Unit Project

Conducting an Experiment

In many situations, patterns become apparent only after sufficient data are collected, organized, and displayed. Your group will be carrying out one of these experiments.

- In Project 1, you will investigate the rate at which a leaking faucet loses water.

- In Project 2, you will investigate how the drop height of a ball is related to its bounce height.

You will examine and use the patterns in the data collected from these experiments to make predictions.

Project 1: Wasted Water Experiment

In this experiment, you will simulate a leaking faucet and collect data about the volume of water lost at 5-second intervals. You will then use the patterns in your results to predict how much water is wasted when a faucet leaks for one month.

Read the directions carefully before you start. Be prepared to explain your findings to the rest of the class.

Materials:

- a watch or clock with a second hand

- a styrofoam or paper cup

- water

- a paper clip

- a clear measuring container (such as a graduated cylinder)

Directions:

Divide the work among the members of your group.

1. Make a table with columns for recording time and the amount of water lost. Fill in the time column with values from 0 seconds to 60 seconds in 5-second intervals (that is, 5, 10, 15, and so on).

2. Use the paper clip to punch a hole in the bottom of the paper cup. Cover the hole with your finger.

3. Fill the cup with water.

4. Hold the paper cup over the measuring container.

5. When you are ready to begin timing, uncover the hole so that the water drips into the measuring container, simulating the leaky faucet.

6. Record the amount of water in the measuring container at 5-second intervals for a minute.

Use this experiment to write an article for your local paper, trying to convince the people in your town to conserve water and fix leaky faucets.

In your article, include the following information:

- a coordinate graph of the data you collected;

- a description of the variables you investigated in this experiment and a description of the relationship between the variables;

- a list showing your predictions for:

  - the amount of water that would be wasted in 15 seconds, 2 minutes, in 2.5 minutes, and in 3 minutes if a faucet dripped at the same rate as your cup does;

  - how long it would take for the container to overflow if a faucet dripped into the measuring container at the same rate as your cup;

  Explain how you made your predictions. Did you use the table, the graph, or some other method? What clues in the data helped you?

- a description of other variables, besides time, that affect the amount of water in the measuring container;

- a description of how much water would be wasted in one month if a faucet leaked at the same rate as your paper cup (explain how you made your predictions);

- the cost of the water wasted by a leaking faucet in one month. (To do this, you will need to find out how much water costs in your area. Then, use this information to figure out the cost of the wasted water.)