

1.4: The Zeroth Law of Thermodynamics

Temperature is an important property when it comes to measuring energy flow through a system. But how does one use or measure temperature? Fortunately, there is a simple and intuitive relationship which can be used to design a thermometer – a device to be used to measure temperature and temperature changes. The zeroth law of thermodynamics can be stated as follows:

If a system A is in thermal equilibrium with a system B, which is also in thermal equilibrium with system C, then systems A and C share a property called temperature.

This basic principle has been used to define standard temperature scales by the International Committee on Weights and Measures (BIPM) to guide the adoption of the International Practical Temperature Scale of 1990 (Mangum & Furukawa, 1990). IPT-90 is defined by using various physical properties of substances (such as the triple point of water) which occur at very specific temperatures and pressures, and then assigning the measurable values such as the resistance on a standard **platinum resistance thermometer** (Strouse, 2008).

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