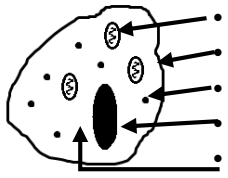
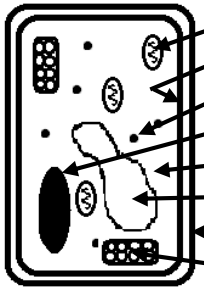
Key points to learn

1. Early light microscopes	Use light and lenses. Have magnifications of x100 to x2 000
2. Electron microscope	Modern. Use a beam of electrons. Magnifications of up to x2 000 000
3. Magnification	How much bigger an image appears than the real object eg Magnification of x100, image looks 100 times bigger than object $magnification = \frac{size\ of\ image}{size\ of\ object}$
4. Resolving power	Smallest size microscope can show
5. Typical Animal cell	 **M**itochondria **C**ell membrane **R**ibosomes **N**ucleus **C**ytoplasm
6. Typical Plant cell	 **M**itochondria **C**ell membrane **R**ibosomes **N**ucleus **C**ytoplasm **V**acuole **C**ell wall **C**hloroplasts
7. Photo-synthesis	Reaction plants use to make glucose from light, H_2O and CO_2
8. Specialised animal cells	1. Sperm – tail to swim 2. Nerve – carry electrical impulses 3. Muscle – contract and relax
9. Specialised plant cells	1. Root hair - absorb water and ions 2. Xylem – carry water and minerals 3. Phloem – carry glucose

Key points to learn

10. Mitochondria	Perform respiration to release energy
11 Cell membrane	Controls movement in/out of cell
12 Ribosomes	Makes proteins by protein synthesis
13. Nucleus	Controls activities of cell. Contains genes to build new cells
14. Cytoplasm	Jelly where most reactions happen
15 Vacuole	Sack filled with sap. Keeps cell rigid
16 Cell wall	Made of cellulose. Supports cell
17 Chloroplasts	Full of green chlorophyll
18 Chlorophyll	Absorbs light for photosynthesis
19 Eukaryotic cells	Animal cells and plant cells. Have cell membrane, cytoplasm and nucleus
20 Prokaryotic cells	Bacteria. Do not have a nucleus. Genetic material is looped
21 Diffusion	Particles spreading out in gas/liquid Move from high→low concentration Dissolved substances like O_2 and CO_2 move in/out of cells by diffusion
22 Factors affecting diffusion	1. Difference in concentration (concentration gradient) 2. Temperature 3. Surface area to diffuse through
23 Osmosis	Diffusion of water through partially permeable membrane (surface that only lets small particles through). Moves from dilute solution → more concentrated solution
24 Active transport	Moves substances from low→high concentration. Needs energy

Trilogy: B1 Cell structure and transport

Part of: 4.1 Cell Biology

Knowledge Organiser

Big picture (Biology Paper 1)

- Cells and organisation
  - Cell structure and transport
  - Cell division
  - Organisation and the digestive system
  - Organising animals and plants
- Disease and bioenergetics
  - Communicable diseases
  - Preventing and treating disease
  - Non-communicable diseases
  - Photosynthesis
  - Respiration

Background

Big or small, all organisms are made of cells. Normally too small to see without a microscope, they are the building blocks of all life: animals, plants, fungi and microbes.

Maths skills

Prefix	Meaning	Standard form
Mega (M)	x 1000000	x 10^6
kilo (k)	x 1 000	x 10^3
milli (m)	÷ 1 000	x 10^{-3}
nano (n)	÷ 1 000 000 000	x 10^{-9}