What Changed Here?

Use comparisons to investigate what happens when substances mix.

5-PS1-4 "Plan and carry out an investigation to determine if the mixing of two or more substances results in new substances. (SEP: 3; DCI: PS1.B; CCC: Cause/Effect)"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline Maya's notes from before mixing, circle her observations after mixing, and write 1 beside the strongest sign that a gas formed. Use your marks to compare what happened in the cups.

Maya's Mixing Test

1. Maya wondered whether mixing kitchen substances could make something new. She chose baking soda, vinegar, water, and sugar. Before any mixing, she noted that baking soda and sugar were white solids, while vinegar and water were clear liquids. She used clean cups, equal spoonfuls of baking soda, and equal amounts of each liquid. She wore goggles and did not taste any mixture.

2. In cup A, Maya stirred baking soda into vinegar. Bubbles rose at once, and a balloon placed over the cup's opening slowly puffed up. In cup B, she stirred the same amount of baking soda into water. Some powder remained at the bottom, and the balloon stayed flat. She observed both cups for two minutes and wrote down what changed, rather than relying on a quick glance.

3. Maya also stirred sugar into water in cup C. The sugar seemed to disappear, but there were no bubbles, and the liquid still looked clear. If the water were allowed to evaporate, sugar crystals could be collected again. A puffed-up balloon provides evidence that a gas formed in cup A. Dissolving sugar does not, by itself, show that a new substance formed. Comparing cups helps Maya connect each change to what she mixed.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why did Maya use the same amount of baking soda and liquid in cups A and B?

2. What did Maya observe that suggests a gas formed in cup A?

3. How does cup B help Maya decide whether the vinegar caused the change in cup A?

4. Sugar seemed to disappear in cup C. What could Maya do to check whether it was still sugar?

3 YOUR TURN

Your own words

Choose two safe substances that Maya did not mix together. Plan a test with a comparison cup to find out whether mixing them makes a new substance. State what you will keep the same, what you will record before and after mixing, and what result would be evidence.

ANSWER KEY

What Changed Here?

GRADE 5 · 5-PS1-4

PART 1 · READ AND MARK

Underline Maya's notes from before mixing, circle her observations after mixing, and write 1 beside the strongest sign that a gas formed. Use your marks to compare what happened in the cups. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why did Maya use the same amount of baking soda and liquid in cups A and B?	**Keeping the amounts the same helped her compare the effect of mixing baking soda with vinegar instead of water.**
2	What did Maya observe that suggests a gas formed in cup A?	**Bubbles rose, and the balloon over cup A puffed up.**
3	How does cup B help Maya decide whether the vinegar caused the change in cup A?	**Cup B had baking soda and water but no vinegar. Its balloon stayed flat, unlike the balloon on cup A.**
4	Sugar seemed to disappear in cup C. What could Maya do to check whether it was still sugar?	**She could let the water evaporate and check whether she could collect sugar crystals again.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would put clean eggshell pieces in lemon juice in one cup and in water in another. I would use the same amount of eggshell and liquid in each cup and watch them for two minutes. Before mixing, I would record how the pieces and liquids look and whether I see any bubbles. After mixing, steady bubbles in the lemon juice cup but not the water cup would be evidence that a new gas formed.

For Part 3, accept other safe mixtures if the plan includes a useful comparison, controlled amounts, observations before and after mixing, and a specific sign that a new substance may have formed. Bubbles are evidence of a gas, but students should not treat every visible change as proof of a new substance.