



# Heat transfer-


**It is common phenomenon and you all must have observed that when one end of utensil is heated, soon the other end also becomes hot.**

## Heating of Pan




Touching other end of Pan

Heat Transferred to other end




**You also must have observed that while boiling water we heat the utensil only at bottom but the water at the top also becomes hot. Have you ever wondered why does this happen??**





**Another phenomenon that may make you wonder is the transmission of heat from the sun to the earth. It is a well-known fact that sun is far away from earth but still how can the heat travel such a huge distance and reach us.**






**These are all due to some phenomenon that transfers the heat from one end to the other. Heat is always transferred from the hotter end to the colder end. There are three modes through which the heat transfers from one end to the other, namely conduction, convection and radiation.**



# Conduction-

- **The process of transferring of heat from the hotter end to the colder end of an object is known as conduction. Whenever a utensil is kept on flame it becomes hot and the heat travels from the base of the utensil to its handle.**




**This is due to the transfer of heat from the hotter base of the utensil to cold handle. When this pan is removed from the flame and kept aside soon the utensil cools down. This is again due to transfer of heat from the hot utensil to cold surrounding.**





**Transfer of Heat to Handle**




**Heating the base of Pan**

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- **Generally, the heat is transferred in solids by the process of conduction. It is the most important mode of heat transfer in solids than in liquids and gases.**
  - **But it is not necessary that all solids will conduct heat because there are many solids that are poor conductors of heat.**

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- Materials that allow heat to pass through them easily are known as conductors of heat. For instance, all metals like aluminium, iron and copper are conductors of heat.
  - Whereas those materials which do not allow heat to pass through them easily are known as poor conductors of heat. [For instance, plastic, wood, water and air. They are also termed as insulators.]



**Therefore the concept of conduction is applicable to solids and that to only those solids which are good conductors of heat.**

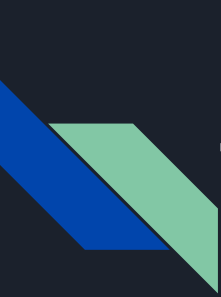


**There is another term called thermal conductivity which refers to the ability of conducting heat. It is maximum in solids that are good conductors than liquids which in turn has greater thermal conductivity than gases.**

**i.e.**


**solids > liquids > gases**





Here temperature at side A is  $T_A$  and the temperature at side B is  $T_B$ .


- There is a temperature difference as  $T_A > T_B$ .
- So in this heat transfer will take place from A to B because we already learnt that heat transfers from the higher temperature to lower temperature.
- Heat From side A starts losing heat and side B will gain heat.

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- So temperature at side A will decrease and that on side B will increase because it is gaining heat. But after sometime time the temperature will become equal on both the sides.
  - This situation is called steady state and after this no transfer of heat will take place because conduction comes into act only if there is a temperature difference.





*PLENARY*



**Q. To keep her soup warm, Paheli wrapped the container in which it was kept with a woollen cloth. Can she apply the same method to keep a glass of cold drink cool? Give reason for your answer.**

**A. Yes, she can apply the same method to keep a glass of cold drink cool because wool is a thermal insulator, and it cannot allow heat to pass through it.**



# ASSESSMENT



**Q. Conduction is the method of transfer of heat in**

**(a) liquids**

~~**(b) solids**~~

**(c) gases**

**(d) vacuum**