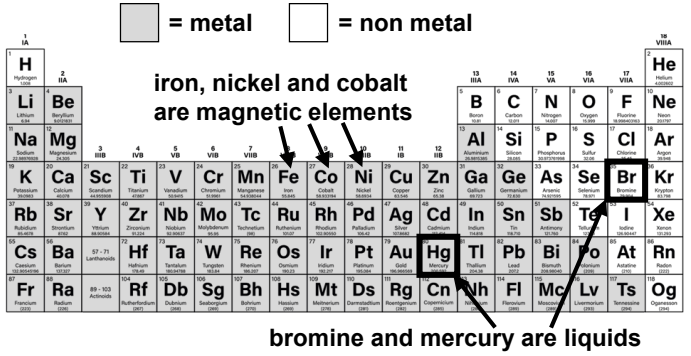
KNOWLEDGE ORGANISER
BIG IDEA: REACTIONS
TOPIC: METALS AND NON METALS

Key word	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 electrical energy 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	reaction where a more reactive element takes the place of a less reactive element in a compound

Key facts



Physical properties of metals and non metals

property	metal	non-metal
state	solid (except mercury which is a liquid)	gas or solid (except bromine which is a liquid)
appearance	shiny	dull
conductivity	good conductors of heat and electricity	poor conductors of heat and electricity
response to force	malleable and ductile	brittle

Reactivity series

less reactive

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	
aluminium		
zinc		
iron		slow reaction with warm acid
tin		
lead		
hydrogen		no reaction
copper		
silver		
gold	no reaction	

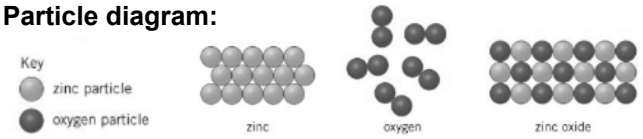
Oxidation reactions

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

Word equation: *element* + oxygen → *element* oxide

eg: *zinc* + oxygen → *zinc* oxide

Particle diagram:



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	*metal* chloride
sulfuric	*metal* sulfate
nitric	*metal* nitrate

metal + acid → salt + hydrogen

lithium + hydrochloric acid → *lithium* chloride + hydrogen

lithium + sulfuric acid → *lithium* sulfate + 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*