C1 Chapter 2: Elements, atoms, and compounds

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Atoms

Atoms are incredibly tiny particles that make up all substances.

There are 92 types of atom – one for each of the 92 elements that exist naturally.

Each type of atom has different properties (e.g., size or mass).

Elements

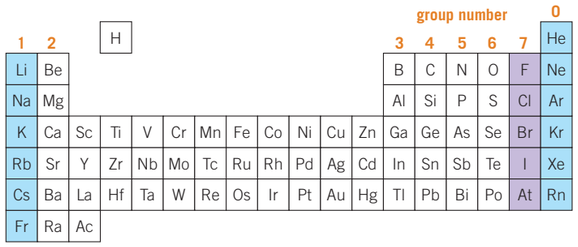
An **element**:

- cannot be broken down into other substances
- is made of one type of atom only.

Examples of elements include gold, potassium, carbon, and hydrogen.

The names and symbols of all the elements can be found on the **Periodic Table** of elements.

Elements in the Periodic Table are grouped together by their properties, which are different for each element.



The **chemical symbol** for an element is universal – it is the same in every language, even if the name of the element is different.

Some examples of chemical symbols for common elements are:

hydrogen	H	sulfur	S
carbon	C	sodium	Na
oxygen	O	chlorine	Cl
nitrogen	N	magnesium	Mg

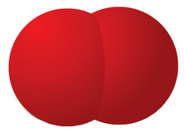
Molecules

A **molecule** is made up of atoms all chemically bonded to each other.

Molecules can be made up from:

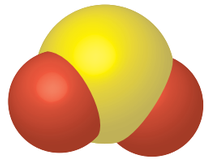
several of the same type of atom

for example, *oxygen gas* O_2



two or more types of atoms

for example, sulfur dioxide SO_2



Different elements have different masses. So, in a molecule, the different atoms that make it up have different masses.

For example, a molecule of water has two hydrogen atoms and one oxygen atom.

Chemical formulae

A **chemical formula** tells you how many of each atom there are in a molecule relative to each other.

H_2O

two hydrogen atoms for every oxygen atom

$MgCl_2$

two chlorine atoms for every one magnesium atom

$NaOH$

one sodium atom for every one oxygen atom, and every one hydrogen atom

Compounds

Compounds:

- are made of two or more *different* atoms strongly joined together.
- can be broken down into other substances.

Naming compounds

In a compound made of a metal and a non-metal, the name of the metal comes first.

for example, iron bromide, magnesium fluoride

If the non-metal atom is oxygen, it is called oxide. If the non-metal atom is chlorine, it is called chloride.

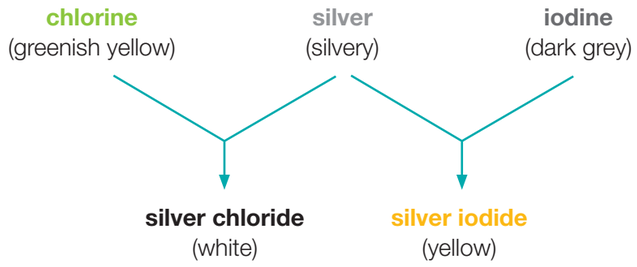
for example, copper oxide, sodium chloride

In a compound made of a non-metal and oxygen, oxygen comes second and is called monoxide if there is one oxygen atom or dioxide for two oxygen atoms.

for example, carbon monoxide, sulfur dioxide

When atoms join together to make a compound, the compound has properties that are different to the properties of the atoms that make them up.

For example, the colours of silver compounds are very different from the colours of the elements that make them up:



Key terms Make sure you can write definitions for these key terms.

atom chemical formula chemical symbol compound element molecule Periodic Table