

Graphing Calculator Lab

Cooling

TI-73 Explorer

In this lab, you will explore the type of equation that models the change in the temperature of water as it cools under various conditions.

▶ SET UP the Lab

- Collect a variety of containers, such as a foam cup, a ceramic coffee mug, and an insulated cup.
- Boil water or collect hot water from a tap.
- Choose a container to test and fill with hot water. Place the temperature probe in the cup.
- Connect the temperature probe to your data collection device.



ACTIVITY

- Step 1** Program the device to collect 20 or more samples in 1-minute intervals.
- Step 2** Wait a few seconds for the probe to warm to the temperature of the water.
- Step 3** Press the button to begin collecting data.

ANALYZE THE RESULTS

1. When the data collection is complete, graph the data in a scatter plot. Use time as the independent variable and temperature as the dependent variable. Write a sentence that describes the points on the graph.
2. Use the STAT menu to find an equation to model the data you collected. Try linear, quadratic, and exponential models. Which model appears to fit the data best? Explain.
3. Would you expect the temperature of the water to drop below the temperature of the room? Explain your reasoning.
4. Use the data collection device to find the temperature of the air in the room. Graph the function $y = t$, where t is the temperature of the room along with the scatter plot and the model equation. Describe the relationship among the graphs. What is the meaning of the relationship in the context of the experiment?

MAKE A CONJECTURE

5. Do you think the results of the experiment would change if you used an insulated container? Repeat the experiment to verify your conjecture.
6. How might the results of the experiment change if you added ice to the water? Repeat the experiment to verify your conjecture.