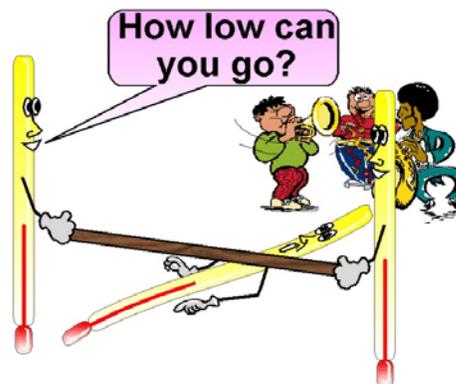


## The Kelvin Scale

We often measure temperatures with the Celsius scale. The Celsius scale can have negative temperatures. This is because it is based on the freezing and boiling points of water. The freezing point of water is arbitrarily assigned the value of  $0^{\circ}\text{C}$  while the boiling point is assigned a value of  $100^{\circ}\text{C}$ . There are 100 equal divisions. This determines the size of the Celsius degree. It is possible to get colder than the freezing point of water. This is why there are negative temperatures in the Celsius scale. The question is, then, how low can temperature go? Lord Kelvin answered this question in the mid 1880s. Using a Celsius thermometer, Kelvin determined that temperatures can go as low as  $-273^{\circ}\text{C}$ , but no lower. This means that the Celsius scale and the Kelvin scale are the same except for their origin. The zero on the Kelvin scale is absolute zero, whereas the zero on the Celsius scale is 273 kelvins ( $273\text{ K}$ ). The relationship between the Kelvin and Celsius temperature is as follows:



**The Temperature Limbo**

$$K = ^{\circ}\text{C} + 273 \text{ and } ^{\circ}\text{C} = K - 273$$

Answer the questions below based on your reading and the equations above.

1. What are the Celsius equivalents for each of the Kelvin temperatures below?

- |                |                |                |
|----------------|----------------|----------------|
| a. 273 K _____ | d. 623 K _____ | g. 500 K _____ |
| b. 373 K _____ | e. 80 K _____  | h. 13 K _____  |
| c. 15 K _____  | f. 0 K _____   | i. 157 K _____ |

2. What are the Kelvin equivalents for each of the Celsius temperatures below?

- |                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| a. $273^{\circ}\text{C}$ _____ | d. $623^{\circ}\text{C}$ _____ | g. $500^{\circ}\text{C}$ _____ |
| b. $373^{\circ}\text{C}$ _____ | e. $80^{\circ}\text{C}$ _____  | h. $13^{\circ}\text{C}$ _____  |
| c. $15^{\circ}\text{C}$ _____  | f. $0^{\circ}\text{C}$ _____   | i. $157^{\circ}\text{C}$ _____ |

3. How does the size of the Kelvin and the Celsius degree compare? Explain. \_\_\_\_\_

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