The Rising Balloon

Test a claim about evidence of a chemical reaction.

P.7.5D.2 "Design and conduct scientific investigations to support evidence that chemical reactions (e.g., cooking, combustion, rusting, decomposition, photosynthesis, and cellular respiration) have occurred."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline what differs among Maya's bottles, circle the balloon measurements, and write 1 and 2 beside the two comparison bottles. Use your marks to track how her test connects an ingredient change to evidence of a reaction.

Where Did the Gas Come From?

1. At the school garden, Maya notices that bread dough rises before baking. She wonders whether yeast is making a new substance rather than simply pushing air already in the dough upward. Yeast can break down sugar and release carbon dioxide gas. But a swelling balloon alone cannot show where gas came from. Maya plans a test with bottles so she can compare setups and measure gas without guessing. If gas appears mainly when yeast has sugar, the pattern will support the claim that a chemical reaction occurred.

2. She labels three identical bottles A, B, and C. Each gets the same amount of warm water. Bottle A gets yeast and sugar, B gets yeast but no sugar, and C gets sugar but no yeast. Maya stretches an identical balloon over each opening and measures its widest width at the start and after 30 minutes. She keeps the bottles in the same room, away from sunlight. Using equal bottles, water amounts, and temperatures helps make the ingredient changes the likely cause of any difference.

3. At the start, all three balloons measure 4 centimeters across. After 30 minutes, A measures 9 centimeters, while B and C still measure 4 centimeters. Maya records the results and repeats the test the next day with fresh materials. The same pattern appears. The extra swelling in A supports the idea that yeast breaking down sugar released a gas, a sign of a chemical reaction. It does not prove the gas is carbon dioxide by itself. To identify the gas, Maya would need another test.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do bottles B and C help Maya test whether both yeast and sugar are needed for the balloon to swell?

2. Which balloon measurements show that the difference developed during the test, rather than being present at the start?

3. Why does Maya keep the water amounts and temperatures the same in all three bottles?

4. How does repeating the test strengthen Maya's claim, and what claim still needs another test?

3 YOUR TURN

Your own words

Design a safe investigation of a chemical reaction other than Maya's yeast test. State what you will change and keep the same, what you will observe or measure and when, and how a comparison will help you decide whether a new substance formed.

ANSWER KEY

The Rising Balloon

GRADE 7 · P.7.5D.2

PART 1 · READ AND MARK

Underline what differs among Maya's bottles, circle the balloon measurements, and write 1 and 2 beside the two comparison bottles. Use your marks to track how her test connects an ingredient change to evidence of a reaction. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do bottles B and C help Maya test whether both yeast and sugar are needed for the balloon to swell?	**B has yeast without sugar, and C has sugar without yeast. Neither balloon swells, so the comparison supports the claim that both ingredients are needed.**
2	Which balloon measurements show that the difference developed during the test, rather than being present at the start?	**All three balloons started at 4 centimeters. After 30 minutes, A was 9 centimeters, while B and C were still 4 centimeters.**
3	Why does Maya keep the water amounts and temperatures the same in all three bottles?	**Keeping them the same makes the ingredient changes a more likely cause of any difference in balloon size.**
4	How does repeating the test strengthen Maya's claim, and what claim still needs another test?	**The same pattern on a second day supports her claim that yeast breaking down sugar released gas. Another test is needed to identify the gas as carbon dioxide.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would place equal pieces of steel wool in two open jars. I would dampen one piece with water and leave the other dry, then keep both jars in the same room for two days. Each morning, I would count the orange-brown patches on each piece. If more patches appear on the damp steel wool, the difference would support the claim that a new substance, rust, formed.

Accept other safe tests that include a comparison, controlled conditions, observations over time, and an explanation of how those observations could support a chemical reaction. A change in appearance alone should not be presented as certain proof.