Elements

Elements are made in stars. They are very simple substances, and cannot be broken down into anything simpler. Elements only contain **one type of atom**, e.g.

Silver only contains silver atoms

Iron only contains iron atoms.

Elements can be sorted in different ways:

- Elements can be

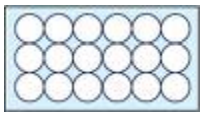
Metal  or **Non-metal** 

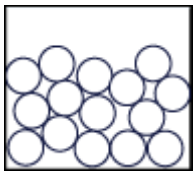
The table below shows some metals and non-metals

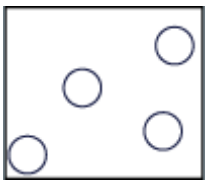
Metal	**Non-metal**
Copper	Oxygen
Silver	Carbon
Gold	Silicon

- Elements can be in different states:

Solid or **Liquid** or **Gas**







The table below shows the state of some elements:

Solid	**Liquid**	**Gas**
Copper	Mercury	Oxygen
Iron	Bromine	Hydrogen
Lead		Nitrogen
Carbon		Chlorine

Most of the solid elements are metals. All gases are non-metals.

Properties of elements

- Metals are **shiny** when polished, and **conduct heat and electricity**. All metals are solid at room temperature except for mercury, which is a liquid.
- Non-metal solids are usually **brittle** (they break easily).
- Non-metals can be solids, liquids or gases at room temperature. Non-metals usually have low melting and boiling points. They are **poor conductors of electricity**. The exception is graphite, a form of carbon, which is a good conductor.

Where we get elements from

Some elements can be extracted from **ores** found in the Earth's crust. Ores look quite different to the elements they contain.

The Periodic Table

This is a way of organising the elements. Each element has its own chemical symbol, e.g. copper is Cu and Iron is Fe. The horizontal rows in the periodic table are called **Periods**. The vertical columns are called **Groups:**

Group 1	Alkali metals
Group 2	Alkali earth metals
Group 7	Halogens
Group 8 (or 0)	Noble gases

All of the elements in the same group have similar chemical properties, e.g. Group 1 metals are all very reactive, very soft and have to be stored under oil. Group 8 are all very unreactive gases.

Chemical Reactions

Elements can join together to form compounds. They have to be chemically joined, not just mixed together. A compound is a substance that has more than one kind of atom joined together. For example, if iron joins with oxygen from the air, it forms the compound iron oxide (rust).

Word Equations

These can be used to show the changes when a chemical reaction happens.

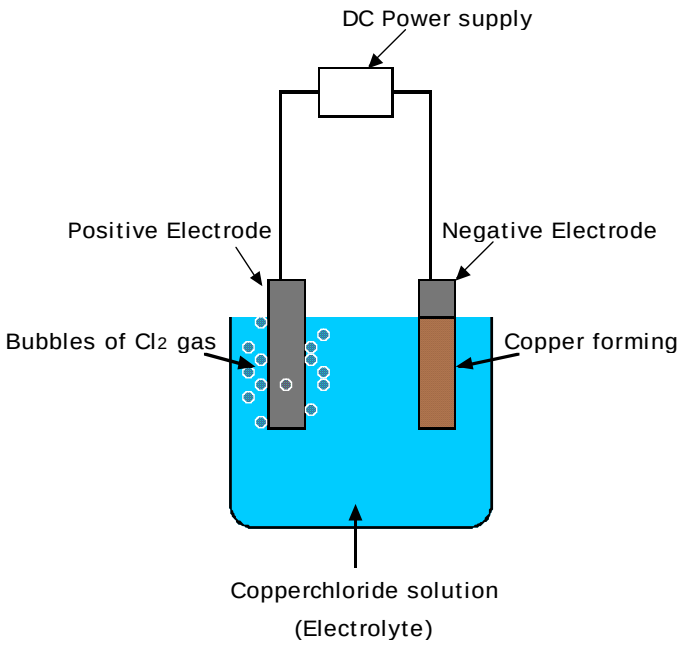
iron + oxygen → iron oxide

The chemicals at the start of a reaction are called the **reactants**.
The chemicals which are formed are called the **products**.

Breaking up compounds

When elements join to make a compound, energy is given out. If we want to turn the compound back into elements, energy has to be put back in.

For some compounds, heat can be used to split them up. For others, we use electricity.



This diagram shows how electricity can be used to split up the compound copper chloride, and separate it into copper and chlorine. This is called **electrolysis**. The word equation for this is

copper chloride → copper + chlorine