

Temperature and Heat

Often, we confuse heat with temperature. However, the two are very different concepts. Here, we'll not only discuss with you how the two are different from each other but will also help you understand the relation between the two.

Heat

We may define [heat](#) as a form of energy. This energy can lead to an increase or decrease in the internal energy of an object or body where the body remains static and no external [work](#) is done either on or by the body.

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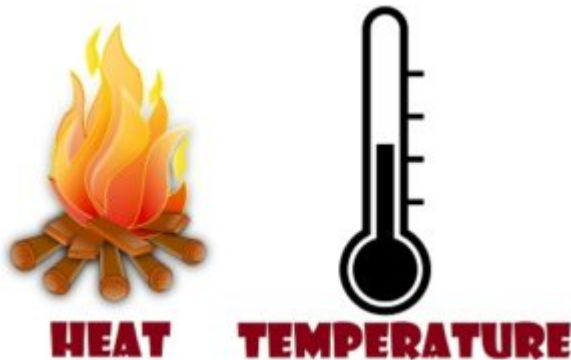
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- [Change of State](#)
- [Heat Transfer](#)
- [Ideal Gas Equation and Absolute Temperature](#)
- [Newton's Law of Cooling](#)
- [Specific Heat Capacity](#)
- [Thermal Expansion](#)

Temperature

We have already understood that heat is the form of energy that leads to an increase or decrease in the internal energy of the body. This internal [energy](#) is also known as temperature. In other words, the

temperature is a [measurement](#) by which we may measure the degree of hotness or coolness present in a body.

Temperature is measured in degrees. The measuring unit for temperature in Celsius and Fahrenheit. However, these measures are used in your daily life. For scientific measurement, we use the Kelvin [scale](#).



(Source: keydifferences)

Let us now find out the [equation](#) for the three measurements.

- $^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$
- $^{\circ}\text{C} = (9/5)(^{\circ}\text{F} - 32)$
- $\text{K} = \text{C} + 273^{\circ}$

What is a Clinical Thermometer? How is it Different from a Laboratory Thermometer?

A clinical thermometer is the one which we use to measure our body temperature. The thermometer which you normally find at your home or at a doctor's clinic is a clinical thermometer. The clinical thermometer is a long narrow tube made of glass. There is a silver

looking bulb attached at the end of it. This bulb contains mercury, thereby making it look silver.

When this temperature is exposed to heat, the mercury in the bulb rises and depending upon the heat of the object points to the small numbers etched on the glass tube, indicating the temperature. One can also use the clinical thermometer to measure hot [water](#). A laboratory thermometer looks pretty much like the clinical thermometer, which has a long narrow uniform glass tube with mercury in it, however, the temperature range of a clinical thermometer ranges from 35 degrees to 42 degrees Celsius.

On the other hand, the temperature range of a laboratory thermometer ranges from -10 degrees to 110 degrees Celsius. We use a clinical thermometer to measure the temperature of a human body, however, we cannot use laboratory thermometer to measure human body temperature.

While using a clinical thermometer we have the liberty to tilt it as per our convenience. But a laboratory thermometer has to be kept upright if we need to get a proper reading. The range of a laboratory thermometer is far wider than clinical one and therefore it has to be used with precision.

Let us learn more about [Conductors and Insulators](#)

What is Conduction?

Conduction is a process of [transferring heat](#) from one end of the object to another. Generally, this process transfers heat from the hotter end to the colder end.

Conduction is ideally only possible in the solid form. It is easier to conduct heat in the solid object because the **atomic** particles are tightly packed and in such a situation transference of heat from the hotter end of the object to the colder end can be done conveniently.

Conductors

We know that conduction is the transfer of heat from higher temperature to low temperature of an object. By that definition, a conductor is the means through which the process of conduction can take place. There are good conductors of heat and there are bad conductors of heat.

Those **materials** through which heat can easily pass are called good conductors of heat. Some example of good conductors of heat may be iron, aluminium or copper. You will notice that whenever you expose one end of these materials to the heat, the rest of the metal quickly heats up.

For example, you can try this experiment at home itself. Take a steel or aluminium spatula and expose it to the heat in your gas burner in the kitchen. You will notice that after a point of time the handle end of the spatula will start heating up and you will not be able to hold it for very long.

Insulators

Bad conductors of heat are those materials which do not permit heat to transfer from one end to another end very easily. For example, wood or plastic. It takes very long for heat to be transferred from one

end of a wooden or plastic object to another. These bad conductors of heat are also known as insulators.

Let us take another example, repeating the same experiment as mentioned above, only this time take a wooden spatula. When you expose its one end to heat, you will notice that it takes very long for the other end to heat up. And even when it does, it is mild enough for you to keep holding the spatula with your bare hands. This proves that wood is a poor or bad conductor of heat.

This happens because the molecules in the wood are held strongly as a result of intermolecular force and thus these molecules fail to travel to the source of heat, thus convection cannot happen in the woods.

Solved Examples for You

Question: The quantity of heat energy required to change the temperature of one gram of water by one degree Celsius is known as

- A. 1 Joule
- B. One Kilojoule
- C. 1 Calorie
- D. 1 Ampere

Solution: Option C – 1 Calorie. The amount of heat required to raise the temperature of one gram of water through 1° (from 14.5°C to 15.5°C), is called one calorie.