KS3 SCIENCE · BIOLOGY

Cells revision sheet

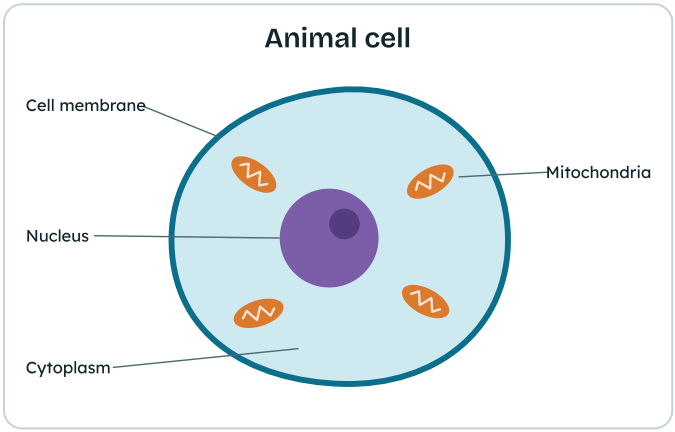
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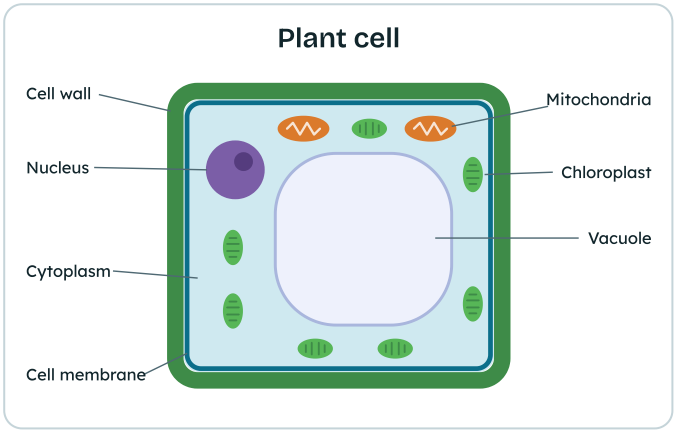


1. What is a cell?

- **Every living thing is made of cells.** A cell is the smallest building block of a living thing.
- Cells are tiny. You need a microscope to see most of them.
- **Unicellular** means made of one cell. **Multicellular** means made of many cells.

2. Animal and plant cells





PART	WHAT IT DOES	FOUND IN
Nucleus	Controls the cell. Holds the instructions (DNA).	Both
Cell membrane	Controls what goes in and out of the cell.	Both
Cytoplasm	Jelly where the cell's chemical reactions happen.	Both
Mitochondria	Release energy by respiration.	Both
Cell wall	Tough outer layer made of cellulose. Supports the cell.	Plants only
Chloroplasts	Absorb light to make food by photosynthesis.	Plants only
Vacuole	Big bag of cell sap. Keeps the cell firm.	Plants only

Watch out: mitochondria *release* energy. Never write that they "make" energy. The cell wall and the cell membrane are different: plant cells have both.

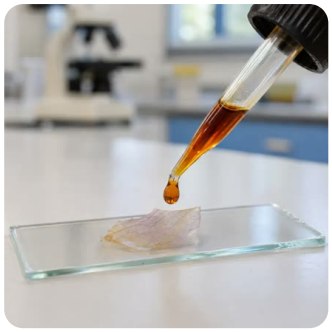
3. Making a slide



Step 1
Peel a thin layer of onion skin, so light can shine through it.



Step 2
Lay it flat in a drop of water on a slide.



Step 3
Add a drop of iodine stain to make the cell parts show up.



Step 4
Lower a coverslip slowly, at an angle, to stop air bubbles.



4. Using a microscope

Total magnification = eyepiece lens × objective lens

- **Example:** a ×10 eyepiece with a ×40 objective gives 10 × 40 = ×400.
- Start on the **lowest power** objective lens.
- Use the **coarse focus** first, then the **fine focus** to make the image sharp.
- The slide sits on the **stage**. The **light** shines up through it.

5. Specialised cells

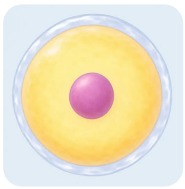
A specialised cell has special features that suit it to one job. In an exam, name the feature, then say how it helps.



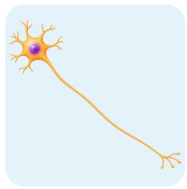
Red blood cell
Carries oxygen. No nucleus, so more room to carry oxygen.



Sperm cell
Swims to the egg. Has a tail and lots of mitochondria.



Egg cell
Joins with a sperm cell. Large, with a food store.



Nerve cell
Carries electrical signals. Very long, with branched ends.



Ciliated cell
Sweeps mucus from the airways with tiny hairs (cilia).



Root hair cell
Absorbs water. Long hair gives a large surface area.



Palisade cell
Photosynthesis. Packed with chloroplasts.

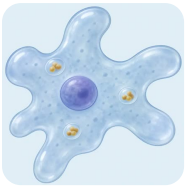


6. Diffusion

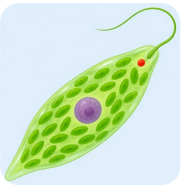
- **Diffusion** is particles spreading out, from high concentration (lots of particles) to low concentration (few particles).
- It happens by itself. The cell does not use any energy.
- Oxygen and glucose diffuse **into** cells. Carbon dioxide diffuses **out**.
- Diffusion is faster when it is warmer.

7. Unicellular organisms

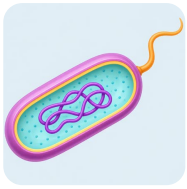
A unicellular organism is a single cell that does every job needed to stay alive.



Amoeba
Changes shape to move. Wraps around its food to eat it.

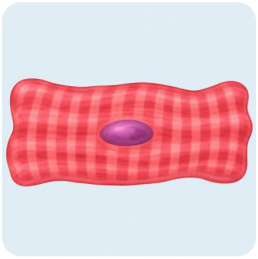


Euglena
Swims with a flagellum. Has chloroplasts, so it makes its own food.

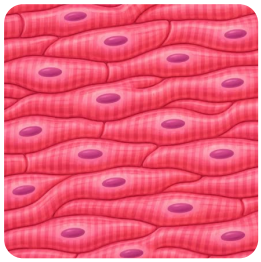


Bacterium
Has no nucleus. Much smaller than an animal or plant cell.

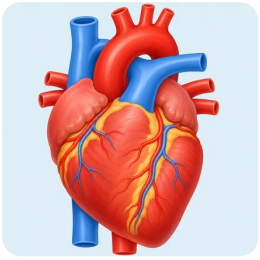
8. From cells to you



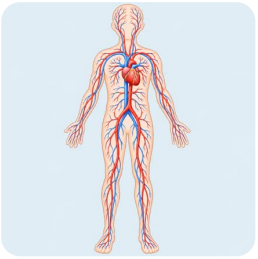
Cell
The smallest building block.



→ Tissue
Similar cells working together.



→ Organ
Different tissues working together.



→ Organ system
Organs working together.



→ Organism
A whole living thing.

Key words

Cell: smallest building block of a living thing

Nucleus: controls the cell

Cell membrane: controls what goes in and out

Cytoplasm: jelly where reactions happen

Mitochondria: release energy by respiration

Cell wall: tough layer that supports a plant cell

Chloroplasts: absorb light for photosynthesis

Vacuole: bag of cell sap

Unicellular: made of one cell

Multicellular: made of many cells

Specialised cell: cell with special features for one job

Stain: dye that makes cell parts show up

Diffusion: particles spreading from high to low concentration

Flagellum: whip-like tail for swimming

Tissue: similar cells working together

Organ: different tissues working together

Pictures are illustrations, not real micrographs.