BAKING SODA AND VINEGAR REACTION LAB

NAME

CLASS / DATE

01 QUESTION

How does baking-soda amount affect a balloon's circumference 60 seconds after it is added to the same volume of vinegar?

02 PREDICT BEFORE YOU MEASURE

AS BAKING SODA INCREASES FROM ⅛ TO ⅜ TSP, CIRCUMFERENCE AT 60 S WILL…

○ increase across these amounts ○ show no clear pattern yet ○ decrease across these amounts

Any prediction is acceptable if it can be checked against all three trials; do not assume a guaranteed winner.

03 VARIABLES

I CHANGE (INDEPENDENT)	I MEASURE (DEPENDENT)

I KEEP THE SAME (CONTROLLED) · CHANGED: ONE-EIGHTH, ONE-QUARTER OR THREE-EIGHTHS TSP BAKING SODA. MEASURED: WIDEST BALLOON CIRCUMFERENCE AT 60 SECONDS. HELD FIXED: 30 ML SAME 5% VINEGAR, BOTTLE, BALLOON AND METHOD.

04 MATERIALS

- ☐ 30 mL same labeled 5% vinegar per trial
- ☐ Baking soda: level ⅛, ¼, ⅜ tsp
- ☐ Nine matching plastic bottles and fresh balloons
- ☐ Dry funnel, flexible tape/string, cm ruler
- ☐ Tray, goggles and timer

05 PROCEDURE

SAFETY Wear splash goggles and work over a tray. Keep faces away from the bottle opening; vinegar can sting eyes and foam can overflow. Do not cap or rigidly seal the reacting bottle. If using a balloon, fit it without stretching or forcing the bottle neck, and stop if the balloon or container looks strained.

1 **SET UP** Measure 30 mL of the same labeled 5% vinegar into each fresh matching plastic bottle. Keep bottles on a tray; never cap them. ☐

2 **LOAD** Use a dry funnel to put a level ⅛, ¼ or ⅜ tsp baking soda into a fresh balloon. Fit it gently over the neck without spilling or forcing. ☐

3 **START** Lift the balloon so powder touches vinegar and start the timer. Keep faces away and watch from the side. ☐

4 **MEASURE** At exactly 60 seconds, measure the balloon's widest circumference with flexible tape or string and a cm ruler. ☐

5 **REPEAT** Record three fresh trials at each amount (nine total). Calculate a mean and range; flag leaks or fit problems. ☐

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DATA AND EXPLANATION

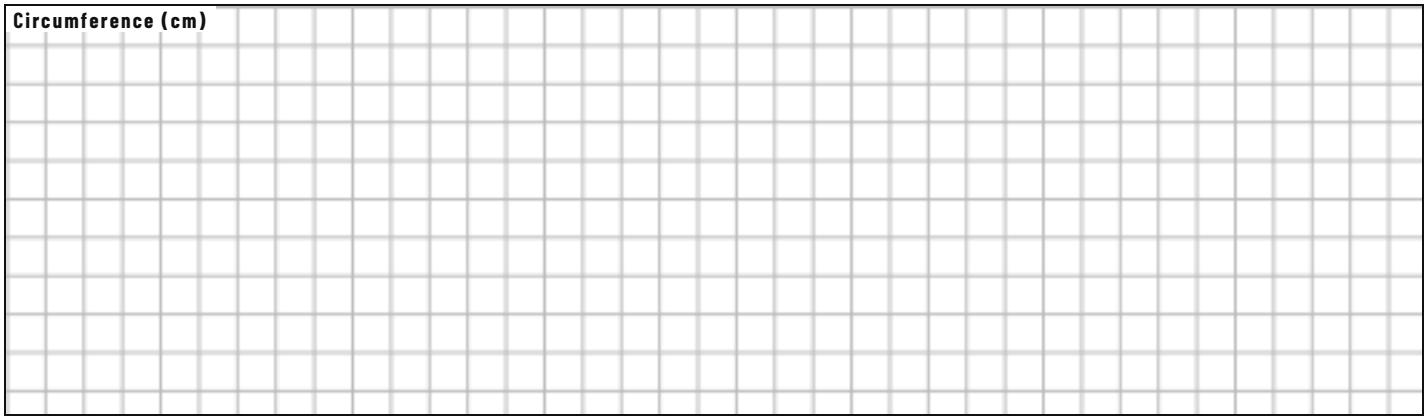
06 RECORD YOUR OBSERVATIONS

BAKING SODA	TRIAL 1 (CM)	TRIAL 2 (CM)	TRIAL 3 (CM)	MEAN / RANGE
⅛ tsp				
¼ tsp				
⅜ tsp				

Measure at exactly 60 seconds. Mean = (Trial 1 + Trial 2 + Trial 3) ÷ 3; range = largest − smallest. Plot means and keep each trial visible.

SHOW ONE CALCULATION

07 BAKING SODA AND BALLOON CIRCUMFERENCE AT 60 S



Plot the mean circumference for ⅛, ¼ and ⅜ tsp or show every trial point. The vertical scale starts at zero because circumference is positive.

X: Baking soda (tsp)

08 EXPLAIN IT WITH EVIDENCE

CLAIM

EVIDENCE

REASONING

Reasoning must use: baking soda · vinegar · carbon dioxide · limiting reactant · circumference

09 THINK FURTHER

How might the pattern change if the fixed vinegar volume were doubled? State what you would keep the same and what you would measure.