



Elements, Compounds and Chemical Change! Year 8 Science at Home

You can help! Your child is learning to classify all matter as elements, compounds or mixtures — and to tell the difference between a chemical change (something new is made) and a physical change (same material, different shape). Your kitchen is a chemistry lab!

Why are we learning this? Chemistry in everyday life up here

Chemistry is happening in every kitchen, every day. When you cook damper, the heat causes chemical changes — proteins and starches in the flour transform permanently. When beeswax melts in the sun, that is a physical change — it is still beeswax, just liquid. First Nations peoples have used chemical knowledge for tens of thousands of years: extracting toxins from plants to make them edible (chemical change through processing), knowing which bark can be dissolved in water for medicinal use, and using fire to create chemical changes that clear land and promote new growth. Understanding chemistry helps your child see the science in practices all around them.

My child will learn to:

✓ Classify all matter

Identify whether a substance is an element, compound or mixture, and explain the difference.

✓ Know the periodic table basics

Understand that the periodic table organises all known elements and that elements in the same group have similar properties.

✓ Identify chemical change

Recognise the signs of a chemical change: gas production, colour change, heat change, formation of a solid (precipitate).

✓ Distinguish chemical from physical change

Explain why dissolving or melting is a physical change, while cooking or burning is a chemical change.

Big ideas to know:

Elements, compounds and mixtures

An element contains only one type of atom (e.g. gold, oxygen, hydrogen). A compound is two or more elements chemically bonded together — forming a completely new substance with different properties (e.g. water H_2O is hydrogen + oxygen bonded; salt $NaCl$ is sodium + chlorine bonded). A mixture contains different substances not bonded — they keep their own properties and can be separated.

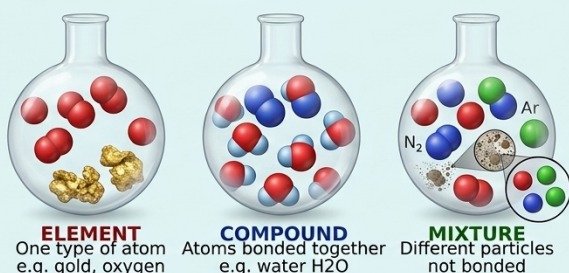
The periodic table

All known elements are organised in the periodic table (118 of them!). Elements are arranged by atomic number (number of protons). Elements in the same vertical column (group) have similar properties — all alkali metals (Group 1) react vigorously with water. Understanding this pattern allows chemists to predict how unknown elements might behave.

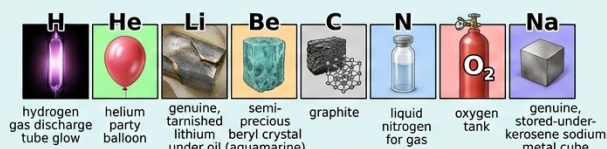
Chemical vs physical change

In a physical change, the substance stays the same — only its shape or state changes (melting, dissolving, bending). In a chemical change, new substances are formed that have completely different properties from the starting materials. Signs of chemical change include: gas produced (fizzing), colour change, temperature change, or a solid formed in a liquid. These changes are usually irreversible.

Classifying Matter



Periodic Table: 118 known elements — the building blocks of everything!



Part of the Periodic Table — each square is one element
Symbol (e.g. H = Hydrogen) and number (protons)

Chemical vs Physical Change

PHYSICAL

CHEMICAL

Sign of changes	Shape/size changes	New substance formed
Gas produced?	No	Often yes (fizz!)
Colour change?	No	Often yes
Reversible?	Usually yes	Usually NO



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Identifying chemical vs physical change

Example	Chemical or physical?	Evidence / why
Dissolving salt in water	Physical	Salt disappears but is still there — evaporate the water and salt returns
Melting butter	Physical	Butter changes from solid to liquid but is still butter — cool it and it returns
Cooking an egg	Chemical	New proteins form, colour changes permanently — you cannot uncook an egg!
Iron rusting	Chemical	Iron + oxygen forms iron oxide (a new substance) — impossible to reverse easily
Burning wood	Chemical	Wood + oxygen produces ash + CO ₂ gas + light + heat — all new substances
Mixing bicarb + vinegar	Chemical	Gas (CO ₂) is produced, temperature changes — reaction creates new substances

Think Like a Scientist — Kitchen Chemist

In your kitchen today, identify 3 physical changes and 3 chemical changes happening during cooking or food preparation. For each chemical change, identify the evidence: gas? Colour change? Heat? New substance formed?

Ask: "Is the substance the same as it was before? Could we reverse this change? Has a new substance been made?"
These three questions will tell you whether it is physical or chemical change!

You will need: (Materials)

- Bicarb soda (1 tsp)
- Vinegar (a small splash)
- Cup or bowl
- Bread and toaster (adult supervision)
- Paper and pencil for recording observations

Changes to investigate:

1. Toasting bread — notice the colour and smell change (chemical!)
2. Dissolving sugar in hot tea — physical or chemical? How do you know?
3. Mixing bicarb soda + vinegar — watch for gas (CO₂) produced!
4. Cutting or chopping food — physical (same substance, different size)
5. Cooking meat — proteins denature permanently (chemical!)

Questions to ask your child

1. What is the difference between an element and a compound? Give an example of each.
2. Why is water (H₂O) called a compound? What elements make it up?
3. If you mix sand and water, is the result a compound or a mixture? How do you know?
4. What are four signs that a chemical change has occurred?

5. How is burning a piece of wood different from just breaking it into smaller pieces?
6. Why is rusting a chemical change and not a physical one?
7. If bicarb soda and vinegar are mixed and fizzing occurs, what gas is being produced and where is it coming from?

The classic bicarb-and-vinegar experiment is the best kitchen chemistry demonstration ever. Combine one teaspoon of bicarb soda with a splash of vinegar in a cup — watch the fizzing! The CO₂ gas you see was NOT in either ingredient before — it is a new substance. That proves it is a chemical change!

Key words to know:

Element	A pure substance made of only one type of atom — cannot be broken down by chemical means (e.g. gold, oxygen)
Compound	A substance made of two or more elements chemically bonded — has completely different properties from its elements
Mixture	Two or more substances combined but not bonded — each substance keeps its properties and can be separated
Periodic table	A table organising all 118 known elements by atomic number and properties
Chemical change	A change that produces one or more new substances — usually irreversible (cooking, burning, rusting)
Physical change	A change that does not produce new substances — same material, different form (dissolving, melting, cutting)
Precipitate	A solid that forms in a liquid during a chemical reaction — one sign of chemical change

Key words to look up

Element · Compound · Mixture · Periodic table · Chemical change · Physical change · Precipitate

What school will check

By the end of Year 8, your child needs to classify matter as elements, compounds or mixtures, and compare physical and chemical changes including identifying indicators of energy change in chemical reactions.

Try it at home!

Mix a teaspoon of bicarb soda into a glass of water. Stir well. Did anything happen? Now add a splash of vinegar. What changes? The first is a physical change (dissolving), the second is a chemical change (reaction). Can you explain why?