**Heat vs. Temperature**



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| **Heat** | **Temperature** |
| ***Do NOT confuse the two - they are linked but NOT the same.***  https://www.cyberphysics.co.uk/graphics/Bulletpoints/Fuzzle1.png**Input of heat** to a system usually results in an **increase of temperature** but NOT where there is a change of state involved - see [latent heat](https://www.cyberphysics.co.uk/topics/heat/latentheat/latentheatexpt.htm)  https://www.cyberphysics.co.uk/graphics/Bulletpoints/Fuzzle1.png**High temperature** of an object does not necessarily mean a lot of heat has been given to it. Heat a thimble of water until it boils and then give the same amount of heat to a bath of water - you won't even detect a change in temperature in the bath of water!  https://www.cyberphysics.co.uk/graphics/Bulletpoints/Fuzzle1.png**How much heat energy is needed** to raise the temperature of 1kg of a substance is called the [**specific heat capacity**](https://www.cyberphysics.co.uk/topics/heat/shc.htm). The SHC helps us compare how easy it is to heat up different substances.  https://www.cyberphysics.co.uk/graphics/Bulletpoints/Fuzzle1.png**Experiments** that investigate heat transfer between substances is called **[calorimetry](https://www.cyberphysics.co.uk/topics/heat/calorimetry.htm)** | |
| Heat is a form of energy. | Temperature is a measure of how hot or cold things are. |
| Difference in temperature makes heat energy move from a hot part to a cold part of an object. | |
| It is measured in joules (J). | It is measured in degrees.  The Celsius and kelvin scales of temperature are used in science but there are others such as centigrade and fahrenheit.  Try the [Dalek temperature scale](https://www.cyberphysics.co.uk/topics/heat/dalek/DalekProblem.htm)! |
|  | Pure ice melts at 0oC or 273K |
|  | Pure water boils at 100oC or 373K at Sea Level - see[here](https://www.cyberphysics.co.uk/topics/heat/pressure_cooker.htm) for what happens at different altitudes |
| It can be measured with a joule-meter or a combination of instruments, the readings of which can be used to perform a calculation to establish the value. | It is measured with a [thermometer](https://www.cyberphysics.co.uk/topics/heat/thermometer.htm). |
|  | There are many different kinds of thermometer, their range, sensitivity and constuction varies widely.  A thermometer can be made from anything which responds to temperature change.  You should know about the [liquid in glass thermometer](https://www.cyberphysics.co.uk/topics/heat/ThermometerLIG.htm) in detail. This uses expansion of liquids with temperature rise. |
| Heat always flows from hot areas to cold areas (See [U-values](https://www.cyberphysics.co.uk/topics/heat/uvalue.htm)) |  |
| The bigger the difference in temperature between two objects the faster the heat will move (See the [pressure cooker](https://www.cyberphysics.co.uk/topics/heat/pressure_cooker.htm)) |  |
| The bigger the area of contact between the two objects the faster the heat transfer will happen |  |
| Heat moves easily through good conductors of heat (such as metals) and very slowly through heat insulators (such as trapped air pockets, wood or plastic). See [double glazing](https://www.cyberphysics.co.uk/topics/heat/heat_travel/double_glazing.htm) and [cavity wall insulation](https://www.cyberphysics.co.uk/topics/heat/heat_travel/cavity_wall.htm). | The temperature of an object made of a good conductor of heat tends to be the same throughout the object but an insulator will be much hotter near the heat source than it is elsewhere. |
| Heat [radiation](https://www.cyberphysics.co.uk/topics/heat/radiation.htm) is absorbed/emitted readily by dark, dull, rough surfaces and less easily by light, shiny, smooth surfaces. | The temperature of dark, dull, rough surfaces will rise quickly if irradiated with [infra red](https://www.cyberphysics.co.uk/topics/heat/radiation.htm) heat radiation and light, shiny, smooth surfaces will not respond as quickly. The hot surfaces will then cool at a similar rate to the way they rose in temperature when the heat source is taken away. |
| There are three methods of [heat transfer](https://www.cyberphysics.co.uk/topics/heat/heatTRF.html): [conduction](https://www.cyberphysics.co.uk/topics/heat/conduction.htm), [convection](https://www.cyberphysics.co.uk/topics/heat/convection.htm) and [radiation](https://www.cyberphysics.co.uk/topics/heat/radiation.htm) | As temperature rises an object usually [expands](https://www.cyberphysics.co.uk/topics/heat/expansion.htm). Click [here](https://www.cyberphysics.co.uk/topics/heat/expansion_q.htm) for a question sheet on expansion. |