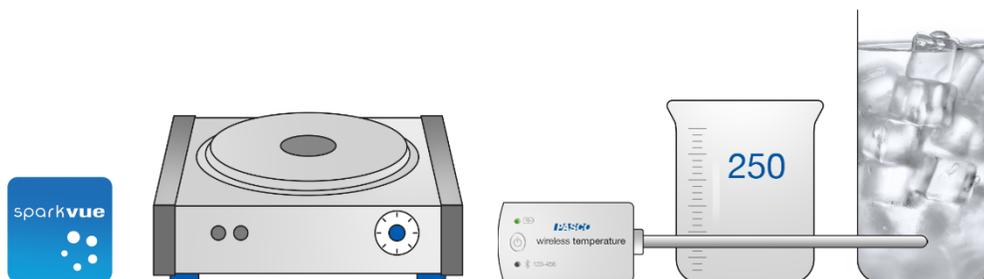# 1B – INVESTIGATING THE TEMPERATURE SCALE

⚬— INQUIRY

How are the Fahrenheit and Celsius temperature scales related?

⚬— MATERIALS

- Device with SPARKvue software
- Temperature sensor
- Ice water
- Beaker, 250-mL
- Heater stirrer

⚬— BACKGROUND

When referring to the weather outside we often say, "It's a beautiful day out. It's 75 degrees today!" What we mean to say is that it is 75 degrees Fahrenheit. Outside the United States, someone else may say it's 24 degrees Celsius when describing the exact same weather. When asked at what temperature water boils and freezes, you may respond with 100 degrees for boiling and 0 degrees for freezing. In this case, you are stating the temperature in units of Celsius.

Temperature is a very important measurement in chemistry. While getting to know SPARKvue and the temperature probe, you will determine the mathematical relationship between two temperature scales.

⚬— SAFETY

Follow these important safety precautions in addition to your regular classroom procedures:

- Wear safety goggles at all times.

⚬— PROCEDURE

1. Turn on the Temperature sensor.

2. Open SPARKvue and choose Sensor Data.

3. From the list of available devices, select the temperature sensor with the correct ID number. It should be at the top of the list. Once it is connected, select Graph from the Templates menu.

4. When the graph appears, select the y-axis label (Temperature). Select the °C temperature unit from the menu on the right and change it to Fahrenheit.

5. Select the x-axis label (Time) and choose the Temperature measurement. Keep the units as Celsius.

PROCEDURE

6. Select the Sampling Options menu . Set the Sample Rate to 10 s. Toggle open the Automatic Stop Condition menu. Change the Condition from "No Condition" to "Stop After Duration" with a value of 300 s. Select OK.

7. Fill a 250-mL beaker halfway with ice water.

8. Place the probe in the beaker and set the beaker on the heater stirrer. Turn the heat on to a high setting.

9. Start collecting data. The data will be collected every 10 seconds for a total of 5 minutes. Then data collection will automatically stop.

10. Sketch a graph of your data in Graph 1.

ANALYSIS

Complete the analysis on your answer sheet.

QUESTIONS

Answer the questions on your answer sheet