Types of Chemical Reactions

How can you spot a chemical reaction?

Lots of changes happen in chemical reactions.

You might recognize that a chemical reaction is happening because the substances involved:

- change color
- give off a gas
- get hot
- get cold
- give out light
- make smells
- form solids.

Chemical reactions are hard to reverse

Chemical reactions are usually difficult to reverse.

For example, magnesium burns in oxygen to form magnesium oxide. It is not at all easy to ‘un-burn’ the magnesium once it has been burned.

magnesium + oxygen → magnesium oxide

Many reactions need an input of energy to get them started. This is called **activation energy**.

Many reactions (like the burning of magnesium) also **release energy** once the reaction has started.

Odd one out

Which of these changes is not like the others?

Lots of chemical and physical changes seem alike, but there are many important differences between these two types of reaction.

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

start

Dangerous chemical reactions

Chemical reactions in food cause it to decay, making it unsafe to eat.

Chemical reactions like these are a nuisance, but other reactions can even be dangerous.

The reaction between iron and oxygen causes the metal to become rusty, which weakens the structure and makes it dangerous to use.

Factories sometimes produce waste gases that pollute the atmosphere. These gases cause acid rain and might contribute to the greenhouse effect.

Helpful chemical reactions

Some examples of useful chemical reactions

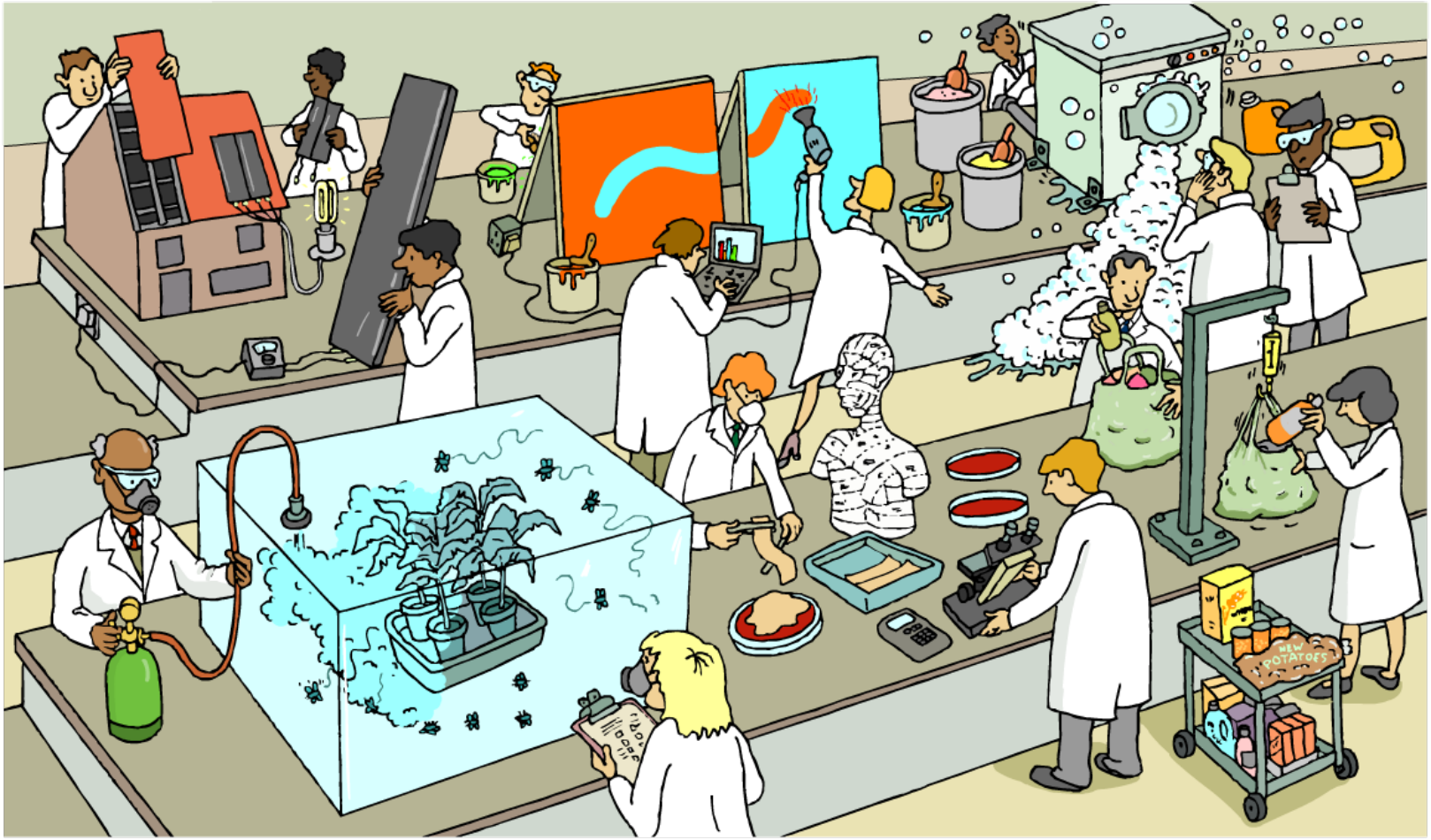
Many chemical reactions are useful, or even essential to survival.

Click "**start**" to find out about some useful everyday chemical reactions.

start

More helpful chemical reactions

Chemists carry out chemical reactions to produce new substances that improve people's lives.

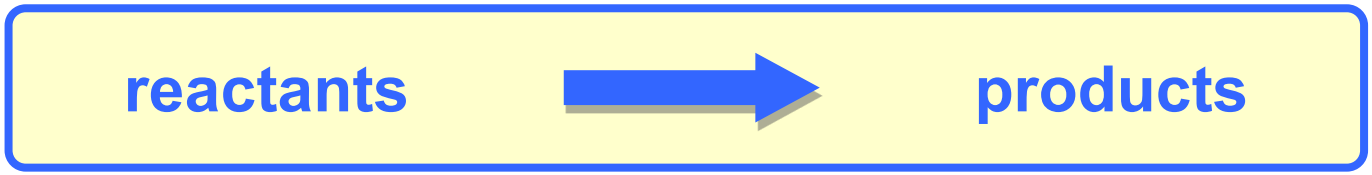


Reactants and products

In a chemical reaction, one or more new substances are always formed.

The starting substances used in a reaction are the **reactants**.

The new substances formed in a reaction are the **products**.



The arrow means ‘change into.’ In a chemical reaction, the reactants change into the products.

It is often difficult to reverse a chemical reaction and change the products back into the reactants.

Word equations

A word equation is a quick, shorthand way of writing a chemical reaction.

There are always three parts to a word equation:

- the names of the reactants
- an arrow
- the names of the products.

What is the word equation for hydrogen reacting with oxygen to form water?

hydrogen + oxygen → water

Reactant or product?

In this chemical reaction, which substances are the reactants and which substances are the products?

magnesium + copper oxide → magnesium oxide + copper

substance	reactant or product?
magnesium oxide	product
magnesium	reactant
copper oxide	reactant
copper	product

Write the word equations

1. Magnesium burns brightly in oxygen to form magnesium oxide.

magnesium + oxygen → magnesium oxide

2. Calcium hydroxide reacts with hydrochloric acid to form calcium chloride and water.

calcium hydroxide + hydrochloric acid → calcium chloride + water

3. Sodium reacts with hydrochloric acid to form sodium chloride and hydrogen.

sodium + hydrochloric acid → sodium chloride + hydrogen