

Lab Safety

Follow the instructions given by your teacher

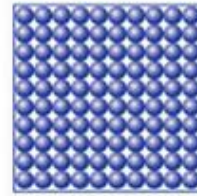
Be aware of your surroundings – take care - no running or ‘horse play’.

Hang up coats and bags, keep walking areas free.

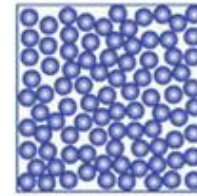
Stand up during practical tasks.

Wear eye protection!

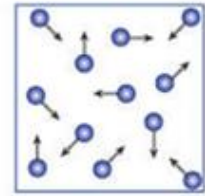
State Changes



Solid

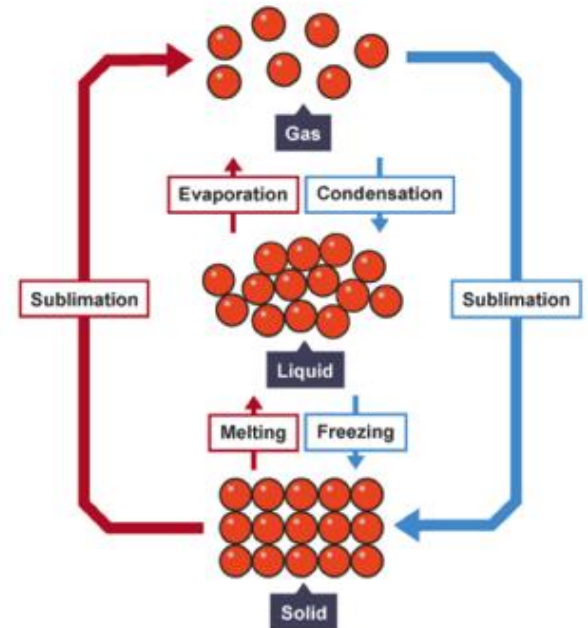


Liquid



Gas

The three **states of matter** are solid, liquid and gas. Changes between the states can be seen in the diagram.

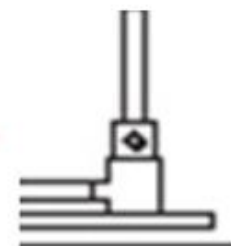




Tripod and Gauze Mat



Bunsen Burner and mat



Beaker



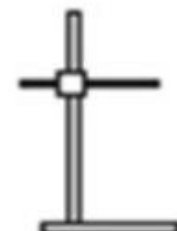
Conical Flask



Test Tube



Retort stand and clamp



Funnel and filter paper



Cells

All living things are made up of cells
Most cells are so small that you can only see them with a microscope.

Both animal and plant cells have these components:

Cell membrane – this surrounds the cell and allows nutrients to enter and waste to leave

Nucleus – this controls what happens in the cell. It contains DNA, the genetic information that cells need to grow and reproduce.

Cytoplasm – this is a jelly-like substance where chemical reactions happen.

Mitochondria – These are structures where respiration takes place.

Specialised Cells

Specialised cells have a **specific role** to perform.

Each specialised cell has a different job to do. They have **special features** that allow them to do these jobs.

Red blood cells carry oxygen around the body.

Nerve cells transmit electrical signals.

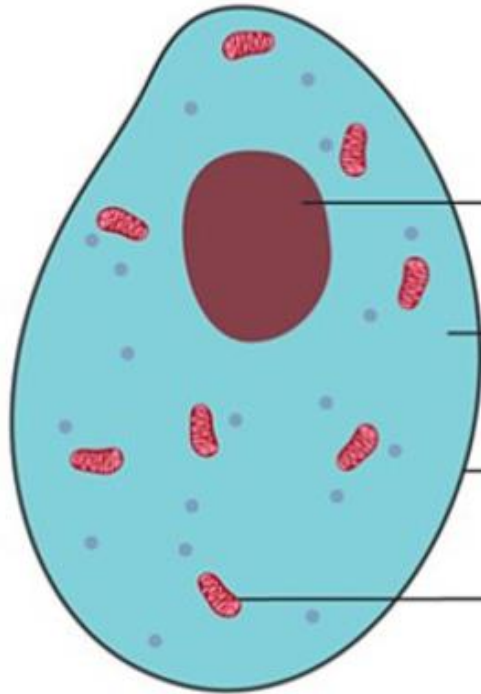
Sperm cells are the male sex cells.

Egg cells are the female sex cells.

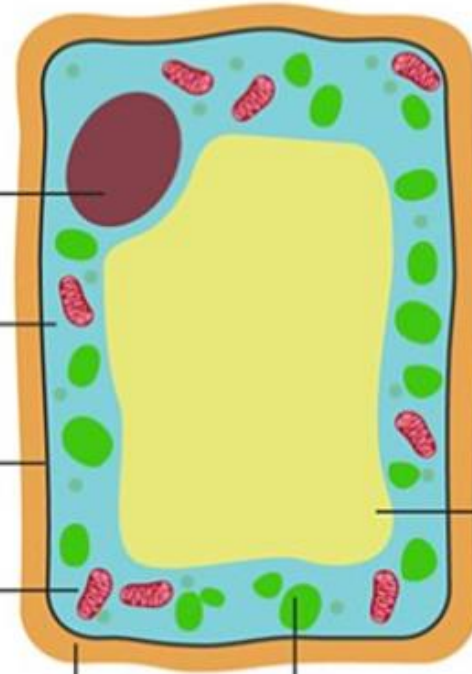
Root hair cells are plant cells. They take water into the root of a plant.

Animal and Plant cells

Animal cell



Plant cell



Nucleus

Cytoplasm

Cell membrane

Mitochondria

Vacuole

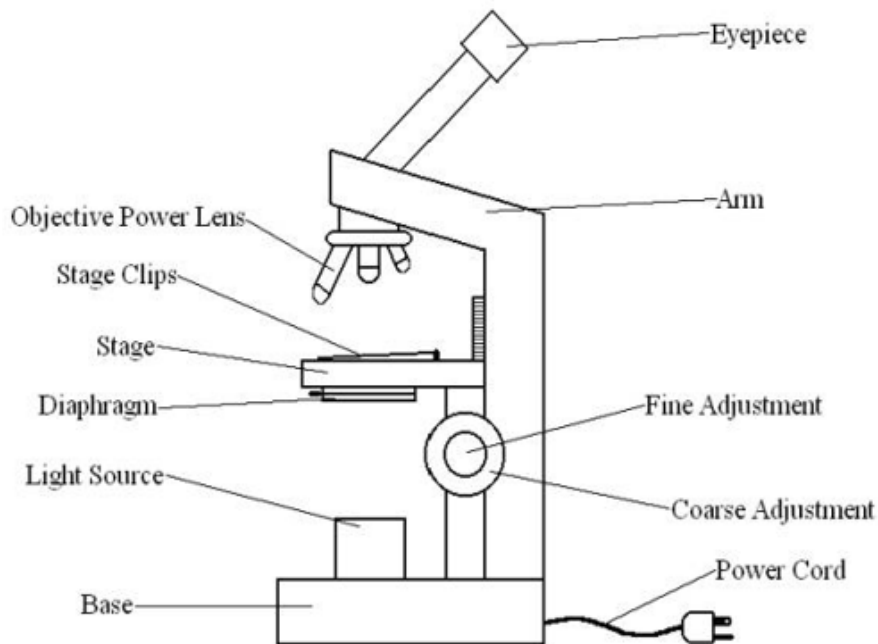
Cell wall

Chloroplasts

Microscopes are used to allow us to look at very small objects in greater detail than the human eye can see.

To use a **microscope**, follow the steps below:

1. Use the lowest magnification lens first.
2. Angle the mirror to let in plenty of light through the microscope.
3. Place the slide you want to look at on the stage.
4. Turn the focusing wheel until you can see your slide clearly.



Total magnification can be calculated using the following equation:

Total magnification = eyepiece lens x objective lens

To calculate the **magnification** of a biological specimen, use the following equation:

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

1	2											3	4	5	6	7	0			
		Key																	1 H hydrogen 1	4 He helium 2
7 Li lithium 3	9 Be beryllium 4	relative atomic mass atomic symbol name atomic (proton) number										11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10			
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18			
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36			
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54			
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86			
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112 – 116 have been reported but not fully authenticated									

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.

Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.