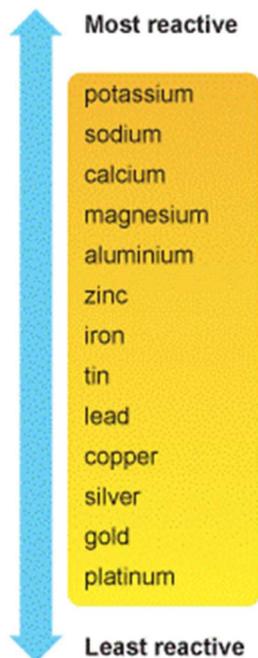


Knowledge organiser – 6.1 Metals & non-metals

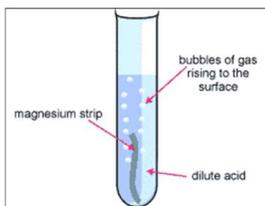
Metals are found on the left hand side of the periodic table; the majority of elements are metals.



Sulfuric acid → sulfate

Nitric acid → nitrate

Hydrochloric acid → chloride



Reactivity series describes the patterns of metal reactions with acids, oxygen and water. Metals get less reactive as you go down the group.

Metals

Shiny

High melting points

Good conductors of electricity

Good conductors of heat

High density (heavy for its size)

Malleable (hammer into shape) and ductile (make into wires)

Non-metals

Dull

Low melting points

Poor conductors of electricity

Poor conductors of heat

Low density (light for its size)

Brittle (breaks easily)

Metals and acid

$Metal + acid \rightarrow salt + hydrogen$

Magnesium + hydrochloric acid \rightarrow magnesium chloride + hydrogen

Metals and oxygen

$Metal + oxygen \rightarrow metal\ oxide$

Magnesium + oxygen \rightarrow magnesium oxide

Metals and water

$Metal + water \rightarrow metal\ hydroxide + hydrogen$

Potassium + water \rightarrow potassium hydroxide + hydrogen

KEYWORD

DEFINITION

Chemical property

How a substance behaves in its chemical reactions.

Displaces

A more reactive metal displaces – or takes the place of – a less reactive metal from its compound.

Element

A substance that cannot be broken down into other substances.

Oxidation

A chemical reaction in which a substance combines with oxygen.

Oxides

A substance made up of metal or non-metal element joined to oxygen.

Physical property

A property of a material that you can observe and measure.

Product

A substance that is made in a chemical reaction. (After the arrow)

Reactant

A starting substance in a chemical reaction.

Reactive

A substance is reactive if it reacts vigorously with dilute acid or water.

Reactivity

The tendency of a substance to undergo a chemical reaction.

Thermite reaction

Reaction of aluminium with iron oxide to make aluminium oxide and iron.

State symbols (equations)

(s)	Solid
(l)	Liquid
(g)	Gas
(aq)	Solution (aqueous)

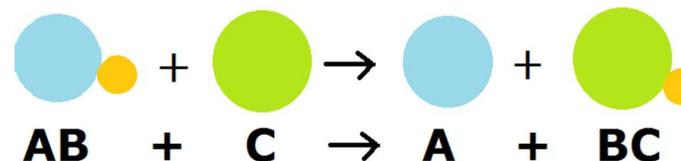
There is a pattern. Metals that react vigorously with dilute acids also react vigorously with oxygen. Metals that do not react with dilute acids do not react with oxygen.

Metal	Reaction with dilute acid	Reaction with oxygen
magnesium	reacts very vigorously	burns vigorously
zinc	reacts steadily	burns less vigorously
iron	reacts steadily	burns
lead	reacts slowly	do not burn; when heated, form layer of oxide on surface
copper	no reaction	
gold		no reaction

Word equations – Used to describe chemical reactions in a simple way. The reactants are on the left of the arrow, and the products are on the right. The arrow (\rightarrow) means 'react to make'. It is NOT like the = sign.

Displacement reactions - Displacement reactions involve a reaction between a metal and a compound of a different metal.

A more reactive metal will displace a less reactive metal from its compounds.



For example, the more reactive magnesium will displace the less reactive copper from the copper sulfate solution.

Magnesium + copper sulfate \rightarrow magnesium sulfate + copper