

## 8.2 Heat Transfer

**Heat transfer** is the movement of heat from one place to another.

There are three modes of heat transfer:

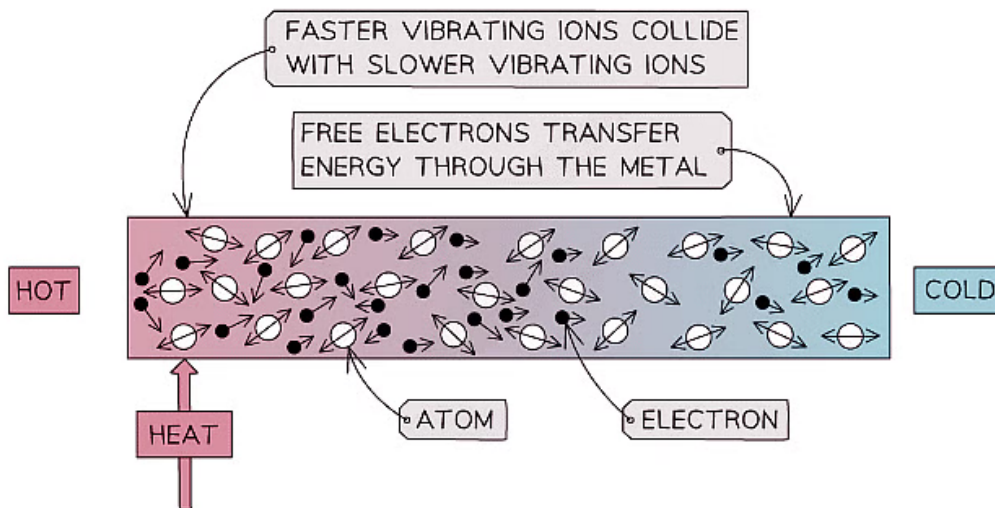
- Conduction.
- Convection.
- Radiation.

### Conduction

**Conduction** is the movement of heat through matter from a region at a higher temperature to a region with a lower temperature without the movement of the matter as a whole.

**Mechanism of heat transfer by conduction:**

- In metals, there are delocalized electrons, whereby the electrons of a region at a higher temperature vibrate and transfer their heat to the electrons in the colder region. This process makes the particles vibrate vigorously making them transfer heat from the higher temperature region to a cooler temperature region and the delocalized electrons gain heat therefore making metals a good conductor of heat.

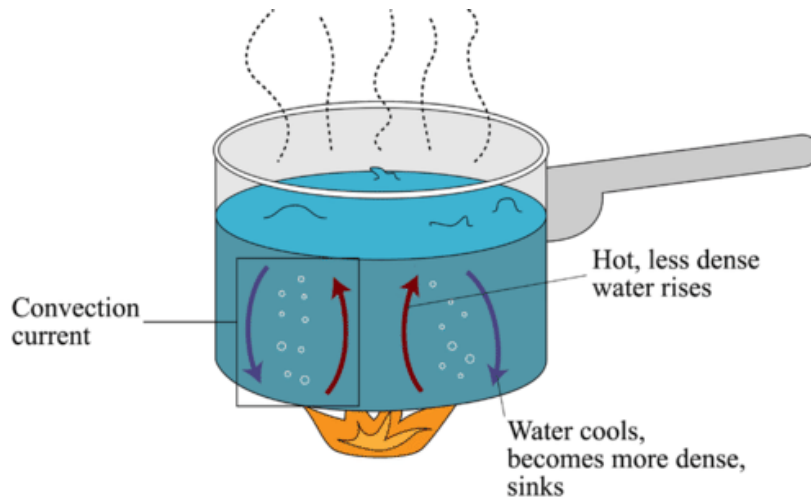


Credit: EduRev.in

### Convection

**Convection** is the heat transfer through fluid i.e. liquids and gases from a region at high temperatures to a region at low temperatures by movement of the fluid itself.

### Convection Current in Fluids



Credit: CK12-Foundation

The water molecules at the bottom heat up and gain more heat energy. They become less dense and rise up. The dense molecules come at the bottom getting heated up and they get less dense and the process continues until the whole liquid boils.

### Natural Convection Currents

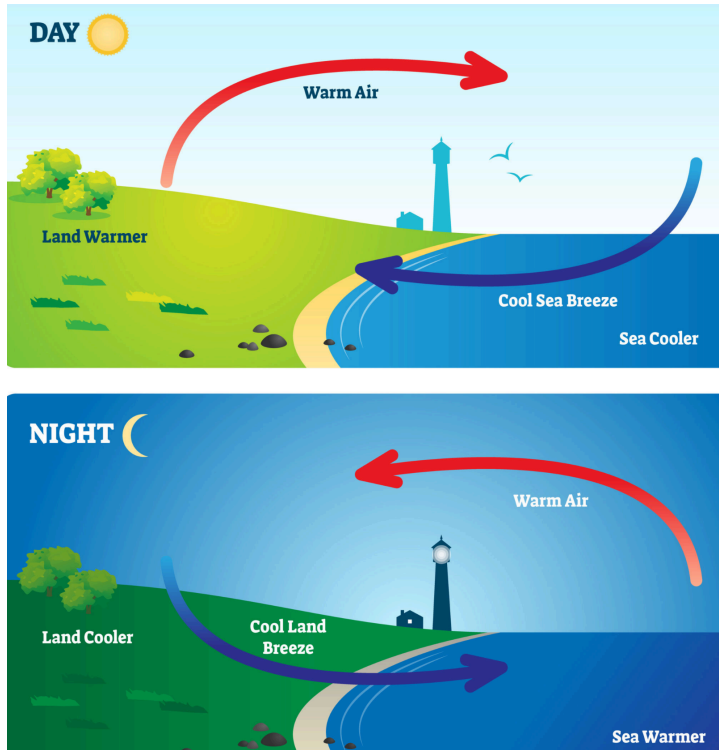
- Land Breeze
- Sea Breeze

#### Sea breeze

During the day, both the land and the sea are heated at the same time, they are heated by the sun, the land being a better absorber of heat than the sea. The warm less dense air above the land rises up. The more dense cool air above the sea flows to the land to occupy the position below the less dense air. The less dense air also gets heated and the process continues.

#### Land Breeze

Land breeze takes place at night. The land is a better emitter of heat than the sea. At night, land becomes very colder than the sea, the warm air on top of the sea rises up and cold air from the land close to the sea occupies the space blowing the less dense air above the sea. The process continues the same way.



Credit: Science-sparks.com

## Radiation

**Radiation** is the movement of heat from a region at a higher temperature to a region at a lower temperature through a vacuum.

**E.g.** How heat from the sun reaches us on the Earth. Buildings in hot countries are always painted white to reflect back the radiation (heat) hence keeping the building cool.

