Chapter 9 Temperature Scales Practice Worksheet

The Fahrenheit and Celsius temperature scales are the most commonly used scales for reporting temperature values. Scientists use the Celsius scale almost exclusively, as do many countries of the world. The United States relies on the Fahrenheit scale for reporting temperature information. You can convert information reported in degrees Celsius to degrees Fahrenheit or vice versa using conversion formulas.

$$T_c = 5/9(T_F - 32)$$

$$T_F = 9/5(T_c) + 32$$

1. The weatherman reports that today will reach a high of 45° F. Your friend from Sweden asks what the temperature will be in degrees Celsius. What value would you report to your friend?

2. Your parents order an oven from England. The temperature dial on the new oven is calibrated in degrees Celsius. If you need to bake a cake at 350° F in the new oven, at what temperature should you set the dial?

3. A German automobile's engine temperature gauge reads in Celsius, not Fahrenheit. The engine temperature should not rise above about 225^oF. What is the corresponding Celsius temperature on this car's gauge?

4. Your grandmother in Ireland sends you her favorite cookie recipe. Her instructions say to bake the cookies at 190.5°C. To what Fahrenheit temperature would you set the oven to bake the cookies?

5. A scientist wishes to generate a chemical reaction in his laboratory. The temperature values in his laboratory manual are given in degrees Celsius. However, his lab thermometers are calibrated in degrees Fahrenheit. If he needs to heat his reactants to 232°C, what temperature will he need to monitor on his lab thermometers?

6. You call a friend in Denmark during the Christmas holidays and say that the temperature in Boston is 15 degrees. He replies that you must enjoy the warm weather. Explain his comment using your knowledge of the Fahrenheit and Celsius scales. To help you get started, fill in this table. What is 15° F on the Celsius scale? What is 15° C on the Fahrenheit scale?

° F	° C
15° F	
	15° C

Kelvin Temperature Scale

For some scientific applications, a third temperature scale is used: the Kelvin scale. On the Kelvin scale, 0 K (degree symbols are not used for Kelvin values) represents **absolute zero**. Absolute zero is equal to $-273^{\circ}C$, or $-459^{\circ}F$. When scientists re conducting research, they often obtain or report their temperature values in Celsius, and other scientists must convert these values into Kelvin for their own use, or vice versa. To convert Celsius values to their kelvin equivalents, you would use the formula:

$$K = T_c + 273$$

To convert kelvin values to Celsius, you would perform the opposite operation; subtract 273 from the Kelvin value to find the Celsius equivalent.

$$T_c = K - 273$$

Although we rarely need to convert between Kelvin and Fahrenheit, you must first convert Fahrenheit to Celsius and then convert Celsius to Kelvin.

1. A gas has a boiling point of $-175^{\circ}C$. At what Kelvin temperature would this gas boil?

2. A chemist notices some silvery liquid on the floor in her lab. She wonders if someone accidentally broke a mercury thermometer, but did not thoroughly clean up the mess. She decides to find out if the silvery stuff is really mercury. From her tests with the substance, she finds out that the melting point for the liquid is 275 K. A reference book says that the melting point for mercury is $-38.87^{\circ}C$. Is this substance mercury? Explain your answer and show all relevant calculations.

Name _____

3. It is August 1ˢᵗ and you are at a Science Camp in Florida. During an outdoor science quiz, you are asked to identify the temperature scale for a thermometer that reports the current temperature as 90. Is this thermometer calibrated for the Kelvin, Fahrenheit, or Celsius temperature scale? Fill in the table below to answer this question.

º F	º C	K
90º F		
	90º C	
		90 K