How Science Works...

Hazard Symbols

These symbols are found on chemical substances.

				
Caution	**Flammable**	**Toxic**	**Corrosive**	**Environmental Hazard**

The Scientific Method

Science isn't just a list of facts. It's actually a method used to prove facts. This is done by creating valid experiments.

This is the method:

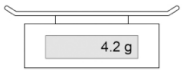
1. Hypothesis	Create a statement you can test.
2. Experiment	Design an experiment to test your statement
3. Results	Analyse your results
4. Conclusion	Do your results support your hypothesis?

The hypothesis should turn a question into a statement you can see if it is true or not.

- E.g. Do plants grow better when its dark or light?
- Hypothesis: Plants grow better in light

You then design an experiment to test this.

Apparatus (Equipment)

Diagram	Name	Function
	Beaker	Mix substances together
	Top-pan Balance	Measure Mass
	Measuring Cylinder	Measure volumes of liquid
	Conical Flask	Hold samples of liquid
	Bunsen Burner	Heat substances

Designing Experiments

To test a hypothesis you need to create an experiment. Experiments need to have three variables: independent, dependent and control.

The independent variable:
This is the variable that you **change** or make **different** in an experiment.

The dependent variable:
This is the variable that you **measure** during an experiment.

The control variable:
These are the variables that you need to **keep the same** so that your experiment has valid results. If they aren't the same in each test, this might affect your results.

Example 1	
A student investigates how long it takes to freeze different volumes of water.	
Independent	Volumes of water
Dependent	How long it takes to freeze
Control	The temperature of the freezer

Example 2	
A student investigates how changing the intensity of light affects the growth of the plant.	
Independent	The light intensity
Dependent	Growth of the plant
Control	Temperature of the room, amount of water.

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	Name the apparatus used to measure volumes of liquid.	Measuring cylinder
2	You have been asked to gently heat a beaker of liquid up using a Bunsen Burner. What other appratus will you need?	Heat proof mat, tripod, gauze.
3	What apparatus can you use to evaporate salt water?	(Bunsen Burner, heat proof mat, tripod, gauze), Evaporation Basin
4	If you want to heat a small amount of liquid, should you use a boiling tube or test tube?	Boiling Tube
5	What apparatus should you use to hold a boiling tube over a flame?	Clamp & Stand
6	For a roaring flame, does the airhole on a Bunsen burner need to be open or closed?	Open
7	For a saftey flame, does the airhole on a Bunsen burner need to be open or closed?	Closed
8	Suggest one safety measure you should follow using the Bunsen Burner.	Stand up, tie hair back, remove all trip hazards.
9	A student investigates how long it takes for in different volumes of water to boil. State the independent variable.	The volume of water used.
10	A student investigates how long it takes for in different volumes of water to boil. State the dependent variable.	The time taken to boil.
11	A student investigates how long it takes for in different volumes of water to boil. State the control variable.	The heat source used. (E.g. bunsen burne or kettle)
12	True or False. The independent variable is what you measure in experiments.	FALSE
13	True or False. Control variables are what you change in experiments.	FALSE
14	State what is meant by an independent variable.	The aspect of the experiment that is changed
15	State what is meant by a dependent variable.	The measurement in the experiment
16	State what is meant by an control variable.	The aspect of the experiment you keep the same, so your results are valid