

## Balancing chemical equations

**Alisha Kakar:** In every chemical reaction, atoms cannot be made and they cannot be destroyed.

They can only be rearranged.

To see this in action, we need to learn how to balance a chemical equation, making sure the number of atoms on each side is the same.

This is called the Conservation of Mass.

There are three key rules to remember when balancing a chemical equation.

Rule one.

Formulas are fixed.

That means you cannot change the chemical identity of a substance.

The subscripts, which are the small numbers to the right of the symbols, show the number of atoms, and they can never change.

Rule two. Only coefficients can change.

These are the big numbers in front of the symbols.

They show how many whole molecules are involved.

These are the numbers we are trying to work out when we balance an actual equation.

Rule three.

The total number of each type of atom must be equal on both sides of the equation.

Think of it like adding complete molecules of a substance, never breaking them apart or changing the formula.

The coefficients make this equation balanced.

There are two nitrogen atoms and three hydrogen molecules on the left, which gives six hydrogen atoms in total.

There is the same number of nitrogen and hydrogen atoms on the right.

This equation is unbalanced. Let's look at how we balance it.

We can see there are two hydrogen atoms on the left and two on the right, so they're balanced.

But, there are two oxygen atoms on the left and only one on the right.

To balance the oxygen atoms, we will need to add another H<sub>2</sub>O molecule on the right.

Now the hydrogen atoms have become unbalanced, with two on the left and four on the right.

So we need another hydrogen molecule on the left.

Now the equation is balanced.

We can see that we've used two molecules of hydrogen and two molecules of H<sub>2</sub>O.

Okay.

Now it's over to you.

Here's an unbalanced equation.

Can you balance it?

You can pause to have a think.

Let's take a look.

On the left there is one sodium atom and two fluorine atoms.

On the right there is only one sodium atom and one fluorine atom.

Coefficients are the only numbers that we can change.

So if we add two to the right, it means we have two fluorine atoms on the left and two fluorine atoms on the right.

But now we have only one sodium atom on the left and two on the right.

So we add a coefficient to the sodium on the left.

And that's our balanced equation.

So when you're balancing equations remember the three key rules.

Formulas are fixed, only the coefficients change, and the total number of each type of atom must be equal on both sides of the equation.

Balancing equations is just about spotting patterns and keeping things equal.

Keep practising and you'll be balancing them in no time.