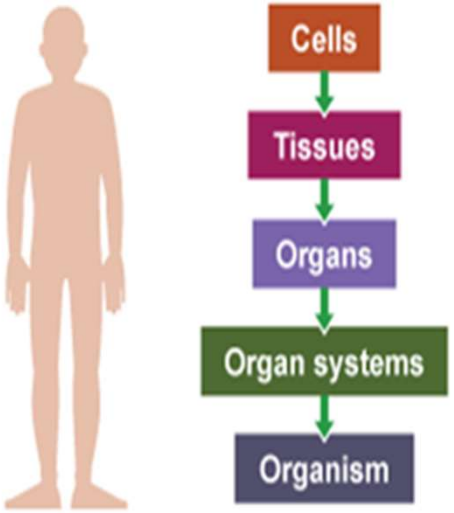
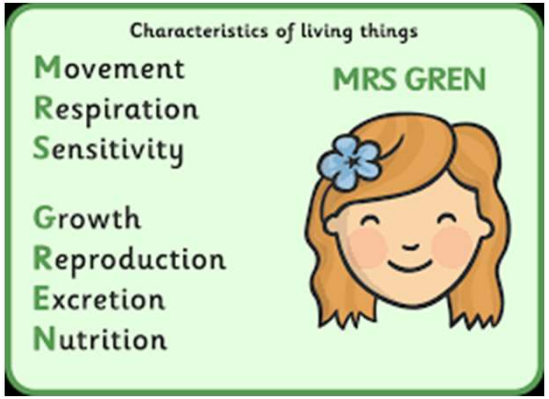
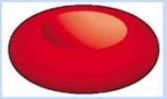
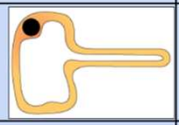
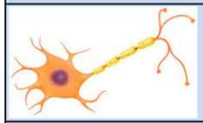
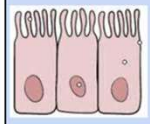
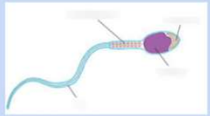
Cells

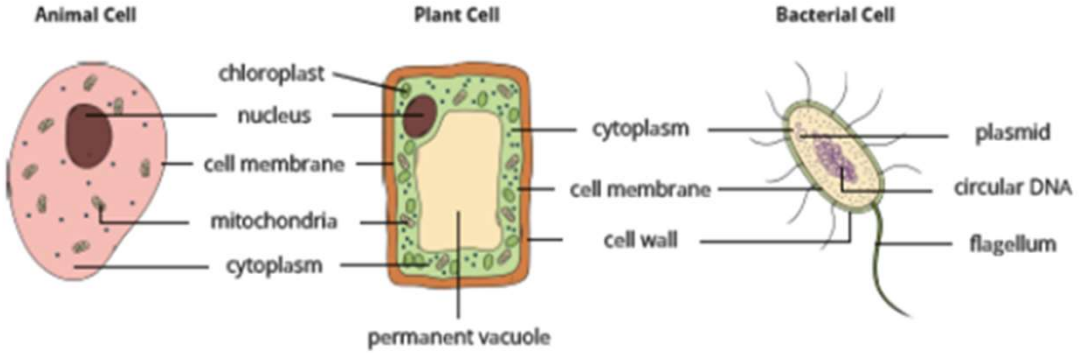




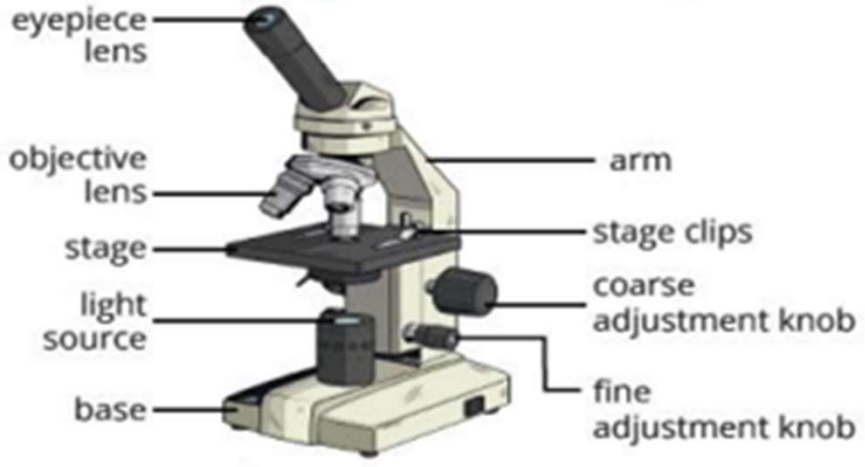
Cell Name	Function (Job	Adaptation (Special feature)
 Red blood cell	To carry oxygen around the body.	Has a biconcave shape and no organelles to increase surface area.
Root Hair cell 	To absorb water and minerals from the soil.	Elongated structure to increase surface area.
 Nerve cell (Neurone)	To transmit electrical messages around the body.	Long and lots of dendrites to communicate with other cells.
Palisade cell 	To absorb sunlight so the plant can photosynthesise to make glucose.	Contains lots of chloroplasts
 Ciliated cell	To trap dust and bacteria particles from the air to prevent them entering our lungs.	Produces mucus that traps bacteria and dust particles. Hair like structures move mucus away from the lungs.
Sperm cell 	To transfer genetic material (DNA) to the egg.	Has a tail to swim, and lots of mitochondria to transfer energy to help swim.

DIffusion in Cells

Eukaryotic and prokaryotic cells



Parts of a Light Microscope



Respiration

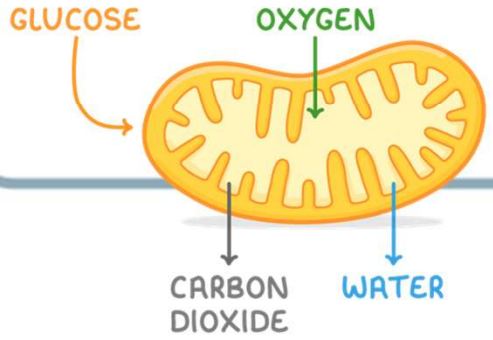
Respiration

with oxygen

Aerobic respiration

glucose + oxygen → carbon dioxide + water (+ energy)

- Respiration occurs in the **mitochondria** of cells to **transfer** energy.
- Glucose is absorbed from the small intestine into the blood **plasma**. It is transported to the cells where it diffuses in.
- Oxygen is breathed in and diffuses into the bloodstream. Oxygen is then carried by haemoglobin to the cells where it diffuses in.
- Carbon dioxide diffuses out of the cells into the blood plasma. It is transported to the lungs where it diffuses into the air sacs and is exhaled.



without oxygen

Anaerobic respiration (in animals)

glucose → lactic acid (+ energy)

- This occurs when there is not enough oxygen for aerobic respiration, such as during strenuous exercise.
- It transfers less energy than aerobic respiration.
- The lactic acid produced can cause muscle cramps. This causes increased inhalation to break down lactic acid – the oxygen needed is called the **oxygen debt**.

Fermentation (in microorganisms)

glucose → ethanol + carbon dioxide (+ energy)

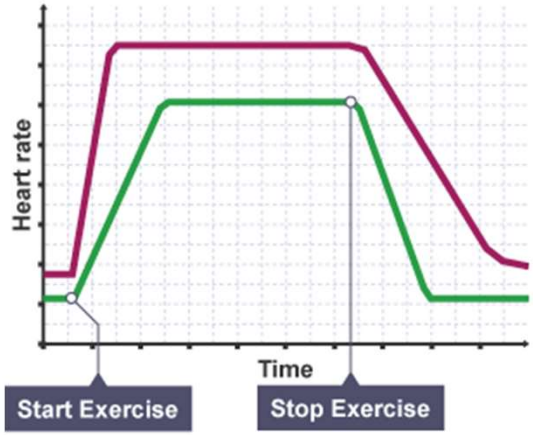
- Yeast respires anaerobically – this fermentation is important in food production (e.g., bread, beer, and wine).

Anaerobic Respiration

Although anaerobic respiration does release some energy, it does not release as much as aerobic respiration does.

Glucose → Lactic Acid (+energy)

The lactic acid produced during anaerobic respiration builds up in muscles. This can be felt as an aching in muscles during or after exercise.



Anaerobic Respiration In Microbes

Anaerobic respiration happens in microorganisms such as bacteria because they need to release energy from glucose. Yeast (unicellular fungi), carry out a process called fermentation.

Glucose → Ethanol + Carbon Dioxide

The ethanol (alcohol) is useful for brewers, and carbon dioxide is useful to bakers because it helps their bread rise.