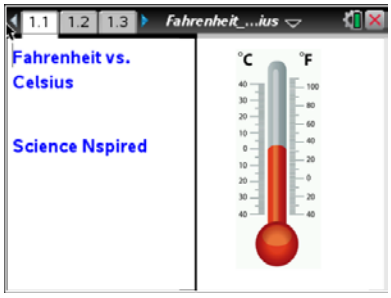
Fahrenheit vs. Celsius
Student Activity

Name _____
Class _____

Open the TI-Nspire document *Fahrenheit_vs_Celsius.tns.*



While nearly the entire world uses the Celsius (Centigrade) temperature scale, the United States continues to use the Fahrenheit scale. In this activity, you will explore the relationship between the two temperature scales by gathering, graphing, and analyzing data.

Move to pages 1.2 and 1.3.

Answer the following questions on your handheld.

Q1. Nearly the entire world uses the _____ temperature scale.

A. Roemer
B. Fahrenheit
C. Kelvin
D. Celsius

Q2. The United States uses the _____ temperature scale.

A. Roemer
B. Fahrenheit
C. Kelvin
D. Celsius

Move to page 2.1.

1. Pour about 100 mL of tap water into a 250 mL beaker.
2. Connect the TI-Nspire™ Lab Cradle to the TI-Nspire™ CX CAS handheld.
3. Connect two Vernier® Stainless Steel Temperature Probes to the TI-Nspire Lab Cradle (see the photo to the right).
4. In the Vernier DataQuest™ App, set up the data-collection mode by selecting **MENU > Experiment > Collection Mode > Events with Entry**.
5. Enter **Temp** as the Name, leave the Units field blank, and click OK.
6. Select **MENU > Experiment > Setup Sensors > Change Units**, and select Fahrenheit for Stainless Steel Probe 2. Click **OK**.
7. Start data collection by pressing the **Start** button ▶.

You will measure the temperature of one group member's hands in both Celsius and Fahrenheit.

8. The volunteer should pick up the two Temperature Probes and simultaneously hold their tips in the palm of the same hand as shown to the right.
9. Watch the live temperature read out. When the temperature stops rising, click the **Keep** button .
10. You will be prompted to enter a number. Type **1** to number the first temperature measurement trial, and click **OK**.
    - The two temperature measurements have been saved.
11. Place the two Temperature Probes simultaneously in the tap water.
12. When the temperature stabilizes, click the **Keep** button , and type **2** for the second trial when prompted. Click **OK**.
13. Add several ice cubes to the beaker of tap water. Stir using both probes. When the temperature stops decreasing, click the **Keep** button , and enter **3** when prompted. Click **OK**.
14. Click on the **Stop** button to stop data collection.
15. Select **MENU > Graph > Select Y-axis Variables > run1.Temperature2.**
16. Select **MENU > Graph > Select X-axis Variable > Temperature**.
17. Select **MENU > Analyze > Curve Fit > Linear**.
18. What is the slope of the line? _____ What is the y-intercept? _____
19. Explain the meaning of these values.

Move to pages 3.1 through 3.3.

Q3. What type of relationship exists between Celsius and Fahrenheit temperatures?

A. Indirect
B. Inverse
C. Exponential
D. Linear

Q4. The slope of the Fahrenheit vs. Celsius graph represents the fact that a change of one Celsius degree is equivalent to a change of _____ Fahrenheit degrees. (Fill in your answer.)

Q5. The y-intercept of the Fahrenheit vs. Celsius graph should indicate the freezing points of water on the Celsius and Fahrenheit scales, respectively.

A. True
B. False

Extension

You will analyze the changes in the mathematical model when the temperatures are graphed with Celsius on the *y* axis and Fahrenheit on the *x* axis.

Return to page 2.1.

1. Select **MENU > Graph > Select Y-axis Variables > run1.Temperature**.
2. Select **MENU > Graph > Select X-axis Variable > Temperature 2**.
3. Select **MENU > Analyze > Curve Fit > Linear**.
4. What is the slope of the line? _____ What is the *y*-intercept? _____

5. Explain the meaning of these values.

6. Disconnect the Temperature Probes.
7. Properly dispose of the water in the beaker.

Move to page 3.4.

Q6. The slope of the Celsius vs. Fahrenheit graph in the Extension is the _____of the slope from the Fahrenheit vs. Celsius graph.

A. product
B. equivalent
C. reciprocal
D. natural log