

KNOWLEDGE ORGANISER**BIG IDEA:** MATTER**TOPIC:** ELEMENTS

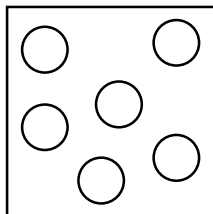
Key Word	Definition
element	What all substances are made up of, and which contain only one type of atom.
atom	The smallest particle of an element that can exist.
molecule	Two to thousands of atoms joined together. Most non-metals exist either as small or giant molecules.
compound	Pure substances made up of two or more elements strongly joined (bonded) together.
chemical symbol	A one or two letter code used to identify an element
chemical formula	Shows the elements present in a compound and their relative proportions e.g. CaCO_3
polymer	A molecule made of thousands of smaller molecules in a repeating pattern. They can be natural or synthetic (man-made)
periodic table	A table that contains all of the known elements. It groups together elements with similar properties.

Chemical formulae are used to show how many **atoms** of each **element** exist in a **compound**. The small (subscript) number to the right of the **chemical symbol** tells you how many **atoms** are present.

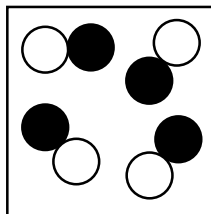
The **chemical formula** for calcium carbonate is CaCO_3 . Each **molecule** of calcium carbonate therefore contains: 1 atom of calcium (Ca), 1 atom of carbon (C) and 3 atoms of oxygen (O).

Gases like oxygen and hydrogen are diatomic, they travel round in pairs. Their formulae are O_2 and H_2 .

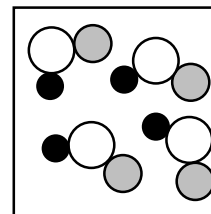
In each of these diagrams the circles represent **atoms**.



An **element** is made from one type of **atom**, they cannot be broken down into other substances.

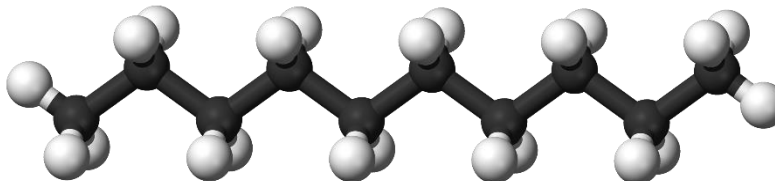


Compounds are made from two or more different types of **atom** strongly joined (bonded) together. They are known as pure substances because although there is more than one type of atom present, the **molecules** are all the same. They can be broken down into simpler substances during chemical reactions.



Naming compounds can be a bit tricky, but learning these common examples will help you.

Name	What does it contain?
hydroxide	Includes hydrogen and oxygen atoms. The formula for sodium hydroxide is NaOH .
nitrate	Includes nitrogen and oxygen atoms. The formula for sodium nitrate is NaNO_3 .
sulfate	Includes sulfur and oxygen atoms. The formula for copper sulfate is CuSO_4 .
carbonate	Includes carbon and oxygen atoms. The formula for calcium carbonate is CaCO_3 .
oxide	Includes oxygen and another element. The name changes depending how many oxygen atoms are present. carbon monoxide (CO - 1 oxygen atom) carbon dioxide (CO_2 - 2 oxygen atoms) sulfur trioxide (SO_3 - 3 oxygen atoms)



The **periodic table** contains over 100 different **elements** and their **chemical symbols**, these are some of the common ones that you are expected to recognise. The first letter is always a capital letter and the second letter (if there is one) is lower case.

Element Name	Chemical Symbol
hydrogen	H
oxygen	O
nitrogen	N
carbon	C
iron	Fe
zinc	Zn
copper	Cu
sulfur	S
aluminium	Al
iodine	I
bromine	Br
chlorine	Cl
sodium	Na
potassium	K
magnesium	Mg

Polymers are substances with long chains of **molecules**, they have identical groups of **atoms** repeated many times.

Synthetic **polymers** can be made in chemical reactions and each polymer has different properties depending on how it was made. Poly(ethene) is a common polymer made from many ethene molecules joined together. Natural **polymers** include: wool, cotton, starch and rubber.