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Science In Spray Bottle®

Laboratory Experiments

By

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Inquiry Activity # 1

Without emptying the bottle:

1. Predict how many times you need to pump the sprayer to empty the water from the bottle in front of you.
2. Propose a way to determine how many times do you need to pump the sprayer to empty the bottle. The maximum number of times that you can physically use the sprayer to spray water from the bottle is 10 times.

The following materials are available you wish to use some of them: Bottle with spray cap water, food coloring, and graduated cylinder. If you wish to propose and use your own materials and/or additional materials you can.

Prediction:

Using the sprayer in this particular bottle, I predict it will take _____ times to pump all the water out of the bottle.

Materials:

Procedures:

Results:

Data Collection

Measurements	Calculation

Conclusions:

Inquiry Activity # 2

1. Identify all the potential factors that might affect the outcomes of the experiments that you have just successfully completed?
2. Make an investigative question involving each of the 6 identified potential factors. Use table 2 to answer this question.
2. Of all the identified potential factors, identify the three factors that you think will have the most influence on the outcomes in the previous inquiry activity.
3. Hypothesize how each identified factor could affect the outcomes of the experiments that you have just successfully completed? Use the table 2 for your answers.
4. Design and conduct an experiment for each of these three hypotheses that answer their corresponding investigated questions.
5. Using graph paper and colored pencils, illustrate your findings as a graph with at least one graph for each experiment. You will need to decide in your group what data to graph to convey the most important information.
6. How does the result from each experiment agree or disagree with your corresponding hypothesis?
7. Any of the factors that you manipulated in your experiment is called an independent variable. What factor in any of your experiments was a dependent variable? Explain.
8. What conclusions can you make from your findings?
9. Did you read all the safety procedures and the procedures for conducting this lab experiment before you started this lab experiment?

Name(s): _____

Date: _____

Table 2
Identified Factors, Investigated Questions, & Student Hypotheses

Potential Factor	Investigated Questions	Hypothesis

Table 3
Student Data and Observations

	First Experiment	Second Experiment	Third Experiment	Additional Observations
Additional Observations				

Name(s): _____

Date: _____

Designing and Conducting Lab Experiment # 1

First Investigated Question:

Materials:

Procedures:

Results and Observations

Conclusions:

Name(s): _____

Date: _____

Designing and Conducting Lab Experiment # 2

Second Investigated Question:

Materials:

Procedures:

Results and Observations

Conclusions:

Name(s): _____

Date: _____

Designing and Conducting Lab Experiment # 3

Third Investigated Question:

Materials:

Procedures:

Results and Observations

Conclusions:

Name(s): _____.

Date: _____

Graphic Interpretation of Student's Observation

A large grid for data recording, consisting of 20 columns and 25 rows. The grid is empty and intended for the student to plot or record their observations.

Activity # 3

Pressure In A Spray Bottle

In this lab activity you will find how many droplets of water you get when you squeeze a spray cap of bottle filled with water. From there you will find out which spray bottle has more pressure than the others. In doing so, you will learn certain science and mathematical concepts as well as develop skills.

Procedures:

1. Read all the procedures before you start this lab investigation and then predict what would happen if you have successfully completed the experiment.
1. Measure and pour 350 ml of water into bottle with a spray cap. Add 2-drops of food coloring into the water.
2. Weigh the bottle with the water.
3. Spray the colored water 10 times. When you squeeze the spray handle squeeze it Fast and All the Way.
4. Weigh the bottle with the remaining water.
5. Measure the weight of the water sprayed by subtracting the weight of the bottle with remaining water from the weight of the bottle of water before the spraying.
6. Take a microscope slide and hold it level in one hand. Then take the spray bottle with colored water and spray water into the air, letting some drops fall on the slide.
7. Pick one drop, and measure its diameter. Enter result in the student data collection sheet.

8. Calculate the volume of the droplet and the weight of the droplet. Enter results in student data collection sheet.
9. Put a piece of wax paper over a piece of graph paper with 1" squares. Spray water above the wax paper, letting the drops of water fall on the wax paper.
10. Count how many drops are in each square.
11. Average the number of drops by adding all the drops and dividing the sum by the total number of squares.
11. Enter your results in the data sheet.

Measurements	Calculation
Water Volume Before The Experiment	
Weight of the Bottle With Water	
Weight of the Bottle With Water After The Experiment.	
The weight of the Sprayed Water	
The weight of the Sprayed Water	
Volume of Droplet ($V = 1/6 \pi D^3$)	
Volume of Sprayed Water Divided by Volume of one Droplet	
The # of droplets per one push in one square inch	

Name(s): _____

Date: _____

Final Lab Report