Color Change Clues

Use observations to predict what happens when an acid meets a base.

P.7.5D "Students will demonstrate an understanding of chemical formulas and common chemical substances to predict the types of reactions and possible outcomes of the reactions..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two observations that show a change when baking soda is added to vinegar. Circle the evidence that helps you predict whether a mixture is still acidic or has extra base.

A Kitchen Lab Investigation

1. At a kitchen lab station, a class tested how vinegar reacts with baking soda. Vinegar contains acetic acid, CH_3COOH, and baking soda is sodium bicarbonate, $NaHCO_3$. Their reaction can make water, sodium acetate, and carbon dioxide, CO_2. The class used purple cabbage juice as an indicator: acids turn it pink, while bases can turn it blue-green.

2. Students poured the same amount of vinegar into each of four cups and added the same amount of cabbage juice. Then they added different amounts of baking soda. They recorded the color after stirring and watched for bubbles while they stirred. The table shows their observations; cup D received the most baking soda.

CUP OBSERVATIONS

Cup and baking soda added	Cabbage juice color	Bubbles while stirring?
A: none	Pink	No
B: small amount	Pink	Yes
C: larger amount	Purple	Yes
D: most	Blue-green	Yes

3. The bubbles suggest a gas formed, not just a color change. The reaction makes CO_2, which can cause those bubbles. When the juice shifts from pink toward purple, the mixture is less acidic; blue-green suggests extra base remains. A purple color suggests near-neutral conditions, but cabbage juice cannot give an exact pH number.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which cup, B or C, is likely closer to neutral? Use the color evidence.

2. Which cup likely has extra base remaining? What observation supports your answer?

3. What observation supports the claim that adding baking soda caused a chemical reaction? Name the gas the passage says can cause it.

4. Why would it be incorrect to report that cup C has a pH of exactly 7?

3 YOUR TURN

Your own words

Design a test using lemon juice, baking soda, and cabbage juice. In three or four sentences, explain what you would keep the same, what you would change, and what color and bubble observations would support your prediction about neutralization and a reaction.

Color Change Clues

PART 1 · READ AND MARK

Underline two observations that show a change when baking soda is added to vinegar. Circle the evidence that helps you predict whether a mixture is still acidic or has extra base. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which cup, B or C, is likely closer to neutral? Use the color evidence.	**Cup C is likely closer to neutral because its cabbage juice is purple, while cup B is still pink.**
2	Which cup likely has extra base remaining? What observation supports your answer?	**Cup D likely has extra base because its cabbage juice is blue-green.**
3	What observation supports the claim that adding baking soda caused a chemical reaction? Name the gas the passage says can cause it.	**Bubbles appeared in cups B, C, and D. The passage identifies carbon dioxide, CO_2, as a gas that can cause the bubbles.**
4	Why would it be incorrect to report that cup C has a pH of exactly 7?	**Its purple color suggests near-neutral conditions, but cabbage juice does not measure an exact pH.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict that adding baking soda to lemon juice will make the mixture less acidic. I would put equal amounts of lemon juice and cabbage juice in three cups, then add no baking soda to one cup, a small amount to another, and more to the third. A shift from pink toward purple would support my prediction that the acid is being neutralized. Bubbles after adding baking soda would support that a chemical reaction made a gas.

Accept color-based predictions that identify purple as nearer neutral than pink and blue-green as evidence of extra base. For the open task, look for a controlled comparison, a change in baking soda amount, and separate interpretations of color and bubbles.