

Temperature Encyclopedia Article

Temperature

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Temperature

Temperature is a thermodynamic term (i.e., referring to the supply, use, or conversion of energy) referring to the average thermal energy in a system. (Thermal energy, or heat, is a type of kinetic energy, which is due to the rate of vibration of atoms and molecules.) The distribution of temperature within a system determines the direction of any heat flow, which occurs from regions of higher to lower temperature (i.e., from higher to lower thermal density).

Temperature is expressed in terms of units of degrees ($^{\circ}$), designated as a value on one of several scales. On the Fahrenheit (F) scale, the freezing point of pure water (at sea level) has a temperature value of 32°F , while the boiling point occurs at 212°F . The Centigrade (or Celsius) scale is used by most of the world's scientists, and is the recommended unit of temperature in the *International System of Units* (or SI). On the Centigrade scale, water freezes at 0°C and it boils at 100°C . The Kelvin scale is less-well known, being used mostly by physicists. The Kelvin scale sets 0K at "absolute zero;" this is an extremely cold temperature at which no atomic or molecular vibration occurs (this is the coldest temperature that is physically possible).

The various scales for measuring temperature are all inter-convertible, as follows:

- degrees Fahrenheit = $9/5 (^{\circ}\text{C}) + 32$
- degrees Centigrade (or Celsius) = $5/9 (^{\circ}\text{F}) - 32$
- degrees Kelvin = $(^{\circ}\text{Celsius}) + 273.15$
- $1^{\circ}\text{F} = 0.555^{\circ}\text{C} = 0.555\text{ K}$