

## Elements

An **element** is a simple substance that cannot be split into anything simpler by chemical reactions. Atoms are the smallest particles of an element. **Atoms** of one element are all the same, and are different from atoms of all the other elements.

All the elements are shown in the **periodic table**. There are 117 known elements. Each element has a **chemical symbol**, which is usually one or two letters. A symbol is written with the first letter as a capital, and the second letter lower case, for example

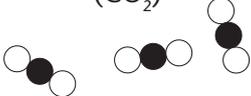
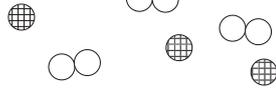
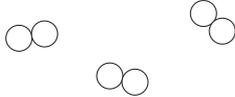
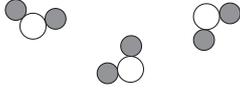
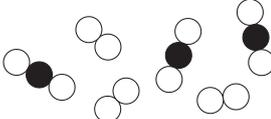
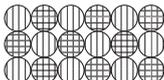
oxygen – O    carbon – C    iron – Fe    aluminium – Al

## Compounds

Elements can join together to make compounds. The name of the compound tells you the elements that are in it. Compounds made from two elements always have a name that ends in '-ide'.

These elements join together...	...to make these compounds
carbon, oxygen	carbon dioxide
sodium, chlorine	sodium chloride
magnesium, oxygen	magnesium oxide

A **chemical formula** tells you the name and number of atoms in a compound. The smallest particle of many compounds is called a **molecule**. Molecules are made up of groups of atoms. Some elements are also made of molecules. For example, a molecule of oxygen contains two oxygen atoms joined together. The formula is  $O_2$ . Water contains two atoms of hydrogen and one of oxygen. The formula is  $H_2O$ .

Elements	Compounds	Mixtures
atoms of helium (He) 	molecules of carbon dioxide ( $CO_2$ ) 	a mixture of helium and oxygen 
molecules of oxygen ( $O_2$ ) 	molecules of water ( $H_2O$ ) 	a mixture of carbon dioxide and oxygen 
a lump of iron (Fe) 	a lump of sodium chloride (NaCl) 	a lump of bronze (a mixture of copper and tin) 

## Metals and non-metals

The **properties** of a substance describe the way the substance behaves, or measurements that we can make on it. **Metals** and **non-metals** have different properties.

Metals	Non-Metals
good <b>conductors</b> of heat and electricity	poor conductors of heat and electricity
shiny	dull
solids with a <b>high melting point</b> (except for mercury)	most are solids or gases
Mainly found on the left-hand side and in the centre of the <b>periodic table</b>	found on the right-hand side of the periodic table
three metals are <b>magnetic</b>	no non-metals are magnetic
flexible	brittle (break easily instead of bending)

## Re-use and recycling

Materials can be classified according to their properties. All the different materials in the world are made up of about 90 different **elements**. Some useful materials occur naturally, but others have to be manufactured using chemical reactions. In many cases, raw materials are **non-renewable**. If we can **recycle** these materials, then we reduce the demand for raw materials. There may also be energy savings as well. A process that uses recycled or renewable materials is **sustainable**. Waste can also be reduced by **re-using** objects such as glass bottles or plastic bags.