What is a chemical reaction?

KS2 KS3 Ages 7-14 ⏰ 3 min read

A chemical reaction is when substances interact and rearrange their atoms to form new substances with different properties. The starting materials are called **reactants**; the results are called **products**. Nothing is created or destroyed — the same atoms are there at the end as at the beginning, just bonded in different configurations.

Chemical reactions are everywhere. Burning a log: chemical reaction. Digesting your lunch: chemical reaction. Rusting metal: chemical reaction (just a very slow one). Your muscles moving: chemical reactions. Baking a cake: dozens of simultaneous chemical reactions. Life itself is essentially a sustained, incredibly complex sequence of chemical reactions.

Imagine you have a bag of red Lego bricks connected in various ways, and a bag of blue Lego bricks. A chemical reaction is like dismantling those specific connections and reconnecting the same bricks into completely new shapes — some red-blue, some all-red, some all-blue. You started with the same number of bricks; you end with the same number of bricks. But what you've built is completely different. That's chemistry: rearranging atomic "bricks" into new structures.

What makes a reaction happen?

Chemical bonds have energy stored in them. To break old bonds takes energy; forming new bonds releases it. If a reaction releases more energy than it takes to start, it can sustain itself — like burning wood (once you light it, it keeps going). These are called **exothermic** reactions. Reactions that absorb more energy than they release — and need continuous energy input — are **endothermic**. Photosynthesis is endothermic: it uses energy from sunlight to build sugar from carbon dioxide and water.

What speeds reactions up?

Temperature: hotter means faster-moving molecules, more collisions, more reactions. Concentration: more reactant molecules in a space means more chance of collision. Surface area: a log burns more slowly than sawdust made from the same wood, because the sawdust has far more surface exposed to oxygen. And **catalysts** —

substances that speed up a reaction without being used up themselves. Your body is full of biological catalysts called enzymes, which make reactions happen at body temperature that would otherwise need enormous heat.