

Box 1: Keywords

Word	Definition
Cell	The smallest functional unit in an organism, the building block of life
Microscope	Optical instrument used to magnify objects so small details can be seen clearly
Chloroplast	The cell component where photosynthesis takes place
Concentration	A measure of the number of particles of a substance in a volume
Diffusion	Movement of liquid or gas particles from high concentration to a place of low concentration down it's concentration gradient
Mitochondria	The cell component where respiration takes place
unicellular	Organism consisting of just one cell
organism	A living thing

Box 2: Key skills

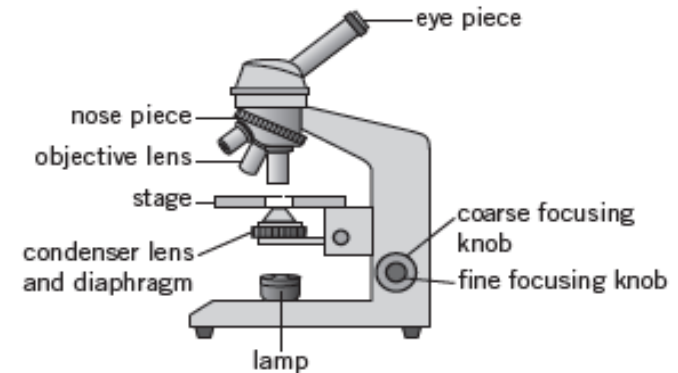
Using a microscope
Calculating magnification
Drawing biological drawings

Box 3: Microscopes

Cells can only be seen under a microscope. A microscope magnifies an object using lenses.

Remember that:

- the specimen needs to be thin so light can pass through
- a dye can be added to make the object easier to see.



Using a microscope

- 1 Move the stage to its lowest position.
- 2 Place the slide/object on the stage.
- 3 Choose the objective lens with the lowest magnification.
- 4 Look through the eyepiece and turn the coarse-focus knob slowly until you see the object.
- 5 Turn the fine focus knob until it comes into focus.
- 6 Repeat steps 1–5 using a higher magnification lens.

Particles move in and out of cells by **diffusion**.

During diffusion, particles spread out from where they are in *high concentration* to where they are in *low* concentration.

Glucose and oxygen move from the blood **into** cells by diffusion.

Carbon dioxide moves **out of** cells to the blood by diffusion.



Box 4: Animal and plant cells

cell membrane – This is a barrier around the cell. It controls what can come in and out of the cell.

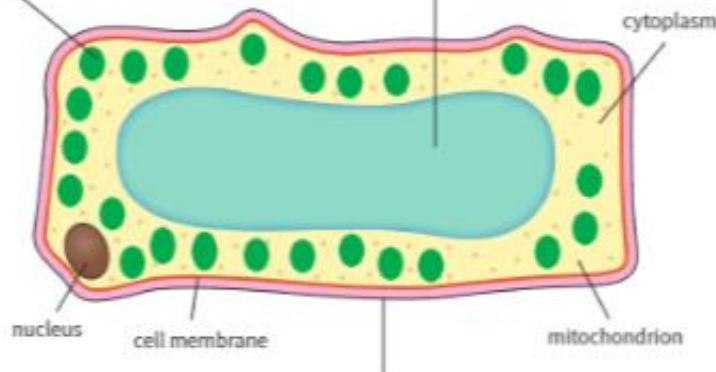
nucleus – This controls the cell and contains genetic material. Genetic information is needed to make new cells.

cytoplasm – This is a 'jelly-like' substance where the chemical reactions in a cell take place.

mitochondria – This is where respiration takes place. **Respiration** is a special type of chemical reaction that transfers energy for the organism.

chloroplasts – This is where photosynthesis happens. Chloroplasts contain a green substance called chlorophyll, which traps energy transferred from the Sun.

vacuole – This contains a watery liquid called cell sap. It keeps the cell firm.



cell wall – This strengthens the cell and provides support. It is made of a tough fibre called cellulose, which makes the wall rigid.

Box 5: specialised cells

Root hair cell	Absorb water and mineral	Large surface area, many mitochondria, no chloroplasts
Leaf cell	Photosynthesis	Top of leaves, lots chloroplasts, large surface area
Red blood cell	Transport oxygen	Haemoglobin, no nucleus, large surface area
Nerve cell	Carry electrical impulses	Long, thin, lots of connections
Sperm cell	Carry male genetic material	Tail to swim, lots of mitochondria

Box 6: Pathway

- KS1 – what is alive
- KS2- Key life processes and organs
- KS3 – cells and organisation
- KS4 – measuring cells
- KS5 – more inside cells

Box 7: Cross curricular links