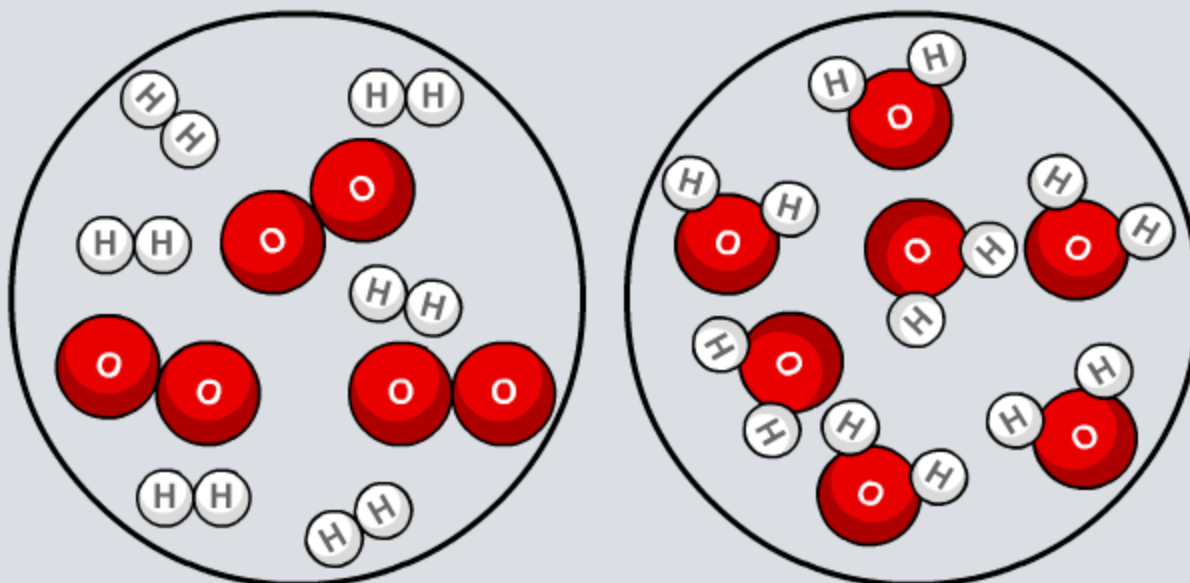
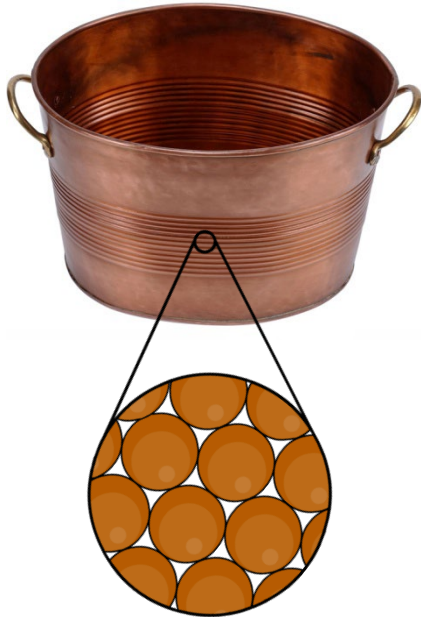


# Elements and Compounds

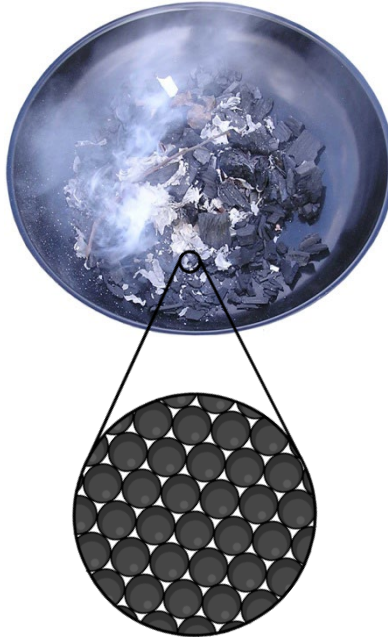


# What is an element?

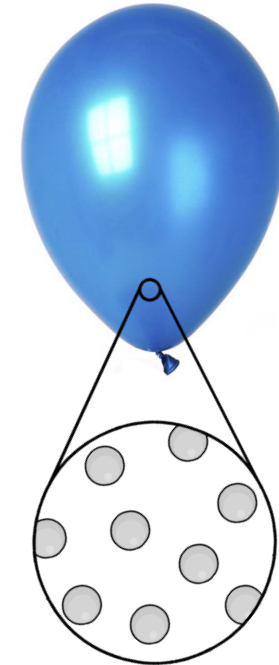
An **element** is a substance that is made of only **one type of atom**. Elements are the simplest substances in the universe.



Copper is an element made up of copper atoms only.



Carbon is an element made up of carbon atoms only.



Helium is an element made up of helium atoms only.



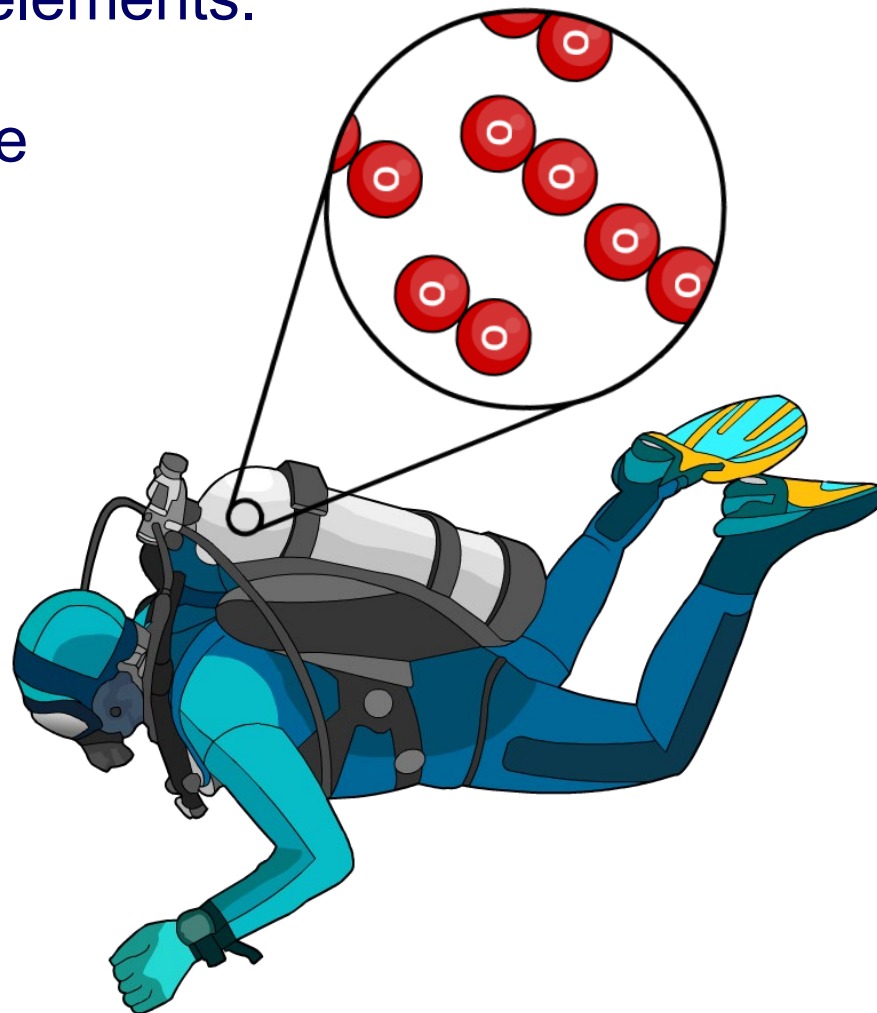
# What are molecules?

**Molecules** are made up of two or more atoms. Molecules can be formed by two atoms of the same element, or by atoms from two or more different elements.

Oxygen is an element made up of oxygen atoms only.

How many atoms are there in one oxygen molecule?

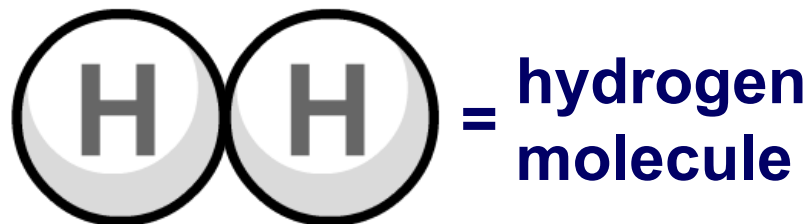
Other elements that form molecules include hydrogen, nitrogen, chlorine and bromine.



The atoms in some elements join together to make **molecules**.

One of the elements that exists like this is **hydrogen**.

Each hydrogen atom joins up with one other atom to make a hydrogen **molecule**.



The **formula** of a hydrogen molecule is  $H_2$ .

Other elements such as nitrogen, oxygen, and chlorine also exist as molecules. What are the **formulae** of these elements?



# Who discovered the elements?

Some elements, such as silver and gold, have been known about and used by people for centuries. However, many of the elements were only discovered in the 18th and 19th centuries.

For example, British scientist Joseph Priestley discovered oxygen when he experimented with heating gases.

Other scientists, such as Humphrey Davy, used electrolysis to isolate elements such as sodium and potassium for the first time.

At the start of the 20<sup>th</sup> century, Marie Curie and other scientists discovered radioactive elements like polonium and francium.

Which countries were these elements named after?



# How many elements are there?

There are currently 117 elements that have been discovered, 94 of which are naturally occurring. The remaining 23 elements only exist under laboratory conditions.

How many naturally-occurring elements can you name?



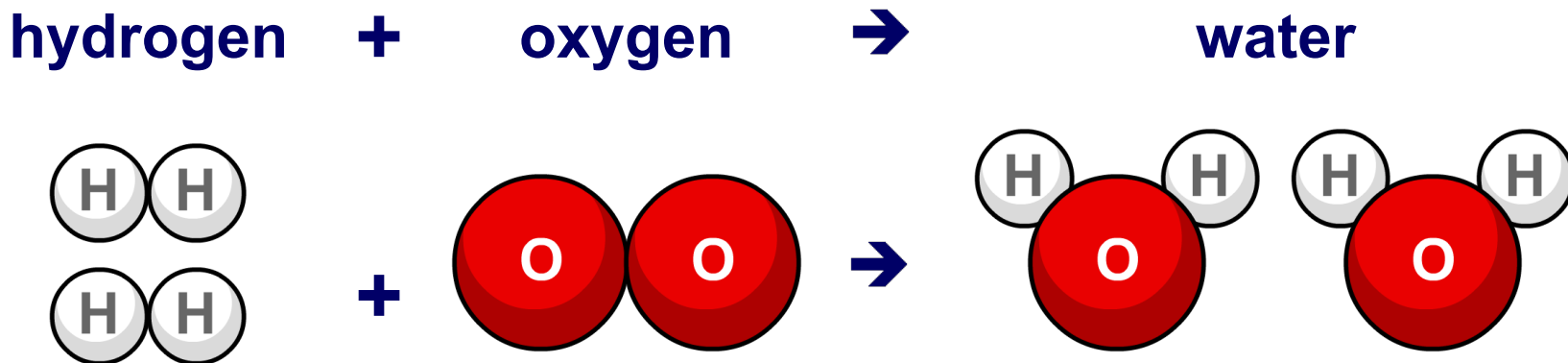
# Combining elements

There are many different materials in the world, but only around 100 elements. These elements can be combined in many different ways to make thousands of compounds.



# Atoms joining to make compounds

When two or more elements react in a chemical reaction, the atoms do not just mix together, they become joined to one another to make **compounds**.

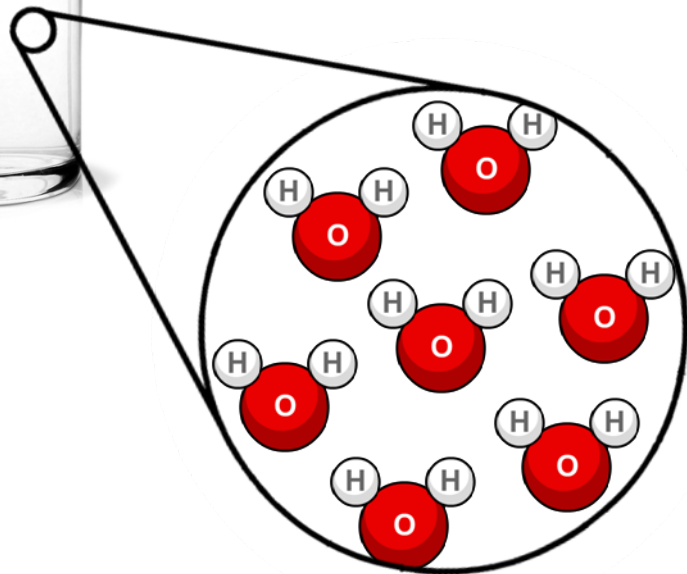


In a chemical reaction, the atoms in the reactants become joined in different ways and this is how new compounds are formed.

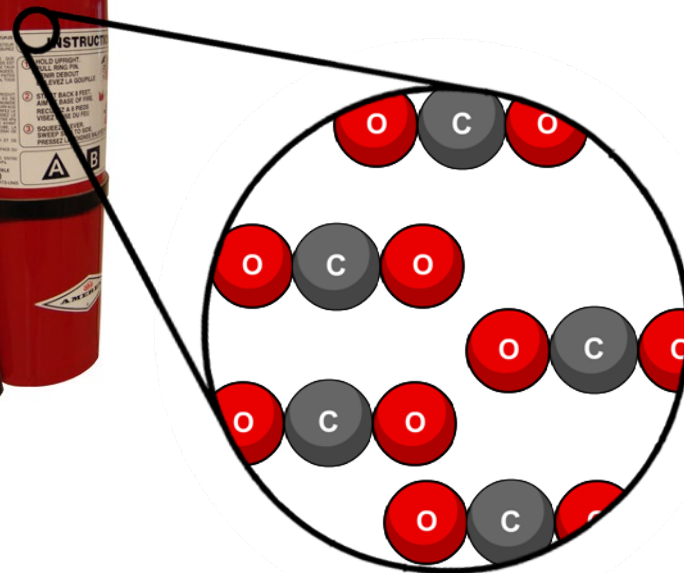


# Molecules of compounds

Some compounds exist as molecules:



Water is made of hydrogen and oxygen atoms. What is the formula of water?



Carbon dioxide is made of carbon and oxygen atoms. What is the formula of carbon dioxide?



## Which of these materials is not like the others?

Lots of materials seem alike, but there are many important differences between those made of just one type of atom (**elements**), and those made of many different types of atoms (**compounds**).

Click "**start**" to see if you can figure out which of these things is not like the others.

**start**



## Are these substances elements or compounds?

element

compound

carbon monoxide (CO)

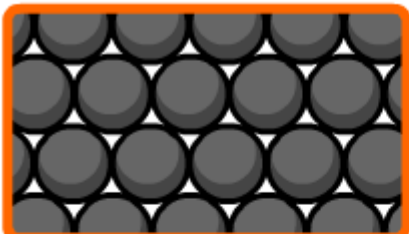


C

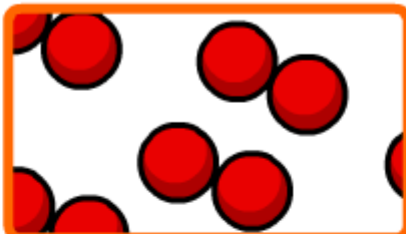
solve



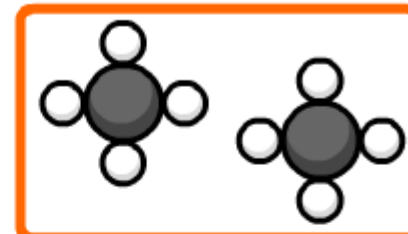
Does each picture show an element or a compound?



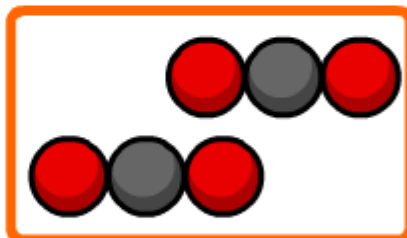
1



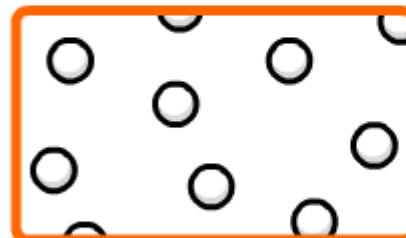
2



3



4



5

compound

?

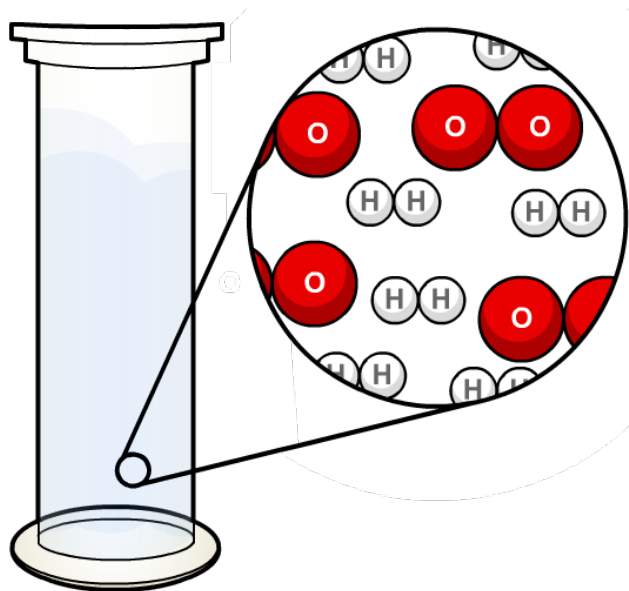
C

solve

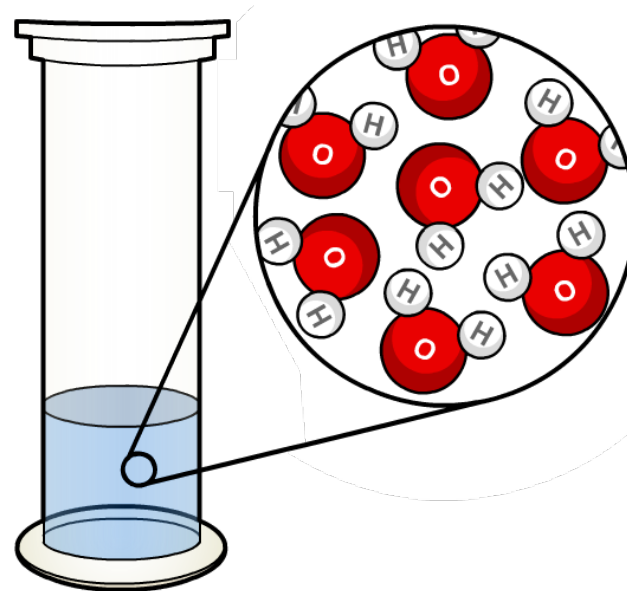
↶

# A compound is not a mixture

The molecules in a **mixture** of hydrogen gas and oxygen gas look like this:



But the molecules in water look like this...



...because water is a **compound**, made when hydrogen and oxygen react and their atoms become chemically joined to each other.

