Step 1: Understand the Key Definitions

There are four keywords and definitions to get to grips within this topic. Once your child has got this, they'll find this topic much easier.

An **atom** is the **smallest** particle that can exist. Everything is made from atoms. Atoms are shown in diagrams as small circles.

An **element** is made up of **one** type of atom only. For example, a piece of pure copper is made up of only of copper atoms. There are 118 known elements on Earth and they are all listed in the periodic table.

A **compound** is a substance made up of two or more atoms of **different** elements chemically joined (or bonded) together. For example, carbon dioxide gas (CO2) consists of one carbon atom and two oxygen atoms bonded together.

A **molecule** describes two or more atoms bonded together (all compounds are molecules and some elements are too).

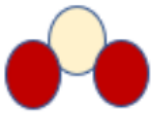
The atoms of some elements, like Neon, do not join together and instead exist on their own as individual atoms (they are **not** molecules). The atoms of other elements, however, like Hydrogen join together as pairs, making a **molecule**.

Step 2: Diagrams of Different Substances

Imagine you are presented with diagrams of different substances? It's very easy to become bogged down with these keywords but only two need to be applied to each diagram. A good rule to remember is to decide first whether a substance is an **atom** **or** **a molecule**. Then decide whether the substance is an **element** **or** a **compound**.

1. The diagram is showing an **atom** and an **element**.

2. The diagram is showing a **molecule** of an **element**.



3. The diagram is showing a **molecule** of a **compound**.

Atoms of the **same** element in diagrams will be drawn as the same size and they will be the same colour (as shown in diagram 2).

If the atoms are of **different** elements they will be a different colour or size (as shown in diagram 3).

Step 3: Symbols

Elements and compounds are not always displayed as diagrams. **Symbols** are used to represent elements and each element from the periodic table has a symbol. This symbol can be made up of **one** or **two** letters but it **always** starts with a capital letter. For example, the symbol for nitrogen is N and the symbol for lithium is Li.

A **formula** is a shorthand way of showing the elements in a compound. The formula for sodium chloride is NaCl. This compound must be made up of **two elements** as there

are **two capital letters** present in the formula. By consulting the periodic table you can discover that this compound is made up of one sodium atom (Na) and one chlorine atom (Cl). Another compound, potassium oxide has the formula K2O. It consists of two potassium atoms (symbol K) and one oxygen atom (symbol O).

Your child needs to ensure they take extra care when writing down the symbols of elements in the periodic table, paying close attention to whether the letters should be in **upper** or **lower** case.

For example, writing CO instead of Co completely changes the substance in question. CO is the formula for the compound carbon monoxide (a deadly, colourless gas), whereas Co is the symbol for the element Cobalt (a magnetic metal found in the Earth's crust).

Step 4: Identify the Difference Between Elements and Compounds

Try these questions together to see if you can identify the differences between elements and compounds:

1) What substance is made from only one type of atom? An **element** or a **compound**?

2) Look at the following diagrams and state whether the substance is firstly an **atom** or a **molecule** and state if it is an **element** or a **compound**:

a)

b)

c)

d)

e)

3) Are the following **elements** or **compounds**?

a) C

b) CuO

c) NaF

d) Ne

e) H2O

f) He

Answer Key:

2 a) molecule of compound
b) atom of element
c) molecule of element
d) molecule of compound
e) molecule of element

3 a) Element
b) Compound
c) Compound

d) Element
e) Compound
f) Element