

Atomic structure and the periodic table

Atoms, elements and compounds

All substances are made up of particles.

The **atom** is the smallest particle of an element that can take part in a chemical reaction.

There are over 100 **elements** and each element contains only one type of atom.

Each element is represented by its own **chemical symbol** and has its own **atomic number**.

A **compound** is formed when the atoms of two or more elements are joined by **chemical bonds**.

Chemical formulae are used to show which elements are in a compound and the number of atoms of each element that is present.

WORKIT!

The formula of iron(II) sulfate is FeSO_4 . Identify the elements present in this compound and determine the number of atoms of each element. (1 mark)

The elements present are iron, sulfur and oxygen.
There is 1 atom of iron, 1 atom of sulfur and 4 atoms of oxygen. (1)

The Roman numerals are not the number of atoms but the charge on the ion present in the compound.

MATHS SKILLS+

You will need to read the number of atoms in a compound from the chemical formula. Remember to leave out the number 1 if there is only one atom in the formula of a compound.



NAILIT!

Some compounds have formulae containing brackets. When you work out the number of atoms in the compound you multiply the number of atoms inside the bracket by the number outside. For example, $\text{Ca}(\text{NO}_3)_2$ has 2 nitrogen atoms and 6 oxygen atoms.



CHECKIT!

- 1 What type of atom would you find in the element sodium?
- 2 Explain why the chemical formula H_2 represents an element.
- 3 What type of substance is silver oxide?
- 4 What type of substance is represented by the following chemical formulae?
a CuBr_2 b Mg
- 5 Name the elements present in the following compounds and give the number of atoms of each element.
a AgNO_3 b $\text{Fe}(\text{NO}_3)_3$