alone and when cells work with similar cells they begin to show how an organism is formed.

Tissues:

- A group of similar cells to carry out the same function.
- e.g. muscle tissue

Organs:

- A group of tissues working together to carry out the same function
- e.g. Lungs, brain, kidneys.

System:

- A group of organs working together to carry out the same function
- e.g. Sensory system and circulatory system.

Organism:

- Composed of a number of different systems.
- e.g. Humans, dogs and daffodils.

Cells - Tissues - Organs - Systems - Organism