

Telling physical and chemical changes apart

Grade 7 science (Year 8 · Class 7) · Worksheet

Name: _____ Date: _____ Class: _____

These problems train you to decide whether a change is physical or chemical, to use the clues of a chemical change sensibly, and to write word equations with reactants and products. You will sort changes, read graphs and diagrams, and correct common mistakes. They suit Grade 7, Year 8 and Class 7 science (NGSS MS-PS1-2).

Start with level 1 and give a reason for every classification.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS1-2

Problem 1 Two kinds of change (easy)

Amara in Enugu is learning to sort changes.

1. State what a physical change is.
2. State what a chemical change is.
3. Give one example of each.

Problem 2 Sorting changes (easy)

Sort each change into physical or chemical. Write P or C.

1. Crushing a can.
2. Frying an egg.
3. Freezing orange juice.
4. Burning charcoal.
5. Cutting a rope.
6. Lighting a match.

Problem 3 Spotting the clues (easy)

Tendai in Harare is studying clues of chemical change.

1. Name three signs that a chemical change may have happened.
2. Decide whether each observation is a chemical sign: a) bubbles rise from a tablet in water; b) an ice cube shrinks; c) an apple slice turns brown; d) a puddle dries up.

Problem 4 Reactants and product (easy)

Read the word equation: copper + oxygen → copper oxide.

1. Name the reactants.
2. Name the product.

3. State what the arrow means.
4. State how many reactants and how many products there are.

Problem 5 Complete the word equations (easy)

Fill in the missing word in each word equation.

1. iron + sulfur → ____
2. zinc + oxygen → ____
3. ____ + oxygen → magnesium oxide

Problem 6 Which is physical? (easy)

Sipho in Durban lists four changes: A, wood burns to ash; B, chocolate melts; C, milk turns sour; D, iron rusts.

1. State which one is a physical change.
2. Explain your choice in one sentence.
3. State the type of change for the other three.

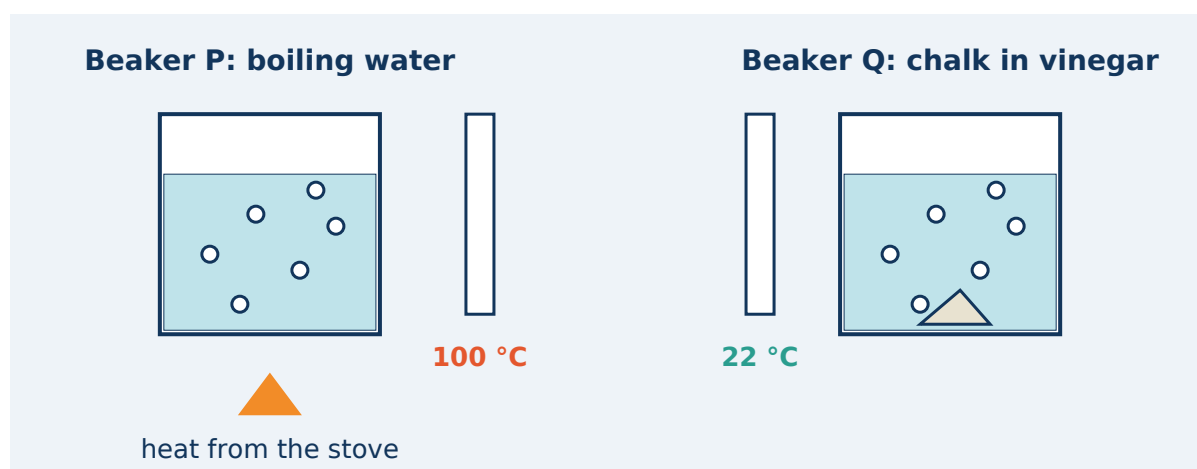
Problem 7 Can you undo it? (easy)

Melted wax and a cooked egg are both cooling down on a plate.

1. State which one will return to its original form when cooled.
2. Explain why the egg cannot be turned back.
3. State the type of change for each.

Problem 8 Boiling or reacting? (medium)

The figure shows two beakers with bubbles. Mateo in Texas must decide which shows a chemical change.



Bubbles in boiling water and in chalk with vinegar.

1. State which beaker shows a chemical change.
2. Explain how the bubbles in P differ from the bubbles in Q.
3. Name the gas in Q and the test that identifies it.

Problem 9 A rusting chain (medium)

Bilal in Lahore leaves a bicycle chain outside during the monsoon. It turns orange-brown and flaky.

1. Give two observations that show a chemical change.
2. Complete the word equation: iron + oxygen + water → ____ (rust).
3. Suggest two ways to stop the chain from rusting.

Problem 10 Milk going off (medium)

Oluwaseun in Ibadan leaves a jug of milk out for two days. It smells sour, has lumps and has small bubbles.

1. List the clues that show a chemical change.
2. Explain why a fridge slows this change.
3. Explain why boiling and cooling the milk would not make it fresh again.

Problem 11 Zinc in acid (medium)

A strip of zinc is dropped into dilute hydrochloric acid. Bubbles form on the zinc, the strip shrinks, and the temperature of the liquid rises from 21.0 °C to 27.5 °C. A lit splint held at the mouth of the tube gives a squeaky pop.

1. Calculate the temperature rise.
2. Name the gas.
3. Write the word equation for the reaction.

Problem 12 Chalk and vinegar (medium)

Chalk is calcium carbonate. Vinegar contains ethanoic acid. When chalk is added to vinegar the mixture fizzes. The word equation is: calcium carbonate + ethanoic acid → calcium ethanoate + water + carbon dioxide.

1. Name the two reactants.
2. Name the three products.
3. Describe the test that proves the gas is carbon dioxide.

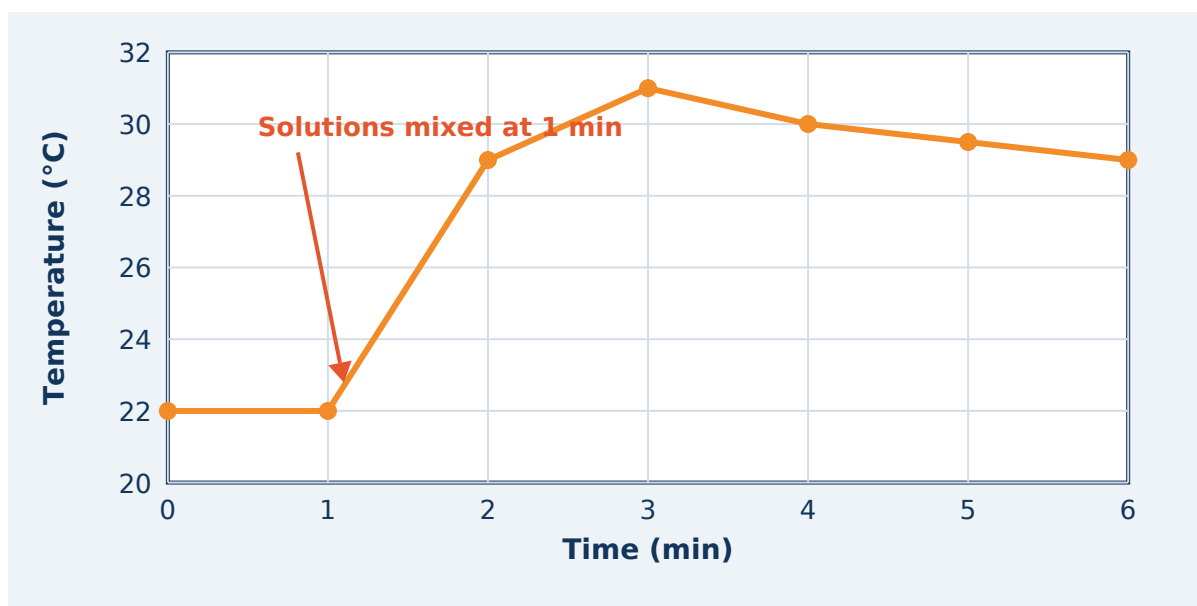
Problem 13 A spirit lamp (medium)

Neha in Pune uses a spirit lamp that burns ethanol in air. Water droplets form on a cold glass held above the flame.

1. Write the word equation for ethanol burning.
2. Identify the reactants and the products.
3. Name the sign of chemical change shown by the flame.

Problem 14 Temperature data (medium)

Two solutions are mixed at 1 minute. The graph shows the temperature of the mixture.



Temperature of a mixture over six minutes.

1. State the temperature before mixing.
2. Read the highest temperature.
3. Calculate the temperature rise.
4. Explain whether the rise alone proves a chemical change.

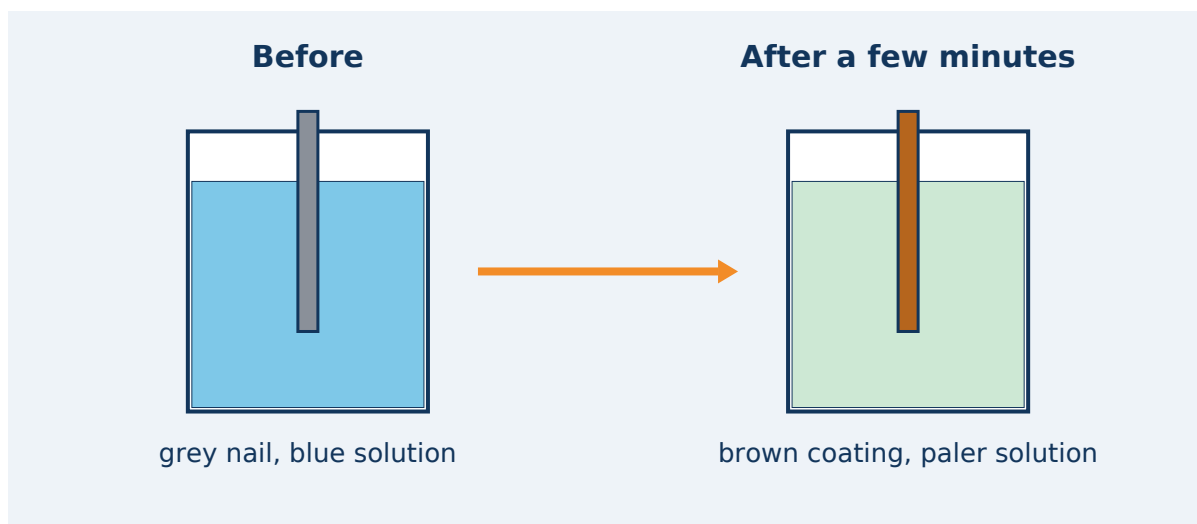
Problem 15 Frying an egg (medium)

Kofi in Kumasi fries an egg. The clear, runny egg white turns firm and white.

1. Classify the change and give a reason.
2. Compare it with melting chocolate, saying which one can be reversed.
3. Suggest one more sign you could look for.

Problem 16 Iron in blue solution (hard)

Ananya in Delhi places an iron nail in blue copper sulfate solution. The figure shows the start and a few minutes later.



An iron nail in copper sulfate solution before and after.

1. Describe two observations that show a chemical change.
2. Complete the word equation: iron + copper sulfate → ____ + copper.
3. Identify the reactants and the products.

Problem 17 Mixture or new substance? (hard)

Sample P is iron filings stirred with sulfur powder. Sample Q is the black solid made by heating the same two powders until they glow.

1. Predict what a magnet does to each sample.
2. Explain which sample involved a chemical change.
3. Describe how to separate the iron from sample P, and explain why the same method fails for sample Q.

Problem 18 A leaf in sunlight (hard)

Lindiwe in Durban learns that green leaves use carbon dioxide and water, with light energy, to make glucose and oxygen.

1. Write the word equation for this reaction.
2. Identify the reactants and products.
3. Explain why this is a chemical change.

Problem 19 Five mystery changes (hard)

A student records observations.

Change	Observation
A	A white solid melts at 55 °C and goes back to the same solid when cooled.
B	Two clear liquids mixed give a yellow solid.
C	Salt crystals vanish in water. Evaporating the water brings back white crystals.
D	Blue crystals heated turn white and give off steam. Adding water turns them blue again and warms them.
E	White sugar heated turns brown, then black, and smells of burnt caramel.

1. Classify each change as physical or chemical.
2. Explain why D is chemical even though it can be reversed.
3. Explain why E is chemical.

Problem 20 Spot the errors (hard)

A student makes three statements.

Statement 1: "Dissolving sugar is a chemical change because the sugar disappears."

Statement 2: "Bubbles always mean a chemical change."

Statement 3: "If the temperature goes up, a chemical change must have happened."

1. Correct statement 1.
2. Correct statement 2 and give a counter-example.
3. Correct statement 3 and give a counter-example.