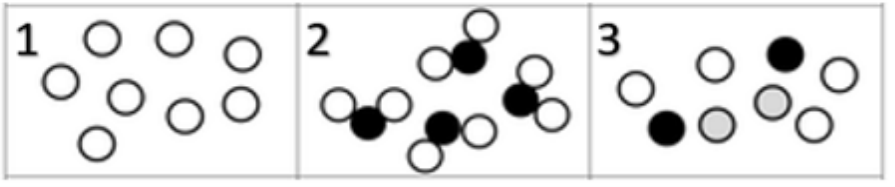
Science: Mind the Gap

1. Key words

1	Element	A substance made up of one type of atom.
2	Compound	A substance made up of atoms of two or more elements, chemically combined.
3	Mixture	A substance made up of atoms of two or more elements, not chemically combined.



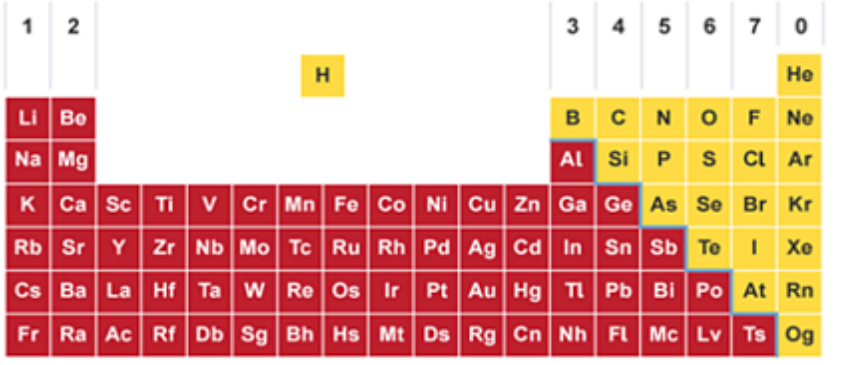
2. Elements and compounds

Name	Hydrogen	Oxygen	Water
Element or compound	Element	Element	Compound
Properties	Gas at room temperature.	Gas at room temperature.	Liquid at room temperature.
Formula	H_2	O_2	H_2O
Description	2 Hydrogen atoms joined together	2 Oxygen atoms joined together	2 Hydrogen atoms joined to 1 Oxygen atom

3. Properties of metals and non-metals

Metals	**Non-metals**
Shiny	Dull
High melting points	Low melting points
Good conductors of electricity	Poor conductors of electricity
Good conductors of heat	Poor conductors of heat
High density	Low density

4. Basic periodic table structure



Red	Metals.
Yellow	Non-metals.
Groups	Columns in the Periodic Table, they go downwards.
Periods	Rows in the Periodic Table, they go sideways.
Discovery	The modern periodic table is based on the model proposed by Dmitri Mendeleev at the end of the 19th century.

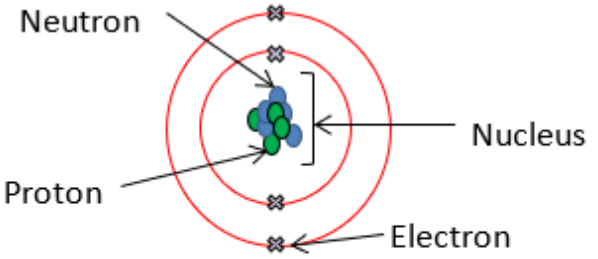
5. Element Symbols

Element symbols are used so that people in any country can understand which chemicals are used in a reaction..

Element	Symbol	Element	Symbol
Magnesium	Mg	Copper	Cu
Zinc	Zn	Sodium	Na
Atomic number	Number of protons in the nucleus of an atom.		
Atomic mass	Total number of protons **and** neutrons in the nucleus of an atom.		

6. Structure of the atom

	Key word	Definition
1	Atom	A single unit of matter.
2	Nucleus	The centre of an atom. Contains protons and neutrons.
3	Proton	A positively charged particle found in the nucleus.
4	Neutron	A neutral particle found in the nucleus. Has no charge.
5	Electron	A negatively charged particle found in energy levels (shells) around the nucleus.



7. Word and Symbol Equations

Word equations represent the formation of compounds during a reaction.

Burning magnesium in air:

Magnesium + Oxygen → Magnesium oxide

Reactants *Products*

Reacting hydrochloric acid and magnesium

Magnesium + Hydrochloric acid → Magnesium chloride + Hydrogen

Reactants *Products*

8. Fire triangle

Combustion The release of thermal energy during a chemical reaction between a fuel and oxygen.

3 things are required for combustion:

- Fuel
- Oxygen
- Heat

9. Group 1 elements – Alkali Metals

Elements	Physical properties	Chemical properties	Patterns
Li, Na, K, Rb, Cs, Fr	• Lower density than other metals. • Softer than other metals.	• Very reactive.	• Reactivity increases down the group. • Melting and boiling point decreases down the group.

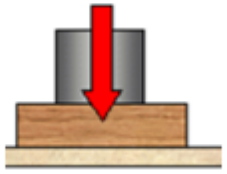
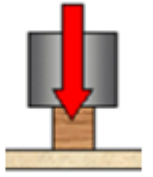
10. Group 7 elements – Halogens

Elements	Physical properties	Chemical properties	Patterns
F, Cl, I, Br	• Does not conduct electricity.	• Very reactive. • A more reactive halogen will take the place of a less reactive halogen in a compound.	• Reactivity decreases down the group. • Melting and boiling point increases down the group.

Science: Under Pressure

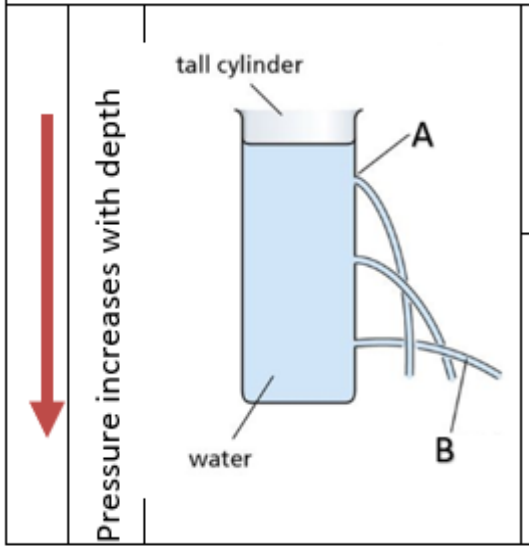
1. Pressure in solids

The pressure exerted on a solid is known as **stress.**

If the force is exerted over a large area, it results in **low pressure.**	If the force is exerted over a small area, it results in **high pressure.**
	
Pressure can be calculated	Presure (Nm^2) = $\frac{\text{Force (N)}}{\text{Area } (m^2)}$

2. Pressure in Liquids

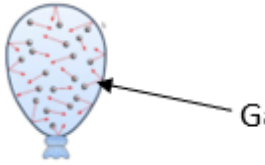
Pressure in liquids



A	At the top of the cylinder the force applied (weight) is small, so it exerts **low pressure – Less particles pushing in all directions.**
B	At the bottom, the force applied (weight) is larger, so it exerts **high pressure – More particles pushing in all directions.**

3. Pressure in solids

Gas pressure is caused by the particles of a gas **colliding** with the wall of the container they are in.



Gas pressure can be increased by:

1	Increasing the heat	The particles have more energy so they collide with the container with more force.
2	Compressing the gas	The same amount of particles are closer together in a smaller volume so there are more collisions.
3	Increasing the number of particles	If more particles are added in the same volume, they will be closer together so there are more collisions.

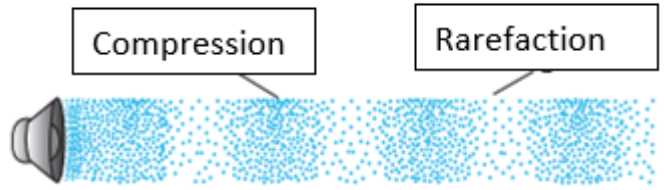
4. Longitudinal waves

Longitudinal waves transfer energy through **vibrating particles.**

Sound waves are a type of longitudinal wave.

Compression
- Particles are close together.

Rarefaction
- Particles are far apart.



Sound waves that are above the frequency of human hearing (20,000Hz +) are called **ultrasound.**

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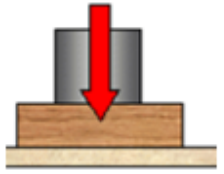	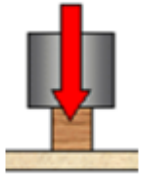
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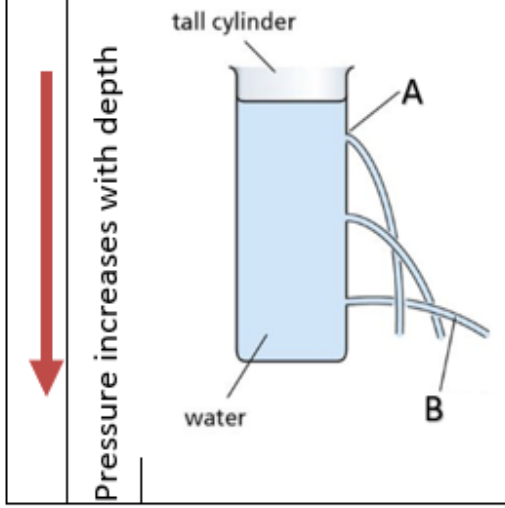

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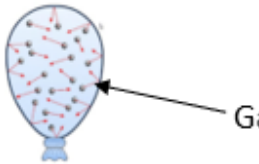

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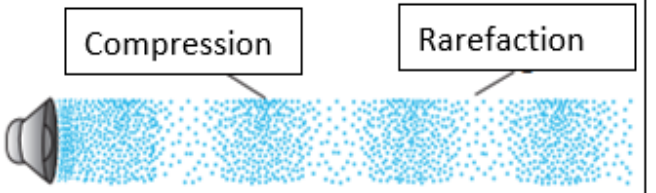

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