Clues After Mixing

Use before-and-after data to evaluate evidence of a reaction.

7.PS1.2 "Analyze and interpret patterns of data related to the properties of substances before and after the substances interact to determine if a chemical reaction has occurred."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the starting properties in each table row and circle the properties observed afterward. Number the changes that may be evidence of a new substance so you can compare them across tests.

What Changed in the Lab?

1. A lab team studies changes by recording properties before and after substances interact. Bubbles, a new solid, or a lasting color change can point to a chemical reaction, but one clue alone may be misleading. Cutting a sheet of foil into strips changes its shape but not what it is made of. The team keeps its notes in a table.

2. For each test, the team uses fresh materials and records what it can see. For safety, the teacher handles the materials while students observe from a distance. A careful record includes color, texture, and whether a solid or gas is present. The team also notes if a change lasts after stirring stops. These details make it possible to compare the starting materials with the materials left behind.

NOTES FROM THREE TESTS

Test	Before interaction	After interaction
A	Clear vinegar and white baking soda powder	Bubbles form for a minute; the powder is no longer visible.
B	Clear water and white salt crystals	The crystals are no longer visible. White salt crystals return when the water evaporates.
C	Blue solution and a gray iron nail	The solution becomes less blue; a reddish-brown solid coats the nail.

3. Scientists use several clues together rather than treating every change as proof. A damp towel darkens when water soaks in, but that does not show a new material has formed. Stronger evidence comes from properties that the starting substances did not have. Some reactions happen quickly; others take longer. Careful notes help scientists tell these changes apart.

2 ANSWER WITH EVIDENCE

Use the passage

1. In Test A, which change is stronger evidence of a reaction than the powder's disappearance? Explain why.

2. Compare Tests A and B. Why does A provide stronger evidence of a reaction?

3. Which changes in Test C support the claim that a reaction occurred? Use both the nail and the solution in your answer.

4. A student says all three tests show reactions because something looks different afterward. Use evidence from two rows to challenge that claim.

3 YOUR TURN

Your own words

In a different demonstration, a gray, bendable metal ribbon interacts with oxygen in the air when heated. It gives off a bright light and leaves a white, crumbly powder. In three or four sentences, compare the before-and-after properties, decide whether they support a chemical reaction, and name one more property you could check to strengthen your claim.

ANSWER KEY

Clues After Mixing

GRADE 7 · 7.PS1.2

PART 1 · READ AND MARK

Underline the starting properties in each table row and circle the properties observed afterward. Number the changes that may be evidence of a new substance so you can compare them across tests. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In Test A, which change is stronger evidence of a reaction than the powder's disappearance? Explain why.	**The bubbles are stronger evidence because they suggest a gas formed. A powder can stop being visible without a reaction.**
2	Compare Tests A and B. Why does A provide stronger evidence of a reaction?	**A produces bubbles, which suggest a gas formed. In B, the salt crystals return after the water evaporates, so the observations do not show that a new substance formed.**
3	Which changes in Test C support the claim that a reaction occurred? Use both the nail and the solution in your answer.	**A reddish-brown solid forms on the nail, and the blue solution becomes less blue. Together, these changed properties support a reaction.**
4	A student says all three tests show reactions because something looks different afterward. Use evidence from two rows to challenge that claim.	**In B, the salt crystals return when the water evaporates, so its different appearance is not strong evidence of a reaction. In C, a reddish-brown solid appears and the solution changes color, providing stronger evidence.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Before heating, the metal ribbon was gray and bendable. After it interacted with oxygen, a white, crumbly powder remained, and the ribbon was no longer present. These new properties support the claim that a chemical reaction occurred. I would check whether the powder conducts electricity as the ribbon did.

Accept claims that distinguish evidence of a new substance from a change in appearance alone. For the open task, the added check should compare a property of the powder with the original ribbon.