Knowledge Organiser Focus: Periodic Table

I should already know:

How to group living organisms.

What living things are made from.

I will learn:

I can describe the structure of an atom and state why they are electronically neutral.

I can understand the trends and patterns shown in Group 1, Group 7 and Group 0 of the Periodic Table.

I can state how to test for oxygen and hydrogen.

I can compare the properties of metals and non-metals.

Discuss the history of the Periodic Table and its arrangement.

This will help in the future:

Careers in Chemistry, such as researcher, pharmacist, atomic scientist.

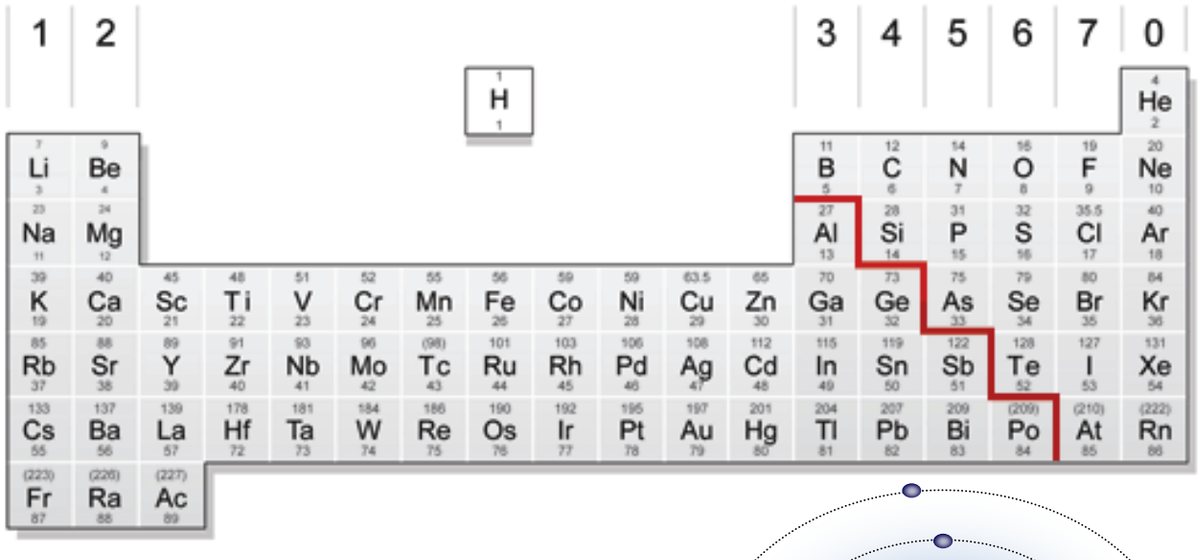
Key Words

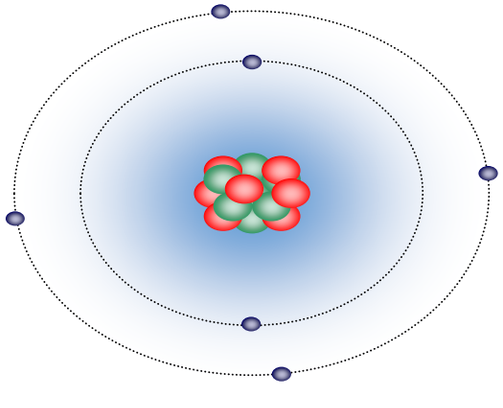
Name the scientist who came up with the periodic table.	Mendeleev
Define "period".	Rows in the periodic table
Define "group".	Columns in the periodic table
State what the period of an element tells us.	The number of electron shells an atom has
State what the group of an element tells us.	The number of outer shell electrons an atom has

Properties of Metals	Definition/additional information
Ductile e.g. Copper	Can be drawn into a thin wire
High melting point and boiling point e.g. Aluminium	Can withstand high temperatures
Good conductors of heat e.g. iron, copper	For heating: used in combination with other metals in saucepans
Malleable e.g. Tin	Can be bent or hammered into shape
High density	A substance with a large amount of mass in a given volume

Define atomic mass number.	The number of protons added to the number of neutrons. (this is the bigger number for each element)
Define atomic number.	The number of protons. (this is the smaller number for each element)
How do you calculate the number of protons for an element?	Use the atomic number
How do you calculate the number of electrons for an element?	Use the atomic number
How do you calculate the number of neutrons for an element?	Atomic mass number - atomic number

What is an exothermic reaction?	A reaction that transfers energy to the surroundings so the temperature of the surroundings increases (feels HOT)
Give 2 uses of exothermic reactions are:	- Self-heating cans - Hand warmers
What is an endothermic reaction?	A reaction that takes in energy from the surroundings so the temperature of the surroundings decreases (feels COLD).
Give 1 use of endothermic reactions :	- Sports injury packs





Greater Depth Challenge

How many variations of the Periodic Table have there been?

Have we discovered all the elements? Give reasons for your answer.

Further Reading

BBC Bitesize, Educake.

Year 8 – The Knowledge – Science – Periodic table

I can describe the structure of an atom and state why they are electronically neutral.

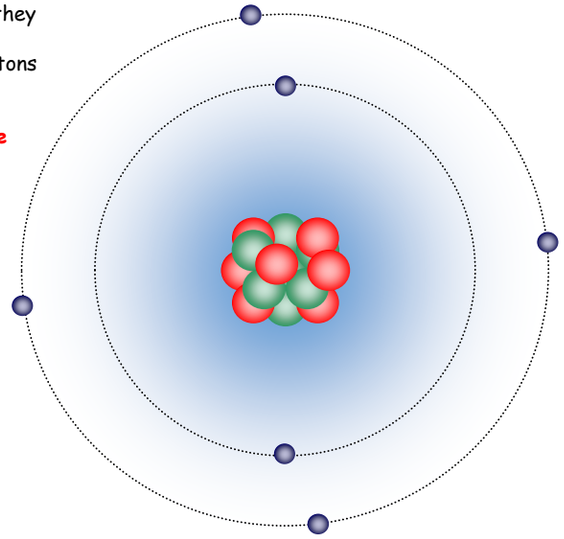
The protons and neutrons exist in a dense core at the centre of the atom. This is called the **nucleus**.

The electrons are spread out around the edge of the atom. They orbit the nucleus in layers called **shells**.

Atoms are considered **electronically neutral** as they always have the same number of protons and electrons. For example, a Lithium atom has 3 protons so it must have 3 electrons.

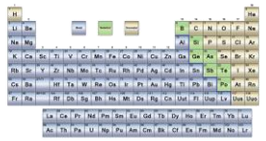
The positive charges must balance the negative charges.

Particle	Charge	Mass (in atomic units)
Proton	1+	1
Neutron	0	1
Electron	1-	Very Small



I can compare the properties of metals and non-metals.

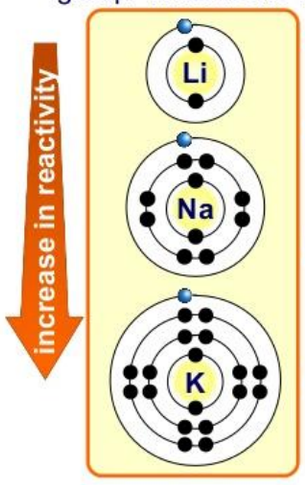
Properties of a typical metal (when solid)	Properties of a typical non-metal (when solid)
conductor of electricity	poor conductor of electricity
good conductor of heat	poor conductor of heat
shiny	dull
high density	low density
malleable (bendy)	brittle (breaks easily)
sonorous	Not sonorous



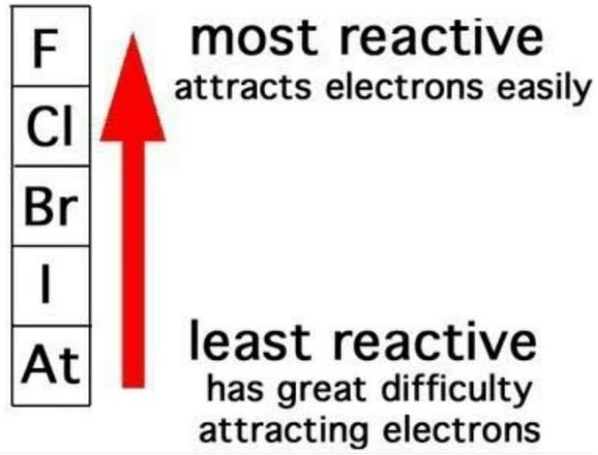
I can understand the trends and patterns shown in Group 1, Group 7, and Group 0 of the Periodic Table.

How does electron structure affect reactivity?

The reactivity of alkali metals **increases** going down the group. What is the reason for this?

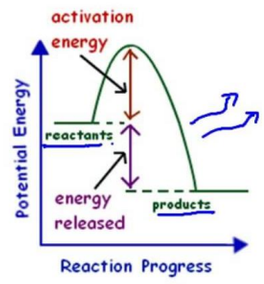


- The atoms of each element get larger going down the group.
- This means that the outer shell electron gets further away from the nucleus and is shielded by more electron shells.
- The further an electron is from the positive nucleus, the easier it can be lost in reactions.
- This is why the reactivity of the alkali metals increases going down group 1.

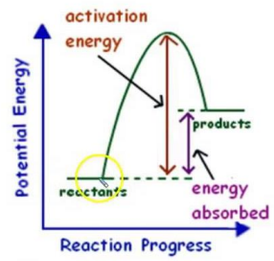


Group 0 are inert and do not react. They already have a full outer shell of electrons.

I can define reactions as endothermic and exothermic making links to energy.



Exothermic reaction



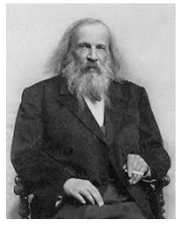
Endothermic reaction

In an exothermic reaction, energy is released into the surroundings as heat. As a result, the temperature of the surroundings increases.

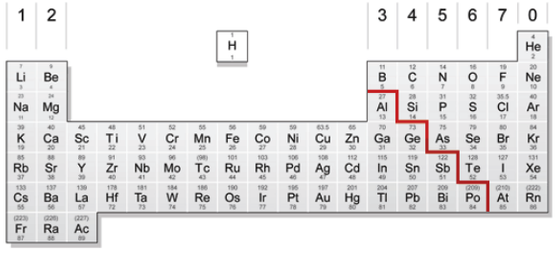
In an endothermic reaction, energy is absorbed from the surroundings. As a result, the temperature of the surroundings drops.

I can discuss the history of the Periodic Table and its arrangement.

As you go across the periods, the mass number increases.
Elements in the same Groups have similar properties.

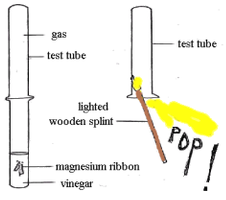


Mendeleev
Ordered in terms of atomic weight. Realised there were still elements to be discovered, so left gaps for them. This meant elements in same group now had similar properties.



I can state how to test for oxygen and hydrogen.

Hydrogen	A lit splint makes a 'squeaky pop'.
Oxygen	Relights a glowing splint.
Carbon Dioxide	Turns limewater milky from clear.



I can describe the structure of an atom and state why they are electronically neutral.

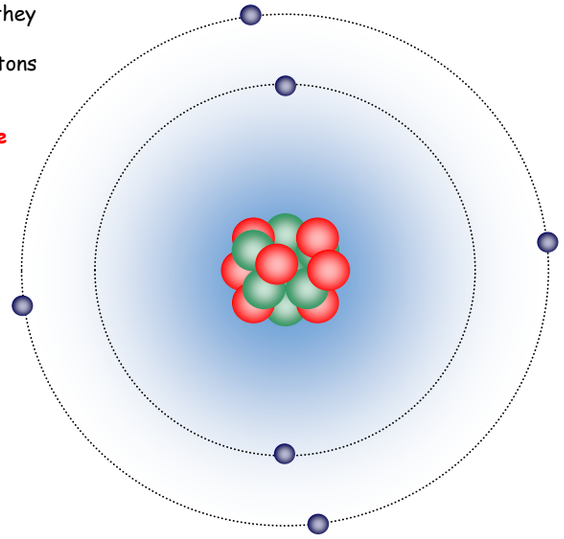
The protons and neutrons exist in a dense core at the centre of the atom. This is called the **nucleus**.

The electrons are spread out around the edge of the atom. They orbit the nucleus in layers called **shells**.

Atoms are considered **electronically neutral** as they always have the same number of protons and electrons. For example, a Lithium atom has 3 protons so it must have 3 electrons.

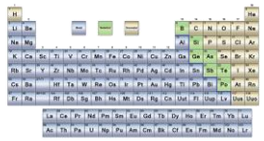
The positive charges must balance the negative charges.

Particle	Charge	Mass (in atomic units)
Proton		
Neutron		
Electron		



I can compare the properties of metals and non-metals.

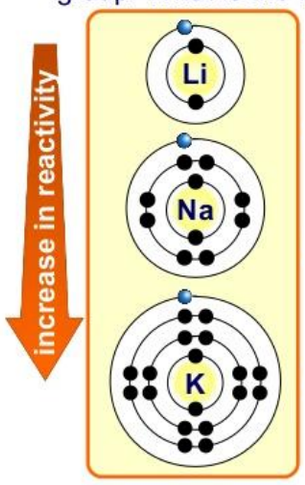
Properties of a typical metal (when solid)	Properties of a typical non-metal (when solid)
conductor of electricity	
	poor conductor of heat
	dull
high density	
	brittle (breaks easily)
sonorous	



I can understand the trends and patterns shown in Group 1, Group 7, and Group 0 of the Periodic Table.

How does electron structure affect reactivity?

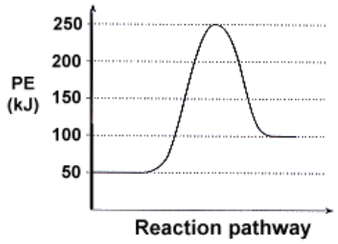
The reactivity of alkali metals **increases** going down the group. What is the reason for this?

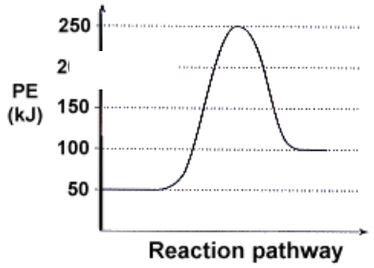


F
Cl
Br
I
At

Group 0 are inert and do not react. They already have a full outer shell of electrons.

I can define reactions as endothermic and exothermic making links to energy.



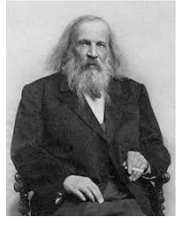


In an exothermic reaction, energy is released into the surroundings as heat. As a result, the temperature of the surroundings increases.

In an endothermic reaction, energy is absorbed from the surroundings. As a result, the temperature of the surroundings drops.

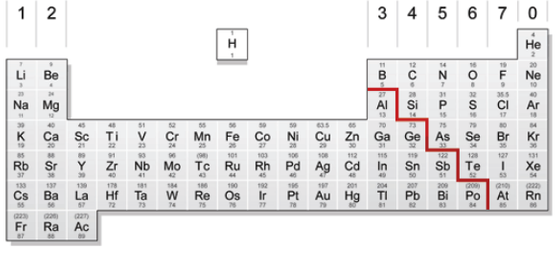
I can discuss the history of the Periodic Table and its arrangement.

As you go across the periods, the mass number increases.
Elements in the same Groups have similar properties.



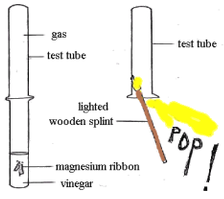
Mendeleev

.



I can state how to test for oxygen and hydrogen.

Hydrogen	
Oxygen	
Carbon Dioxide	



Year 7 – The Knowledge – Science – Skills School

Scientific equipment

	Name	Use
	**Bunsen burner**	**Heating by burning a gas**
	Conical flask	To measure volume of liquids
	**Beaker**	**To hold, pour and heat liquids**
	Measuring cylinder	To measure precise volume of liquid
	**Evaporating basin**	**To heat and evaporate liquids**

	Name	Use
	**Stopwatch**	**To measure time**
	Tongs	To hold hot things (not test tubes)
	**Thermometer**	**To measure temperature**
	Safety Goggles	To protect your eyes
	**Tripod**	**To hold a beaker above a Bunsen burner**
	Gauze	Used to support a beaker

Risk assessment

Hazard / Chemical	Risks	Control measures	Emergency measures

Hazard – something that has the potential to cause harm to a person, property or environment.

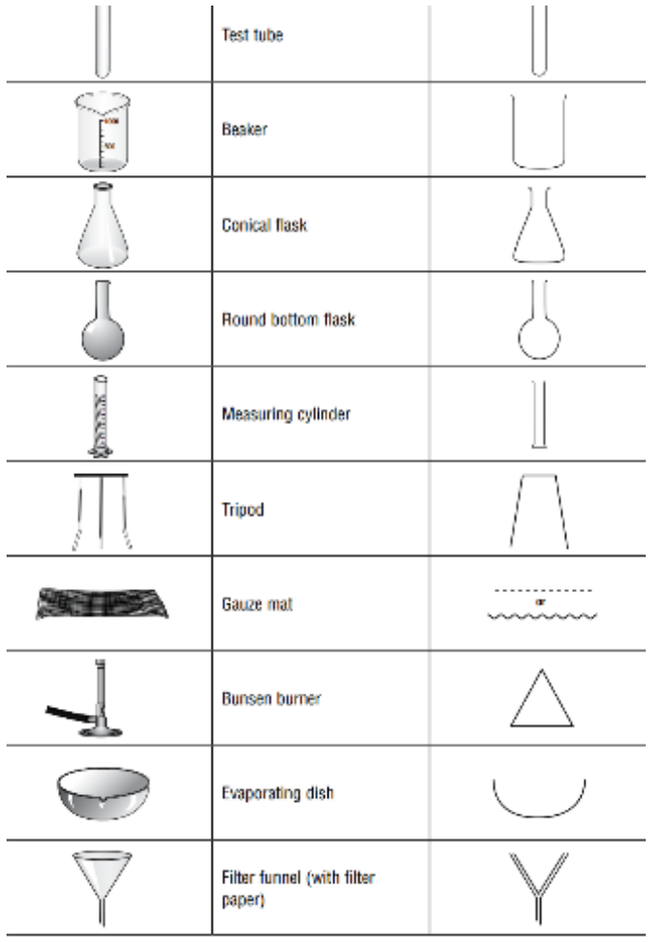
Risk – is the chance or probability of the hazard causing harm or damage to people, property or the environment.

Control measures – minimises the risk of the hazard causing harm.

Drawing equipment

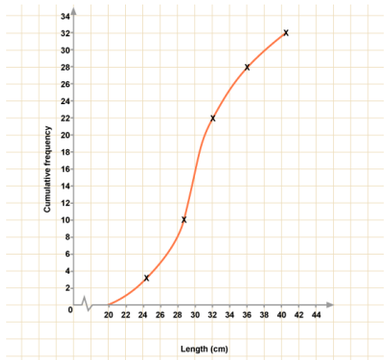
When drawing scientific equipment it must be drawn in 2D and not 3D.

Equipment diagrams should be drawn as part of the method for the experiment.



Hazard symbols

Graphs



Rules for a graph

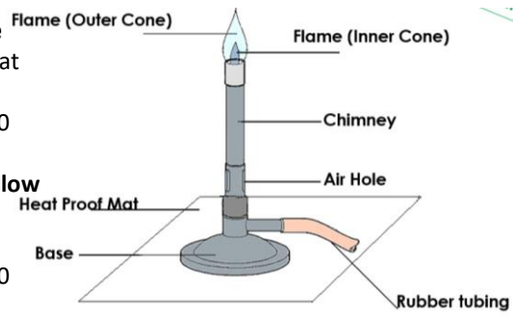
1. Title
2. Size
3. Appropriate scale
4. Labelled axis
5. Plot points accurately
6. Line of best fit

When describing graphs make sure you…

- Identifying if it's an increasing or decreasing trend.
- Support your chosen trend with evidence from the graph.
- Give a reason or opinion for the observed trend.

Bunsen burner

Different flames:
Collar open= Blue flame- used to heat substances
Temperature= 500 degrees
Collar closed= Yellow flame: used as a safety flame .
Temperature= 300 degrees



Calculation

Formula	Write the formula you are using.
Numbers	Substitute in the known numbers.
Answer	Calculate the answer.
Unit	Add units if appropriate.