

## Matter

## 4. Elements

## CONCEPT 2

## LESSON GUIDE

## COMPARING ELEMENTS AND COMPOUNDS

## PRECISE LEARNING POINTS

## KNOW

I know the difference between chemical reactions and physical changes.

## APPLY

I can apply my knowledge to describe the difference in properties between two elements and the compound they would combine to make.

## EXTEND

I can extend my knowledge to explain observations made before and after a chemical reactions has taken place.

## NOTES

We heat gold to make it into new shapes. The gold melts but it does not react with any other element. This is a **physical change** and **no new products are made**.

Iron is a shiny silver metal. When iron combines with oxygen and water from the air, rust is formed; its chemical name is iron oxide. Iron oxide is very different to both iron and oxygen. When **elements** react to form new **compounds**, **chemical changes** take place. The reaction is **irreversible**. **Burning** is an example of a chemical change to produce a compound from an element. During burning, elements combine with oxygen to form an **oxide**.

Consider the elements copper, magnesium and iron.

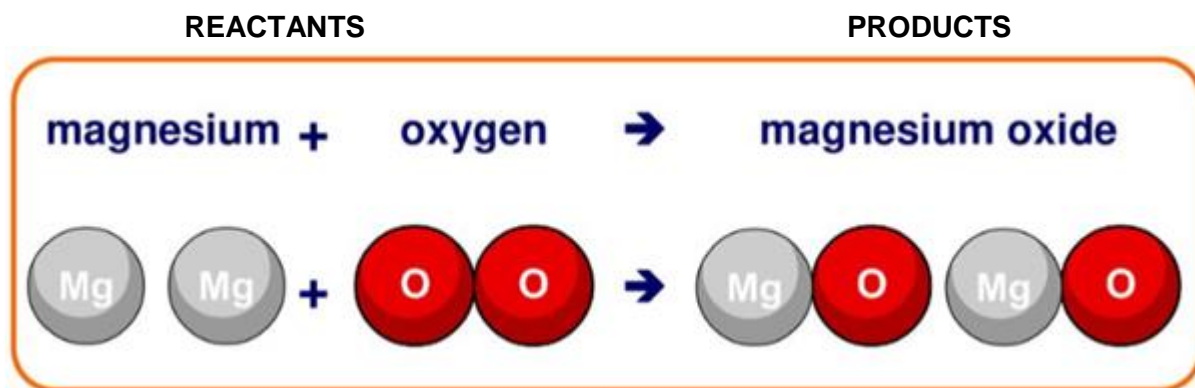
We can observe these elements and compare them to the compounds formed by heating. We can document our findings in a table which enables us to easily compare them:



When carrying out chemical reactions we must always consider health and safety by completing a **risk assessment**. Safety notes should be checked, and you need to know what to do to prevent an accident taking place (the precautions) and what to do if an accident does take place.

Element/compound	Colour	Appearance	Magnetic
copper	red/orange	soft metal	no
copper oxide	black	powder	no
magnesium	silver/ white	soft metal	no
magnesium oxide	white	powder	no
iron	silver grey	large particles	yes
iron oxide	black	powder	no

When magnesium is heated, the new compound has a different appearance to the original element. The **reactants** in this example are magnesium and oxygen, and the **products** are magnesium oxide. We can show the reaction using a word equation:



Two atoms of magnesium react with one molecule of oxygen to produce two units of magnesium oxide. The number of atoms of each element must be the same on both sides of an equation – this is called a balanced equation.