Clues in the Cup

Use test results to investigate changes in matter.

5.4 "Analyze data from tests to determine whether a new substance is formed after two or more substances are combined."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what happened during mixing in each table row, circle the follow-up test result, and number the two rows with the strongest evidence that a new substance formed.

Four Science Fair Mixtures

1. At the science fair, four groups combined materials in clear cups. Each group began with small amounts and watched closely. They recorded what happened during mixing, then ran a follow-up test. For the first two mixtures, they stretched a balloon over the cup opening before combining the materials. Their results appear in the table.

RESULTS FROM FOUR MIXTURES

Materials combined	During mixing	Follow-up test
Vinegar and baking soda	Bubbles appeared.	The balloon swelled.
Vinegar and crushed chalk	Bubbles appeared.	The balloon swelled.
Sugar and water	Sugar grains disappeared.	After the water evaporated, sugar crystals remained.
Sand and water	Sand grains sank.	A filter recovered the sand grains.

2. A change you can see does not always mean a new substance formed. Cutting a carrot changes its shape, but the pieces are still carrot. When steel wool reacts with oxygen in damp air, a reddish material called rust forms. Scientists look for test results that show a material has different properties from the starting materials.

3. Scientists compare early observations with later test results. They also ask if an ordinary physical change could explain what they saw. A claim is stronger when two results point to the same cause. Read each row as a set of clues rather than deciding from one detail. Some clues show that materials can be separated again.

2 ANSWER WITH EVIDENCE

Use the passage

1. What evidence supports a new-substance claim for vinegar and baking soda? Use both results from its row.

2. How do the chalk results compare with the baking soda results? What claim does that support about the chalk mixture?

3. A student says the sugar became a new substance because it disappeared. Which test result challenges that claim, and why?

4. Why does the sand mixture provide weaker evidence of a new substance than the chalk mixture? Use one result from each row.

3 YOUR TURN

Your own words

Plan a test with two safe materials that are not in the table. Name the materials, describe what you would check after mixing, and explain one possible result that would support a new-substance claim and one that would not.

ANSWER KEY

Clues in the Cup

GRADE 5 · 5.4

PART 1 · READ AND MARK

Underline what happened during mixing in each table row, circle the follow-up test result, and number the two rows with the strongest evidence that a new substance formed. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What evidence supports a new-substance claim for vinegar and baking soda? Use both results from its row.	**Bubbles appeared, and the balloon swelled. Together, these results support the claim that mixing produced a gas.**
2	How do the chalk results compare with the baking soda results? What claim does that support about the chalk mixture?	**Both mixtures produced bubbles and swelled a balloon. The chalk mixture also shows evidence that a gas formed.**
3	A student says the sugar became a new substance because it disappeared. Which test result challenges that claim, and why?	**Sugar crystals remained after the water evaporated. Recovering the sugar challenges the claim that it became a new substance.**
4	Why does the sand mixture provide weaker evidence of a new substance than the chalk mixture? Use one result from each row.	**A filter recovered the sand grains, but the chalk mixture produced bubbles and swelled a balloon. The sand result shows the original material could be separated, while the chalk results support gas formation.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would mix a pinch of salt with vegetable oil and watch for gas or a lasting color change. Then I would filter the mixture to see whether I could recover the salt. Gas produced during mixing would support a new-substance claim. Recovering unchanged salt grains without any other change would not.

Accept claims that use the table's observations and follow-up tests together. For Your Turn, accept other safe material pairs and tests when the student explains how the results would affect the claim.