

Tutorial 1: Units and Measurements

Goal:

- ✓ To understand how to use the metric system.
- ✓ To understand the significance of SI units, and to be able to use SI units to express measurements of mass, length, volume, density and temperature.

Metric System

The metric system is based on the decimal system. It is a common system used for scientific measurements.

<i>Prefix</i>	<i>Symbol</i>	<i>Multiplier</i>
<i>kilo-</i>	<i>k</i>	<i>1000 (10³)</i>
<i>hecto-</i>	<i>h</i>	<i>100 (10²)</i>
<i>deka-</i>	<i>da</i>	<i>10 (10¹)</i>
<i>base unit</i>		
<i>deci-</i>	<i>d</i>	<i>0.1 (10⁻¹)</i>
<i>centi-</i>	<i>c</i>	<i>0.01 (10⁻²)</i>
<i>milli-</i>	<i>m</i>	<i>0.001 (10⁻³)</i>
<i>micro-</i>	<i>μ</i>	<i>0.000 001 (10⁻⁶)</i>

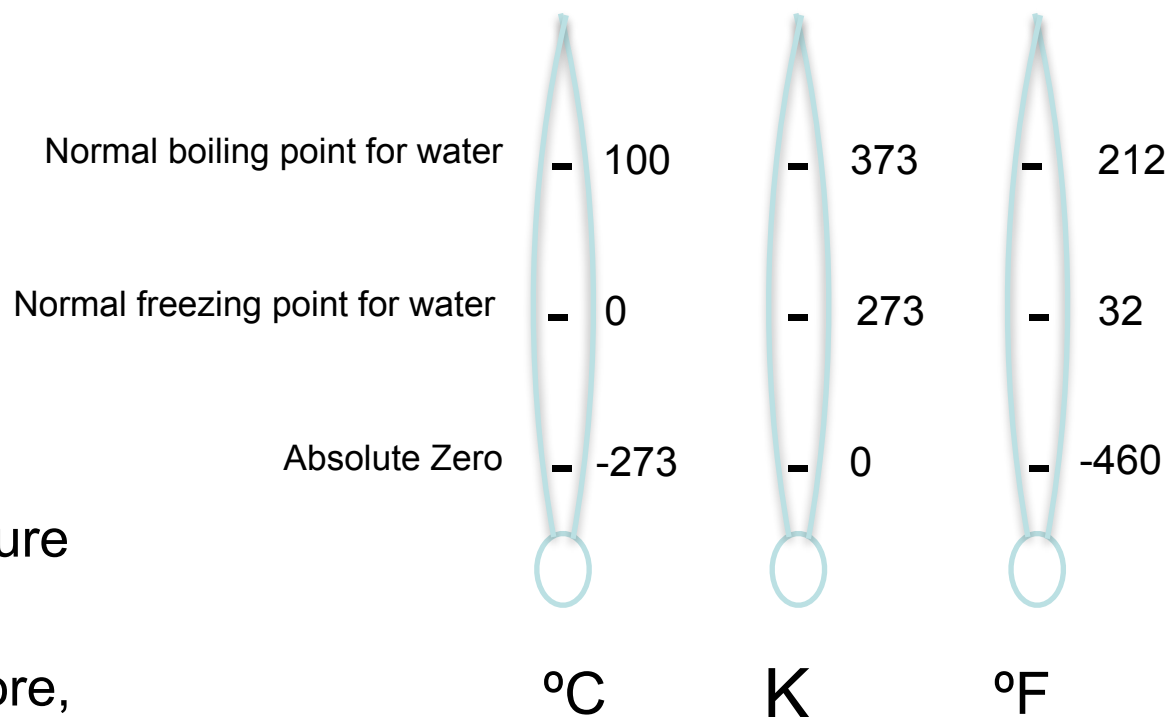
International System of Units (SI Units)

There are seven internationally agreed upon choice of metric units known as SI units. All other units can be derived from these units.

<i>Quantity</i>	<i>SI Unit</i>	<i>Common Units</i>
<i>mass</i>	<i>kg</i>	<i>g, oz, lb</i>
<i>length</i>	<i>m</i>	<i>cm, in, mi</i>
<i>temperature</i>	<i>Kelvin (K)</i>	<i>Celsius (°C), Fahrenheit (°F)</i>
<i>time</i>	<i>s</i>	<i>min, hr</i>
<i>amount of substance</i>	<i>mol</i>	<i>dozen</i>

Temperature

- **Temperature:** The measure of how hot or cold an object is.
- **SI Unit:** Kelvin (K)
- **Common Units:**
Celsius ($^{\circ}\text{C}$)
Fahrenheit ($^{\circ}\text{F}$)
- Most laboratory thermometers will measure $^{\circ}\text{C}$, but many equations require temperature expressed in K. Therefore, converting between temperature in $^{\circ}\text{C}$ and K is important in your chemistry class!



Volume

- **Volume:** Amount of space occupied by a body.
- **SI Derived Unit:** cubic meter (m^3)
- **Common Units:**
 - liters (L)
 - milliliters (mL)
 - cubic centimeters (cm^3)

Density

- **Density:** Amount of mass per unit volume of a substance.
- **SI Derived Units:** kg/m^3
- **Common Units:**
 - g/cm^3
 - g/mL