A Plop and Fizz

Purpose

Students will read analog and/or digital meters on instruments used to make direct measurements and incorporate bar graphs and scatter plots into writing to serve as evidence for conclusions.

Materials

For the teacher: chalk, chalkboard, science textbook
For each student: science textbook, science journal, pen or pencil
For each group of students: 3 antacid tablets, 3 beakers, graduated cylinder, 200 ml water at room temperature, 100 ml hot tap water, ice cubes, thermometer, stop watch, scale

Activity

A. Pre-Activity Discussion

1. Ask students to open their science textbooks and look for examples of charts and graphs. When someone finds an example, ask: "What information is being presented? Are the units of measurement clearly labeled? Is there a title that indicates the information contained in the graph or chart?"
2. Ask the students: "What basic information should be included in every graph or chart?" List their answers on the chalkboard and make sure they include the following: title, units of measurement, labels on the axes.
3. Point out that the text also refers the reader to the graph or chart and explains its importance.
4. Ask students: "Do you think that graphs and charts are helpful? How do they help the reader understand information?"

B. A Plop and Fizz

1. Divide the class into groups of two or three students.
2. Explain that each group will test the effects of temperature on reaction rate. Tell students they will do this by observing what happens when an antacid tablet is dissolved in hot water, cold water, and room temperature water.
3. Distribute three antacid tablets, three beakers, a graduated cylinder, water at room temperature, hot water, ice cubes, a digital/analog thermometer, balance scale, and stopwatch to each group.
4. For the first trial, have each group fill one of the beakers with 100 ml of water at room temperature. Instruct them to record the volume and temperature of the water in their journals.

(continued)

INCORPORATING TECHNOLOGY

Have students create graphs and charts using a computer spreadsheet program.

EXTENDING THE ACTIVITY

Discuss with students how reaction rates are affected by temperature in the human body. Discuss what happens when a person has a fever.

Standards Link
7.3.12

Activity (continued)

5. Instruct students to take the mass of one of the antacid tablets and record the results in their science journals using the appropriate units.
6. Direct one student from each group to drop the antacid tablet into the water while another student in the group begins the stopwatch.
7. Instruct students to record the time it takes for the tablet to dissolve. Tell students to record the temperature of the solution every minute for the next five minutes.
8. Remind students to record all of their observations and results in their science journals.
9. For trial two, direct students to repeat steps 4 through 8 using hot tap water.
10. For the third trial, have students repeat steps 4 through 8 using ice water.

C. Reporting What You See

1. Have students share their data and direct them to record their results in lab reports, using scatter plots and bar graphs.
2. Distribute lined paper and graph paper and tell each group to include the following sections in their report: project title, problem, procedure, results, conclusions, and summary.
3. As students work on their reports, ask questions, such as:
   - As the tablet dissolved, did the temperature of the water change?
   - How could you show this in a scatter plot?
   - How could you show this in a bar graph?
   - Could you make a different graph for each trial?
4. Discuss how the temperature of the water affected the reaction rate of the antacid tablets. Discuss how, like most chemical reactions, the speed of the reaction increases with temperature.
5. Discuss any trends that were reflected in the graphs students produced.

Classroom Assessment

Basic Concepts and Processes

Ask questions, such as the following while students are doing the experiment:

📖 Why is it important to put the appropriate units on the measurements we are taking?

📖 In what ways will graphs and charts contribute to your lab report?

💡 How do you know this?

💡 Did you have any difficulties creating your graphs?