Cells

Scale & Organism Hierarchy

An organism is a living thing. A multicellular organism contains lots of cells. Unicellular organisms are only one cell.

Measurement Scale	
Kilometres (km)	*Biggest*
Metres (m)	↓
Centimetres (cm)	
Millimetres (mm)	
Micrometres (μm)	*Smallest*

Organism Hierarchy	
Organism	*Biggest*
Organ System	↓
Organ	
Tissue	
Cell	*Smallest*

Conversions

cm → (x 100) → m

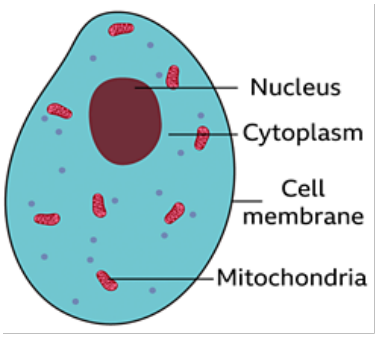
cm → (x 10) → mm

μm → (x 1000) → mm

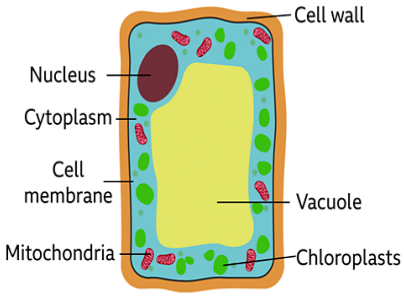
Cells

- Cells are the smallest unit of life.
- Cells contain structures inside called cell organelles.
- Cells can be specialised to do specific jobs. These are known as specialised cells.
- All animal and plant cells contain a nucleus which controls the cell and stores DNA
- You need a microscope to see cells.

Animal Cells



Plant Cells

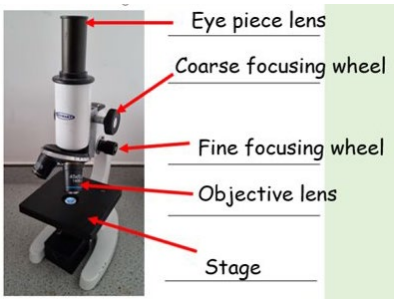


Cell Organelle Functions

Found in both animal and plant cells	
Nucleus	Controls cell, contains DNA
Cytoplasm	Where reactions happen
Cell Membrane	Controls when comes in and out
Mitochondria	Releases energy from respiration

Found in plant cells only	
Chloroplast	Where photosynthesis occurs
Cell Wall	Supports the cell
Vacuole	Contains cell sap

Microscopes



Eyepiece lens

Objective lens

Total magnification = eyepiece lens x objective lens

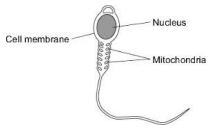
For example, for an *eyepiece of ×10* and an *objective of ×10*, the total magnification of the object is:

10 × 10 = 100

Specialised Cells

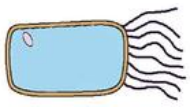
Red Blood Cell

Large surface area to transport O_2



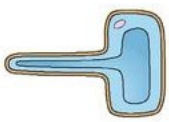
Sperm Cell

Tail and lots of mitochondria to swim



Cilia Cell

Traps dust and microbes with mucus in hairs



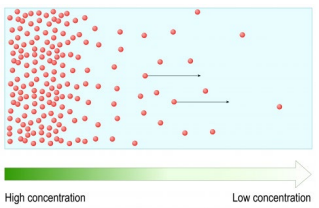
Root Cell

Absorbs water and minerals for plants

Diffusion

The movement of particles from a high concentration to a low concentration.

Animal:
O_2 diffuses into cells
CO_2 diffuses out of cells



CORE Questions

The following are core questions for this topic. Cover the answer section with a sheet of paper and try and quiz yourself. Only try learning 5 at a time, once you know them move on.

1	What is an organism?	A living thing.
2	What is the smallest functional unit of an organism?	Cell
3	Put the following into order of size from smallest to biggest. Organ, Tissue, Organism, Cell, Organ System.	Cell > Tissue > Organ > Organ System > Organism
4	Put the following into order of size from smallest to biggest. Meters, centimeters, kilometers, millimeters, micrometers.	Micrometer > Millimeter > Centimeter > Meter > Kilometer
5	Convert 2000 micrometers into millimeters	2 millimeters
6	Convert 4 millimeters into micrometers	4000 micrometers
7	What is the function of the cell membrane?	Allows substances in and out of the cell.
8	What is the function of the nucleus?	Controls the cell. Contains DNA.
9	What is the function of the cytoplasm?	Where chemical reactions take place.
10	What is the function of the Ribosome?	Creates proteins.
11	What is the function of the mitochondria?	Releases energy (from respiration)
12	What is the function of the chloroplasts?	Where photosynthesis takes place (plants make their own sugars using sunlight)
13	What is the function of the vacuole?	Contains cell sap
14	What is the function of the cell wall?	Strengthens cell and keeps it rigid
15	State the similarities between an animal and plant cell.	Nucleus, Cell Membrane, Ribosome, Cytoplasm, Mitochondria
16	State the differences between an animla and plant cell.	Chloroplast, Vacuole, Cell Wall
17	Why would you not find chloroplasts in plant cells for the roots?	They are underground, so there is no sunlight.
18	On a microscope, which lens would you look through?	Eyepiece lens
19	On a microscope, where would you place the slide you are observing?	Stage
20	An eye piece lens has a magifican of x5, and the objective lens has a magnification of x20. Calculate the total magnification.	Total magnification = 5 x 20 Total magnification = 100
21	Why do some cell slides need to be stained with dyes?	It makes the cell easier to observe.
22	What diffuses into an animal cell?	Oxygen
23	What diffuses out of an animal cell?	Carbon dioxide
24	What diffuses into a plant cell?	Carbon dioxide
25	What diffuses out of a plant cell?	Oxygen
26	Define the term diffusion	The movement of particles from a place of high concentration to a place of low concentration.
27	Define the term specialised cell.	A cell with a particular function.
28	Why do red blood cells have no nucleus?	Absorb more oxygen
29	State an adaptation of a sperm cell and how it allows it to function.	Tail - swim, streamlined shape - move faster.
30	How are root hair cells adapted to absorb minerals and water?	They have a large surface area.
31	State two examples of specialised cells in animals.	Red blood cell, egg cell, sperm cell, nerve cell
32	State two examples of specialised cells in plants.	Root hair cell, leaf cell
33	What is meant by a unicellular organism?	An organism which consists of one cell only. (e.g. bacteria)
34	What is meant by a multicellular organism?	An organism made up of many many cells.