8F Summary Sheets

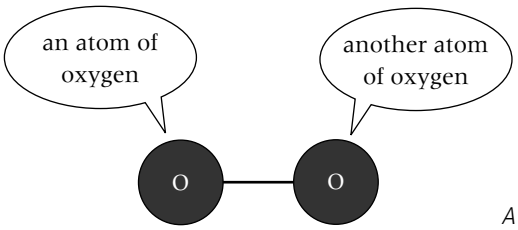
Compounds and mixtures

8 F

Elements are simple substances which cannot be split up in chemical reactions. **Atoms** are the smallest particles of an element that can exist. Atoms of an element are all the same.

Each element has its own **chemical symbol**. For example, the chemical symbol for oxygen is O.

Some elements have their atoms joined to each other in small groups called **molecules**. Oxygen is an example.

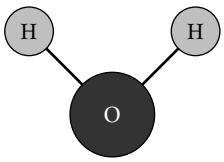


A molecule of oxygen consists of two oxygen atoms joined together.

Compounds

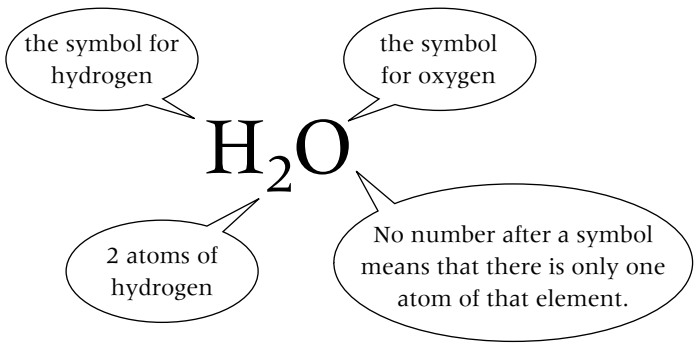
Elements can join together to make **compounds**. A compound contains two or more elements joined together. The name of the compound tells you the elements that are in it. Compounds made from two elements always have a name which ends in '-ide'.

Many compounds exist as atoms attached to each other in small groups – molecules.



A molecule of water.

The **chemical formula** tells you the numbers of atoms of each element in a compound. Each element in the chemical formula is shown by its chemical symbol. For example:



A compound always contains the same elements in the same ratio.

The properties of a compound are different from the elements that make it up. For example, hydrogen is an explosive gas and oxygen will relight a glowing splint but water is a liquid which will put fires out.

Chemical reactions

Compounds can react chemically by mixing them with other chemicals, or by using heat or electricity. You can tell that a **chemical reaction** has occurred if there is a colour change or when a gas is given off.

Most chemical reactions also involve an energy change. This is usually in the form of heat, but can also involve light being given off, for example, in burning (**combustion**).

In a chemical reaction a new substance is always formed. Most chemical reactions are not easily reversed (they are **irreversible**).

Some chemical reactions take place just by mixing. When you make a solid by mixing two liquids, the solid is called a **precipitate**.

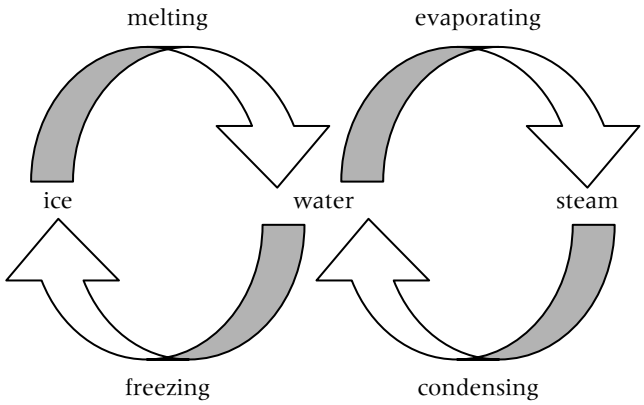
Other chemical reactions need energy to start them off. This energy can be in the form of heat, light or electricity. When you use energy to split up compounds they are **decomposed**.

We can write **word equations** to show a chemical reaction. The chemicals that you start with are called the **reactants**. The chemicals at the end are called the **products**. For example:

$$\underbrace{\text{magnesium + oxygen}}_{\text{reactants}} \longrightarrow \underbrace{\text{magnesium oxide}}_{\text{product}}$$

Physical changes

In a **physical change** no new substance is formed. **Melting**, **evaporating, condensing** and **freezing** are all examples of physical changes.
For example:



Mixtures

Elements and compounds can also be mixed together. A **mixture** is easier to separate than the elements in a compound. Soil, river water and sea water are examples of mixtures that occur naturally.

Elements and compounds melt and boil at a fixed temperature. Mixtures do not have definite **melting points** and **boiling points**.

Air is a mixture of gases – most of the air is nitrogen and oxygen. The gases in the air can be separated by **fractional distillation**.

