Science Department

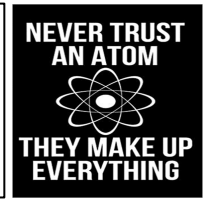
KNOWLEDGE & VOCABULARY ORGANISER

Year 7 Atoms

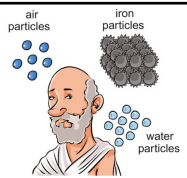
Keyword	Definition
Atom	The smallest piece of an element. They are the fundamental building block of all matter.
Chemical reaction	A process in which one or more substances are changed into others, by their atoms being rearranged. Also known as irreversible reactions.
Conservation of mass	The total mass of the products in a chemical reaction will be the same as the total mass of the reactant.
Compound	Two or more different elements which are chemically joined together.
Element	A substance containing only one type of atom.
Molecule	A substance when 2 or more atoms are joined together
Mixture	Two or more different elements or compounds which are not chemically joined together.
Physical change	A process in which the physical properties are changed, but no new substances are made. Also known as reversible reactions.
Products	The substance(s) formed in a chemical reaction
Properties	The qualities and characteristics of a substance that describe and identify it.
Reactants	A substance that reacts together with another substance to form products during a chemical reaction.

Scientists use the particle theory to explain the properties of substances.
Particle theory understands that:

- **All matter is made up of particles**
- **Particles are moving all the time**
- **There are forces of attraction holding the particles in place**
- **These forces vary in strength in the different states of matter**







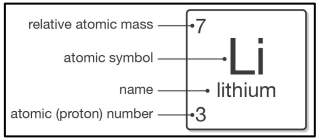
400BC, Greek philosopher, Democritus named the particles that make up all matter 'atoms'.

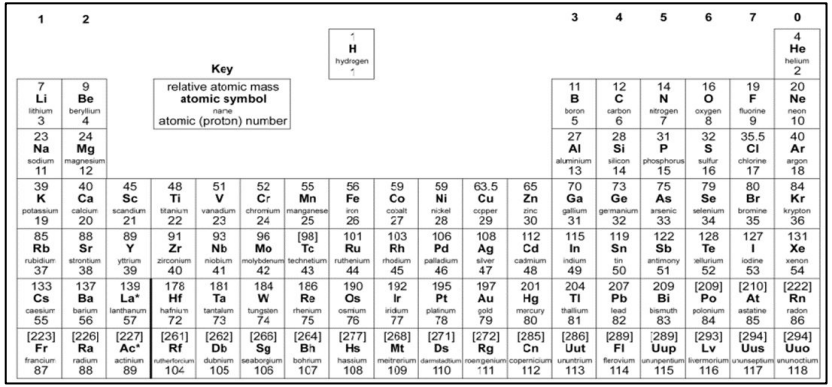
1805, English Chemist, John Dalton said:

- All matter is made of particles called atoms
- Atoms cannot be created or destroyed
- In a chemical reactions, atoms rearrange to make new substances



All elements are shown on the Periodic Table.
We use symbols to identify them. The symbols ALWAYS start with a capital letter. Not all have a second letter but if they do it is ALWAYS lower case!





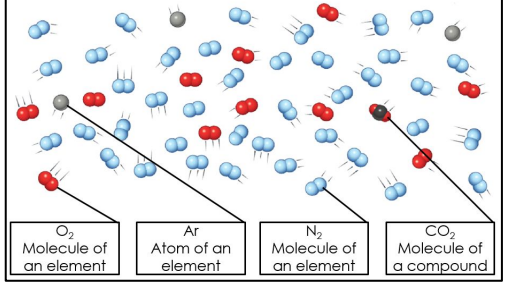
Further Reading:

https://www.bbc.co.uk/bitesize/topics/zstp34j https://www.bbc.co.uk/bitesize/topics/zypsgk7

Atoms can join together in different ways:

- 2 or more atoms joined make a **molecule**
- If the atoms are the same its an **element**
- If they are different it's a **compound**
- **Mixtures** are made up of different substances that are not chemically joined. They can be easily separated by various methods (discussed in next Chemistry topic!)

Air is a mixture



Chemical formula:

When atoms combine, Chemists use the symbols of the Periodic table to construct chemical formula.
This tells us information about the type of atoms and number of atoms in the compound.

For example:
H_2SO_4 = Sulphuric Acid
This tells me that there are 3 elements in total:
Hydrogen = H x 2
Sulphur = S x 1
Oxygen = O x 4
The subscript numbers tell us how many of each atom are in that molecule. Chemists don't tend to write the number 1!

In a chemical reaction the bonds between the atoms in the **reactants** are broken. The atoms are rearranged to form new substances which are called **products**. These reactions are often irreversible.

We can use equations to show these chemical reactions.
There are 3 parts to chemical equations:

1) The reactants – the chemicals that react together (written before the arrow)
2) An arrow – this shows us that a reaction has occurred
3) The products – the chemicals that are made (written after the arrow)

For example:

Methane + Oxygen → Carbon Dioxide + Water

Reactants Products

Chemical Reaction or Physical Change?

- Chemical changes happen when chemical reactions occur. They involve the formation of new chemical elements or compounds. These are often irreversible.

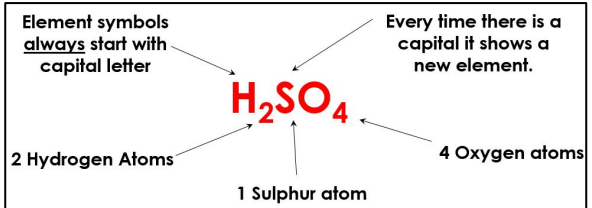
E.g. Iron will react with oxygen to form Iron Oxide (rust).



- Physical changes do not lead to new chemical substances forming. In a physical change, a substance simply changes physical state. These are reversible.

E.g. A solid to a liquid.





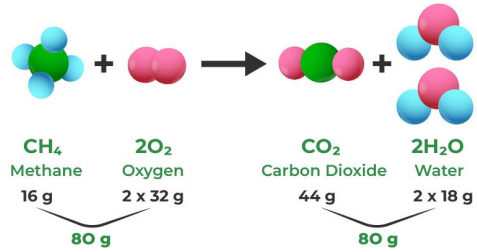
The law of conservation of mass states that whenever a physical change or chemical reaction happens, the mass of the chemicals before is the same as the mass of the chemicals after.

This means that the mass of the products always is equal to the mass of the reactants.

Sometimes this may appear to be different if one of the reactants or products is a gas!

This also means that there will be the same number and type of atoms in the reactants as there are in the products.

We use this to 'balance equations'. By adding large numbers in front of our chemical symbols, it shows us the 'reacting ratios' of the substances in our reaction.



Signs that a Chemical reaction has taken place include:

- Temperature change
- Colour change
- Odour
- Fizzing/ Bubbles/ Effervescence/ Gas
- Bangs/ Explosions
- Smoke/ Flames
- Solid forms in a solution (precipitation)

