

Deriving the Conversion Factors for the Fahrenheit and Celsius Scales

A chart showing the three different temperature scales has been provided for you. Use it to complete this activity. Place a straight edge across the Fahrenheit and Celsius scales to read their corresponding values.

1. Complete the following table.

	Fahrenheit	Celsius
T_f	32°	°
T_b	212°	°
$T_b - T_f$	°	°
$\frac{T_b - T_f \text{ Fahrenheit}}{T_b - T_f \text{ Celsius}} =$		

2. Is the Celsius degree the same size as the Fahrenheit degree? _____
3. The Celsius degree is _____ times the size of the Fahrenheit degree.
4. a. Multiply 100°C by the answer to question 3. _____
 b. Does your answer equal the corresponding Fahrenheit temperature (T_b)? _____
 c. What must be added to the answer in a in order for the result to equal 212°F? _____
5. Fill in the blanks.
 - a. _____ °F = $212 \times 100^\circ\text{C} +$ _____ °
 - b. _____ °F = _____ $\times 20^\circ\text{C} +$ _____ °
 - c. _____ °F = _____ $\times 0^\circ\text{C} +$ _____ °
6. Now write the formula for changing a Celsius temperature to Fahrenheit.
 °F = _____ \times °C + _____ °
7. Using the formula you have just derived, solve the following problems.
 - a. _____ °F = 50°C
 - b. _____ °F = -40°C
 - c. _____ °F = 30°C
8. For those who found the above too easy, try this. Use the formula in question 6 to derive the conversion factor for degrees Fahrenheit to degrees Celsius.

Deriving the Conversion Factors for the Celsius and Kelvin Scales

A chart showing the three different temperature scales has been provided for you by your teacher. Use it to complete this activity. Place a straight edge across the Celsius and Kelvin scales to read their corresponding values.

1. Complete the following table and answer the questions that follow it.

	Celsius	Kelvin
T_1	30°	°
T_2	40°	°
$T_2 - T_1$	°	°
$\frac{T_2 - T_1}{10}$	°	°

- a. Is an increase of 10 degrees on the Celsius scale also an increase of 10 degrees on the Kelvin scale? _____
- b. Is the size of one degree on the Celsius scale the same as the size of one degree on the Kelvin scale? _____
2. Complete the following table and answer the question that follows it.

Celsius		Kelvin	
T_3	50°	T_4	°
T_5	80°	T_6	°
$T_4 - T_3 =$		°	
$T_6 - T_5 =$		°	

What number must be added to the Celsius temperature in order to obtain the corresponding Kelvin temperature? _____

3. Complete the following conversion factors.

a. degrees Celsius + _____° = degrees Kelvin

b. degrees Kelvin - _____° = degrees Celsius

4. Using the conversion factors you have just derived, solve the following problems.

a. 22°C = _____°K

d. 273°K = _____°C

b. 83°C = _____°K

e. 100°K = _____°C

c. 100°C = _____°K