

Matter Change Detectives

Classify changes by whether a new substance forms.

7.6.C “distinguish between physical and chemical changes in matter;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each described change, then write P or C beside it to show whether it is physical or chemical.

Following Matter Through Changes

- ① At a candle-making workshop, students reshape wax without changing what the wax is. A block can be cut into pieces, and warm wax can melt into a liquid. When the liquid cools, it becomes solid wax again. These are physical changes because the material remains wax. Its size, shape, or state changes, but its particles are still the same substance. Dissolving sugar in water is also a physical change. The sugar spreads through the water, yet it can be recovered when the water evaporates.
- ② Chemical changes produce one or more new substances. For example, iron left outside can react with oxygen and water to form rust, a substance with different properties from iron. Baking soda mixed with vinegar produces carbon dioxide gas, so bubbles appear. Color change, odor, bubbles, or heat can be clues, but one clue alone does not prove a chemical change. Water also makes bubbles when it boils, and boiling water is a physical change because it is still H₂O.
- ③ During a campfire investigation, students compare two changes. Steam from a kettle touches a cool metal lid and becomes liquid water. No new substance forms, so condensation is a physical change. In the fire, wood burns and leaves ash while gases enter the air. The original wood cannot be restored simply by cooling or reshaping it. Burning is a chemical change because new substances form. Scientists use several observations and ask whether the substance's identity changed before making a classification.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Why are cutting wax and melting wax physical changes?

2 Iron rusts outside. What makes rusting a chemical change rather than a physical change?

3 Do bubbles in boiling water prove that a chemical change happened? Explain using the passage.

4 Classify condensation on the cool lid and burning wood. Give a reason for each classification.

3 YOUR TURN _____ Your own words

Complete both rows of the table with changes not named in the passage. Include one physical change and one chemical change, then explain how you know each classification.

CHANGE	PHYSICAL OR CHEMICAL?	HOW DO YOU KNOW?

PART 1 • READ AND MARK

Underline each described change, then write P or C beside it to show whether it is physical or chemical. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why are cutting wax and melting wax physical changes?	The material remains wax. Only its size, shape, or state changes.
2	Iron rusts outside. What makes rusting a chemical change rather than a physical change?	Iron reacts with oxygen and water to form rust, a new substance with different properties from iron.
3	Do bubbles in boiling water prove that a chemical change happened? Explain using the passage.	No. Boiling water makes bubbles, but it is still H₂O, so boiling is a physical change.
4	Classify condensation on the cool lid and burning wood. Give a reason for each classification.	Condensation is physical because liquid water forms and no new substance forms. Burning wood is chemical because ash and gases, which are new substances, form.

PART 3 • YOUR TURN (SAMPLE ANSWER)

CHANGE	PHYSICAL OR CHEMICAL?	HOW DO YOU KNOW?
An ice cube melts	Physical	It remains H ₂ O; only its state changes.
An apple slice browns in air	Chemical	New substances form as the apple reacts with oxygen.

Accept physical changes when the student explains that the substance remains the same, even if size, shape, state, or location changes. Accept chemical changes when the student explains that new substance or substances form; examples may vary.