

KEYWORD	DEFINITION
Chemical reaction	Where chemicals are changed into different chemicals
Reactant(s)	The starting chemical(s) in a reaction
Product(s)	The end chemical(s) in a reaction
Physical properties	Can be observed or measured without changing the chemical
Malleable	Easily shaped
Ductile	Can be stretched into wires
Conductor	Allows heat or electricity to pass through
Reactivity	The tendency of a substance to undergo a chemical reaction
Oxidation	When a chemical reacts with oxygen in the air
Displacement	Ration where a more reactive element takes the place of a less reactive element in a compound

KEY FACTS □ = metal □ = non metal

Iron, nickel and cobalt are magnetic elements

mercury and bromine are liquids

Physical properties of metals and non metals

PROPERTY	METAL	NON-METAL
State	Solid <i>(except mercury which is a liquid)</i>	Gas or solid <i>(except bromine which is a liquid)</i>
Appearance	Shiny	Dull
Conductivity	Good conductors of heat and electricity	Poor conductors or heat and electricity
Response to force	Malleable and ductile	Brittle

ELEMENT	Reaction with oxygen	Reaction With dilute acid
Potassium	React with oxygen in the air at room temperature	explode
Sodium		
Lithium		
Calcium		Bubbles, give off hydrogen, form a salt
Magnesium	React with oxygen in the air when heated	Slow reaction with warm acid
Aluminium		
Zinc		
Iron		
Tin		
Lead	No reaction	
Hydrogen		
Copper		
Silver		
Gold	No reaction	No reaction

more reactive

Oxidation Reactions

Metals and non-metals react with oxygen in the air forming oxides. Metal oxides (e.g. sodium oxide) are bases and non-metal oxides (e.g. sulphur dioxide) are acids.

Word equation: element + oxygen → element oxide
Example: zinc + oxygen → zinc oxide

Particle diagram:

KEY
● zinc particle
● oxygen particle

zinc oxygen zinc oxide

Metals and Acids

Metals react with acids forming salts and hydrogen. The name of the salt formed depends on the acid used

	Acid	Salt formed
	hydrochloric	<u>metal</u> chloride
	sulphuric	<u>metal</u> sulphate
	nitric	<u>metal</u> nitrate

metal + acid → salt + hydrogen

lithium + hydrochloric acid → lithium chloride + hydrogen

lithium + sulphuric acid → lithium sulphate + hydrogen

Displacement Reactions

This is when a more reactive metal takes the place of a less reactive metal in a compound. If the less reactive metal is by itself, no reaction takes place.

zinc + lithium chloride no reaction as zinc is less reactive than lithium

In this example calcium is more reactive than zinc so a reaction takes place – the metals 'swap'

zinc + copper oxide → zinc oxide + copper

The periodic table is arranged in rows, called periods and columns, called groups.

Groups contain elements with similar chemical properties

Keyword	Definition
Periodic Table	A tabular representation of all known elements in order based on atomic number
Atomic Number	The number of protons in the nucleus of an atom. Also called the proton number
Periods	A horizontal row in the periodic table
Groups	A vertical column in the periodic table containing elements with similar chemical properties
Element	A substance made of only one type of atom
Compound	A substance where two or more elements have chemically joined together
Mixture	Two or more substances that are not joined together. The substances can be elements, compounds or both
Reactive	The tendency of a substance to undergo a chemical reaction

Further Reading:

<https://www.bbc.com/bitesize/guides/z3vwxnb/revision/5>

<https://www.bbc.com/bitesize/guides/z84wjxs/revision/1>

Group 1 – Alkali Metals

Group 1 metals are very soft metals which can be cut with a knife. They have very low melting and boiling points and are very reactive compared with other metals. The elements become more reactive as you go down Group 1.

When the Group 1 metals react in water they produce a metal hydroxide and hydrogen gas e.g.



Group 2 – Alkali Earth Metals

Group 2 metals are reactive, but less reactive than Group 1 elements.

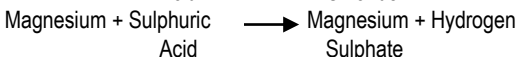
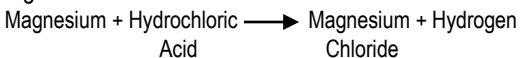
Group 2 metals react with acids to produce salt and hydrogen. The name of the salt depends on the acid used.

Hydrochloric acid – **chloride**

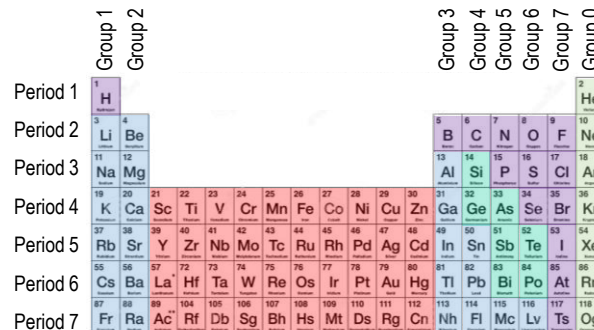
Sulphuric acid – **sulphate**

Nitric acid – **nitrate**

e.g.



Group 2 metals become more reactive as you go down the group



Group 7 – The Halogens

Group 7 elements become less reactive when you move down the group. This can be shown as a displacement reaction.

Group 0 – The Noble Gases

Group 0 elements are not reactive. This is because the atoms have full outer shells.

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Lithium – Li Sodium – Na Potassium – K	Beryllium – Be Magnesium – Mg Calcium – Ca	Boron – B Aluminium – Al Gallium – Ga	Carbon – C Silicon – Si Germanium – Ge	Nitrogen – N Phosphorus – P Arsenic – As	Oxygen – O Sulphur – S Selenium – S	Fluorine – F Chlorine – Cl Bromine – Br	Helium – He Neon – Ne Argon – Ar