

Temperature Encyclopedia Article

Temperature

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Temperature is usually defined as the degree of an object's heat energy. The higher the energy level, the hotter the object. When two objects are placed next to each other, heat energy will always travel from the hotter to the colder object. Temperature plays an important role in chemistry, as chemical reactions depend on the temperature of the environment. The rate of reaction generally increases with a temperature increase.

Temperature can have a significant impact on the behavior of substances. For example, at extremely low temperatures, some materials become superfluids, which "escape" out of containers. Other substances, such as mercury, become superconductors. Superconductivity was discovered in 1911, when Heike Kamerlingh Onnes (1853-1926), using liquid helium, cooled mercury to 4K, and discovered that the metal offered no resistance to electricity.

Since our perception of temperature is subjective (terms such as "hot" and "cold" are relative), scientists use thermometers to measure temperature. The accepted thermometer scale for scientific use is the Celsius (formerly called centigrade) scale, developed by the Swedish astronomer Anders Celsius (1701-1744). Celsius divided his scale into 100 degrees, 100 indicating the melting point of ice and 0 indicating the boiling point of water. After Celsius's death, his colleagues at the University of Uppsala reversed the scale, creating the modern form.

While the Celsius scale is widely used by scientists, the SI uses the Kelvin scale to measure temperature. Suggested by William Thomson, Lord Kelvin (1824-1907) in 1848, this is an absolute scale, based on the concept of absolute zero, the lowest possible temperature, when all molecular movement stops. Although absolute zero still remains a purely theoretical concept, scientists working in the field of low-temperature physics have managed to create temperatures low enough to be measured in nanodegrees K. The Kelvin scale uses Celsius units, the main difference being that zero on the Kelvin scale is absolute. On the Kelvin scale, ice melts at 273.15K.

In the United States, temperature is also measured by the Fahrenheit scale, according to which ice melts at 32 degrees and water boils at 212 degrees. Since the Fahrenheit scale uses 180 units (from 32 to 212) for a temperature range covered by 100 Celsius units, it follows that nine Fahrenheit degrees equal five Celsius degrees.