

Inquiry Lab: Bubbleology

This inquiry lab is designed to introduce you to the scientific method and stimulate effective science communication.

You are challenged to evaluate the claims of liquid dishwashing soap manufactures by measuring the size of bubble-domes that can be created by using solutions of the various brands. For the sake of this experiment it will be assumed bubble-dome size is directly correlated with the cleaning power of the liquid soap. In addition, you are also expected to determine which brand of soap is the most cost-effective (best buy) based on your findings. This can be accomplished by determining the bubble-dome to cost ratio (divide the diameter in cm of the dome by the cost in dollars). Each trial sample of soap tested should be the same volume. IGCSE Hint: $\text{mL} = \text{cm}^3$

Materials:

- Pipette
- 3 samples - Dishwashing liquid A, B, & C
- 3 - 250 mL beakers labeled A, B, & C
- 1 Graduated cylinder
- Straw
- Paper towels
- Paper (regular & graph)
- Writing utensil
- Ruler & meter stick

Procedure:

Using a pipette, measure 2 mL of dishwashing liquid and transfer to a 250 mL beaker. Measure 100 mL of water with a graduated cylinder. Pour into the 250 mL beaker containing the soap. Using a straw or stirrer, mix the solution thoroughly. Using a graduated cylinder or pipette, measure 10 mL of soap solution and pour small amount directly onto lab table. Do not allow solution to run off the table. Spread evenly to create a large and consistent filmy area. Dip a straw into the soap solution within your beaker. Touch the surface for your film near the center with straw at approximately a 45 degree angle. Gently blow until a bubble-dome forms and continue blowing until it pops. You may take more than one breath to blow a bubble, as they can get quite large before popping. With a ruler or meter stick, measure the diameter of the ring of soap-suds left by the popped bubble-dome. If the dome was irregular in shape, measure 2 or 3 diameters and average them. Run five trials with each soap brand. Record the data on an appropriate data table. Graph the results and report on your findings. Include a table and graph devoted to cost effectiveness. Make sure you record the original price of each soap brand to perform this calculation correctly.

Answer these questions:

1. State your hypothesis for this experiment.
2. What is the independent variable for this experiment?
3. What is the dependent variable?
4. Which soap appeared to be the best cleaner? Assume that bubble-dome size is directly correlated with cleaning power.
5. Which brand appears to be the “best buy”, or most cost-effective?
6. Did your experimental data support or negate your hypothesis? Explain.
7. Was this a valid test? List some experimental errors that may cause you to doubt the validity of your findings.
8. What suggestions would you make for further studies of this kind? What changes or extension would you recommend?