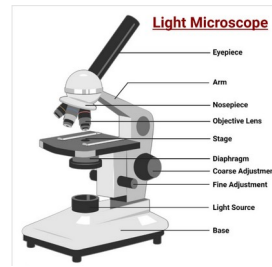


Year 9 B1 Part A Cell Structure

Key term	Definition
Magnification	The number of times larger an image is compared to the real object.
Resolution	The ability to distinguish between two separate points.
Prokaryotic	A type of cell that does not have a nucleus; the genetic material is free in the cytoplasm
Eukaryotic	A type of cell that has a nucleus containing genetic material.
Specialised	A cell that has adapted to carry out a particular function.
Adaptation	A feature that enables an organism or cell to survive and do its job.
Structures	Parts of a cell or organism that have a specific function
Function	The job or role of a part of an organism or cell.
Microscope	An instrument that magnifies small objects, allowing them to be seen in greater detail.
QR Code/Link to revision website	A picture of an object that is a magnified image of a real object.



Microscopes

Light microscope	Electron microscope
uses light to form images	uses a beam of electrons to form images
living samples can be viewed	samples cannot be living
relatively cheap	expensive
low magnification	high magnification
low resolution	high resolution

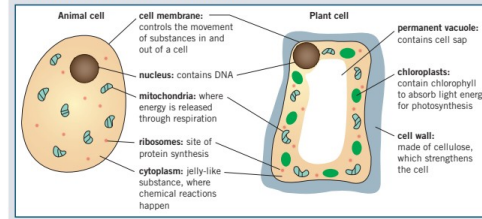
Electron microscopes allow you to see sub-cellular structures, such as ribosomes, that are too small to be seen with a light microscope.

To calculate the **magnification** of an image:

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}}$$

Eukaryotic cells

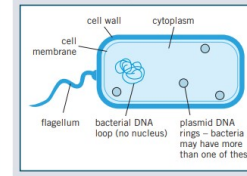
Animal and plant cells are eukaryotic. They have genetic material (DNA) that forms **chromosomes** and is contained in a **nucleus**.



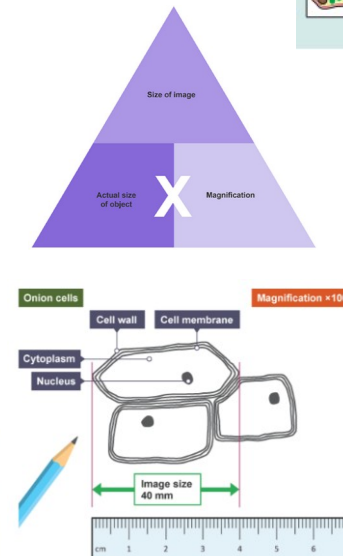
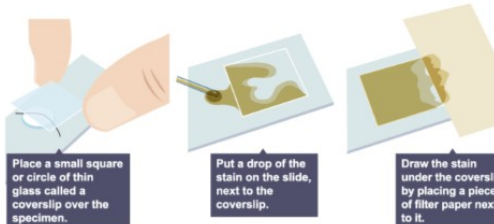
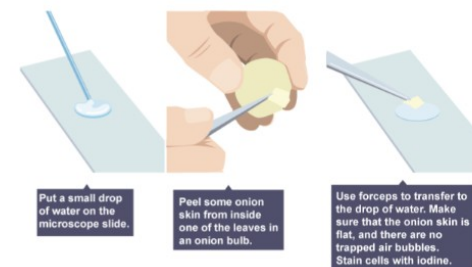
Prokaryotic cells

Bacteria have the following characteristics:

- single-celled
- no nucleus – have a single loop of DNA
- have small rings of DNA called **plasmids**
- smaller than eukaryotic cells.



Preparing a Plant cell Slide



Specialised cells

Cells in animals and plants differentiate to form different types of cells. Most animal cells differentiate at an early stage of development, whereas a plant's cells differentiate throughout its lifetime.

Specialised cell	Function	Adaptations
sperm cell	fertilise an ovum (egg)	• tail to swim to the ovum and fertilise it • lots of mitochondria to release energy from respiration, enabling the sperm to swim to the ovum
red blood cell	transport oxygen around the body	• no nucleus so more room to carry oxygen • contains a red pigment called haemoglobin that binds to oxygen molecules • flat bi-concave disc shape to increase surface area-to-volume ratio
muscle cell	contract and relax to allow movement	• contains protein fibres, which can contract to make the cells shorter • contains lots of mitochondria to release energy from respiration, allowing the muscles to contract
nerve cell	carry electrical impulses around the body	• branched endings, called dendrites, to make connections with other neurones or effectors • myelin sheath insulates the axon to increase the transmission speed of the electrical impulses
root hair cell	absorb mineral ions and water from the soil	• long projection speeds up the absorption of water and mineral ions by increasing the surface area of the cell • lots of mitochondria to release energy for the active transport of mineral ions from the soil
palisade cell	enable photosynthesis in the leaf	• lots of chloroplasts containing chlorophyll to absorb light energy • located at the top surface of the leaf where it can absorb the most light energy

Magnification and Resolution

Calculate your overall magnification, if your eyepiece lens is x5 and your objective lens is x10.
Answer: $5 \times 10 = 50$

Resolution means how close together 2 objects can be, and still be seen as separate objects.

Resolution of a light microscope $0.250 \mu\text{m}$.
Resolution of an electron microscope 0.25 nm

Resolving power is a measure of the ability to distinguish between two separate points that are very close together.

How to do scientific drawings



Knowledge Organisers



1. **Vocabulary:** Key words and definitions (up to 10) to the left (the ones that you will teach explicitly, and expect students to use)
2. **Legible:** Font – clear, Sans Serif. One sided, A4. visual - diagrams, models, etc., where appropriate, key terms/concepts in bold. No distraction.
3. **Keep it core:** Prioritise the core, crucial, powerful knowledge
4. **Co-construct** with colleagues: To build consistency and shared expert knowledge