Foaming Spuds

Directions: Use the following information to answer questions 3 through 6 on pages 14 through 17.

Mike and Kelsey were studying how hydrogen peroxide (H_2O_2) in cells breaks down to form water and oxygen. When this reaction happens, bubbles of oxygen gas are released, producing foam. This reaction is described as follows:

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

hydrogen peroxide → water + oxygen

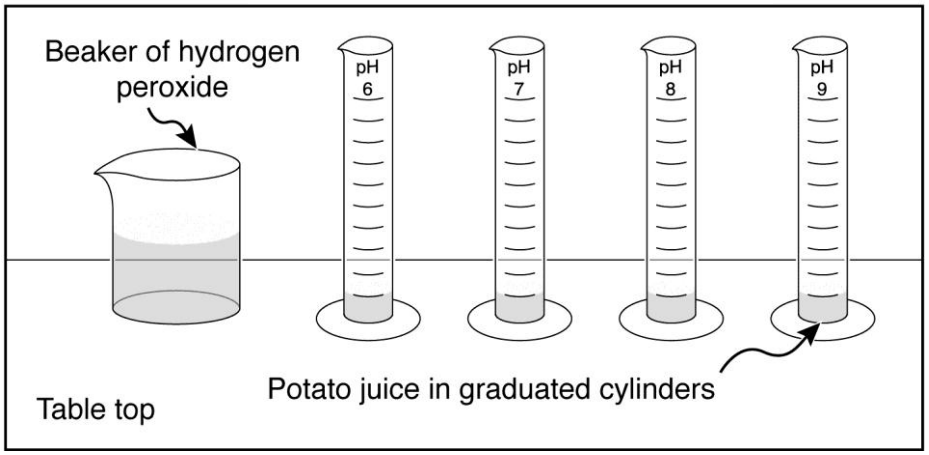
A protein named *catalase*, found in all cells including potatoes, increases the rate of this reaction. Mike and Kelsey used potato juice as the source of *catalase* to do the following controlled experiment.

Question: What is the effect of the acidity of potato juice on the volume of foam produced when hydrogen peroxide is added to potato juice?

Prediction: As the acidity of potato juice decreases (higher pH), the volume of foam will increase.

Materials:
graduated cylinders labeled pH 6, pH 7, pH 8, and pH 9
potato juice from the same potato,
divided and adjusted to four acidities: pH 6, pH 7, pH 8, and pH 9
hydrogen peroxide (H_2O_2)
beaker
stopwatch
stirring rods
thermometer

Controlled Experiment Setup



Procedure:

1. Label four graduated cylinders, one for each acidity.
2. Put 10 milliliters of potato juice at pH 6 in the appropriately labeled cylinder.
3. Do the same for each of the other cylinders.
4. Monitor the room temperature to make sure the temperature remains the same throughout the investigation.
5. Add 5 milliliters of hydrogen peroxide to each graduated cylinder, stir for two seconds. Wait three minutes.
6. Measure and record the volume of foam in each graduated cylinder as Trial 1.
7. Clean all graduated cylinders and stirring rods.
8. Repeat steps 1 through 7 two times for Trials 2 and 3.
9. Calculate and record the average volume of foam for each acidity of potato juice.

Data:

Acidity of Potato Juice vs. Volume of Foam

Acidity of Potato Juice (pH)	**Volume of Foam** (milliliters)			
	Trial 1	Trial 2	Trial 3	Average
6	22	25	25	24
7	32	38	36	35
8	41	42	42	42
9	32	29	30	30

4 Write a conclusion for this controlled experiment.

In your conclusion, be sure to:
- Answer the experimental question.
- Include **supporting** data from the Acidity of Potato Juice vs. Volume of Foam table.
- Explain how these data **support** your conclusion.
- Provide a **scientific** explanation for the trend in the data.

Question: What is the effect of the acidity of potato juice on the volume of foam produced when hydrogen peroxide is added to potato juice?
Conclusion: