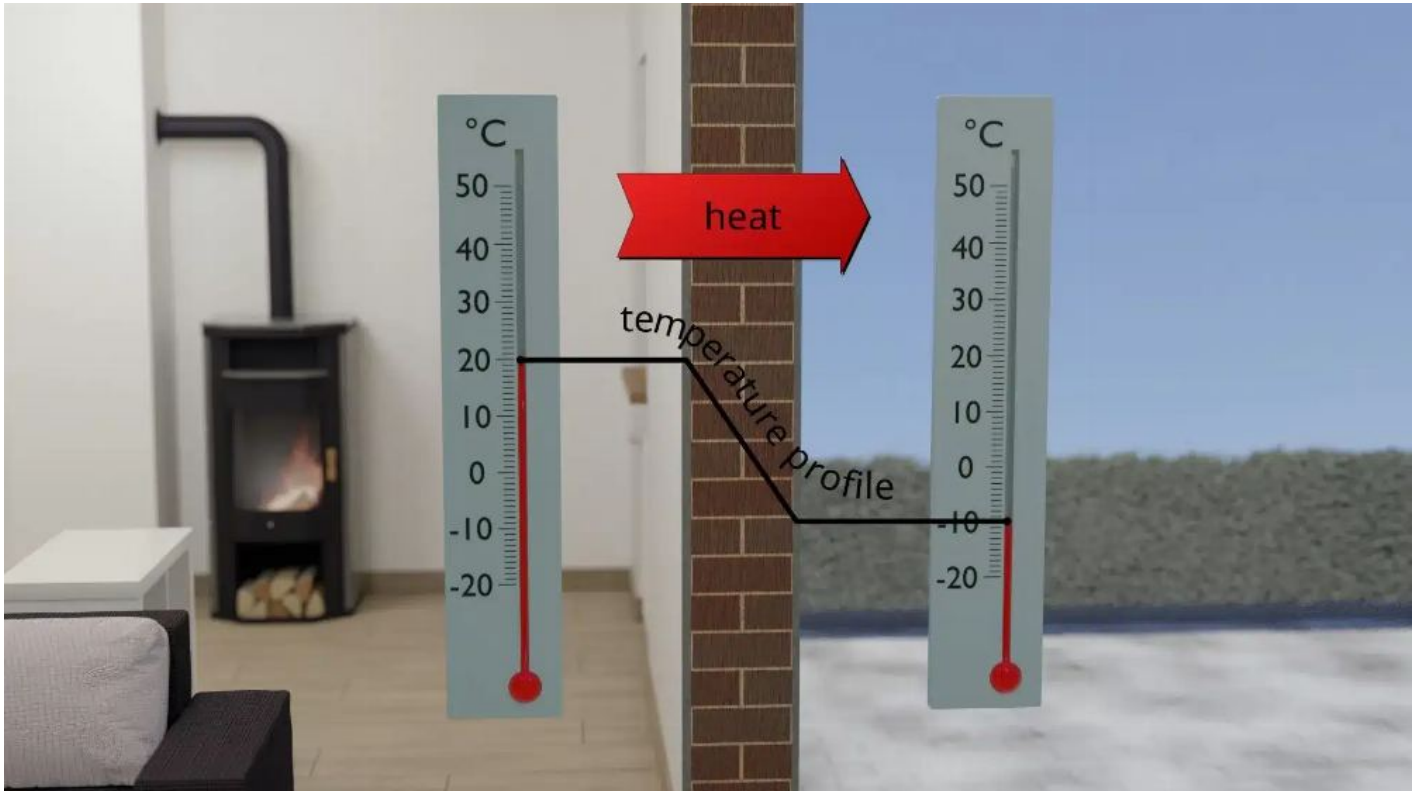


What is Fourier's Law?

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About Fourier's Law

- Fourier's law, or Law of Heat Conduction, describes how heat is transferred, or conducted, through solid materials.
- As molecules vibrate and electrons shuttle about, the heat diffuses from the hotter end of an object to the colder end.
- It states that the rate of heat conduction through a plane layer is proportional to the temperature gradient across the layer and the heat transfer area of the layer.
- Basically, it is an empirical relation between the rate of heat conduction, heat transfer, and temperature gradient in the direction of heat flow.
- Formula: $q = -k \nabla T$, where,
 - q is the heat flux, which is expressed as energy per unit area per unit time.
 - k is the heat conductivity coefficient (thermal conductivity). The dimension is area per unit time, so typical units for expressing it would be m^2/s .
 - ∇T is the temperature gradient (K/m).
- The thermal conductivity of the material (k) is also known as the proportionality constant that is obtained in the formula. A high value of k denotes that the material is a good thermal conductor, and easily transfers

energy through it.

What is Conduction?

- Conduction is one of the three main ways that heat energy moves from place to place. The other two ways heat moves around are radiation and convection.
 - Conduction is the process by which heat energy is transmitted through collisions between neighboring atoms or molecules.
 - Conduction occurs more readily in solids and liquids, where the particles are closer together, than in gases, where particles are further apart.
 - Anything that involves direct physical contact to transfer heat is an example of conduction.
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Q1) What is convection?

Convection is a mode of heat transfer that occurs when heat is carried through a fluid (liquid or gas) due to its movement. In free convection, air or water moves away from the heated body as the warm air or water rises and is replaced by a cooler parcel of air or water. In forced convection, air or water is forcibly moved across the body surface (such as in wind or wind-generated water currents) and efficiently removes heat from the body.

Source: [Startling Exception Discovered to 200-Year-Old Law of Physics](#)

Source: <https://vajiramandravi.com/current-affairs/fouriers-law/>

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