

Conduction and Convection

1- Conduction

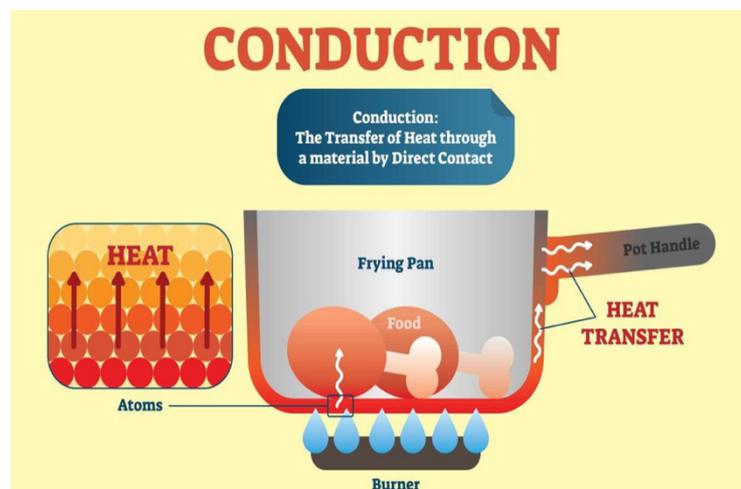
➤ **Definition:**

Conduction is the process where vibrating particles transfer energy to their neighbouring particles.

- Conduction happens mainly in solids
- when you heat an object the movement of particles get higher. In result the more collision of particle cause the transfer of energy from hotter place to the colder one.
- Energy is transferred in the form of Thermal energy
- Thermal conductivity is the measure of how quickly energy is transferred through a material.
- Material with higher thermal conductivity transfer energy between particles quickly.



1. **Heating a Pan on a Stove:** When you put a pan on a heated stove, heat from the stove transfers to the pan's surface, which helps you cook your food. This is a classic example of conduction, in which heat moves from a hotter object (the stove burner) to a cooler one (the pan)



2. **Ironing Clothes:** Ironing clothes involves conduction. The iron is heated and then applied to the wrinkled fabric. The heat from the iron transfers to the clothes, smoothing out wrinkles. This heat transfer from the hot iron to the cooler clothes directly results from conduction.



**CONDUCTION EXAMPLES IN
EVERYDAY LIFE**



2- Convection

► **Definition:**

Convection is where energetic particles move away from hotter region to colder region.

- It only happens in liquid and gaseous phase.
- Energy is transferred by heating from thermal energy store.

P1: Energy

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- ▶ unlike solids, particles of gas and liquid also move faster by heating, space between particles also increases. Due to space between particles density of liquid and gas decreases

Heating \rightarrow particles move faster \rightarrow spaces b/w particles increase \rightarrow Density decrease

- ▶ liquid or gaseous particle move from hotter and less denser region to cooler and more denser region.

- ▶ **Formulas**

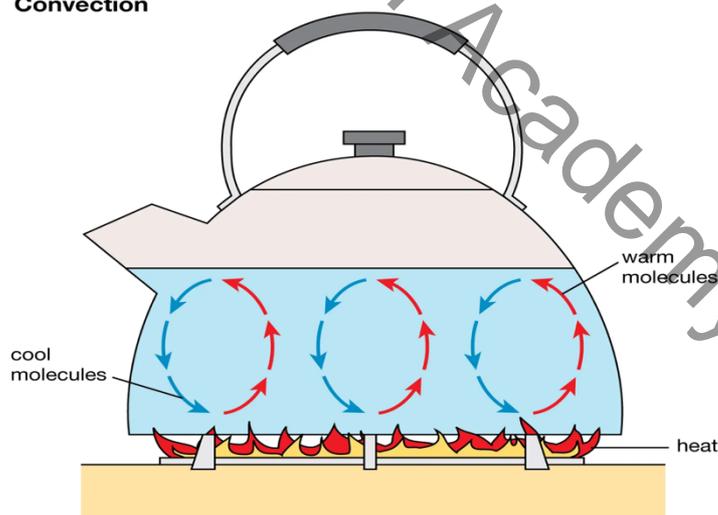
a) Density = mass/ volume

b) mass= Density * Volume

c) Volume= mass/ Density



Convection



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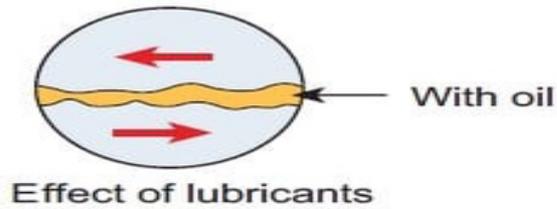
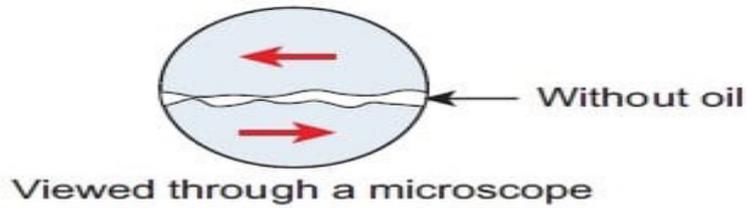
3- Reducing unwanted Energy Transfer

Few ways to reduce home temperature and reducing heating Cost

- I. Lubrication
- II. Insulation

I. Lubrication:

- When something move, there is at least one force is present between 2 surfaces called Friction force.
- Friction force between 2 surfaces cause heat
- To reduce this friction force we use lubricants. These lubricants may be liquid (oil) form.

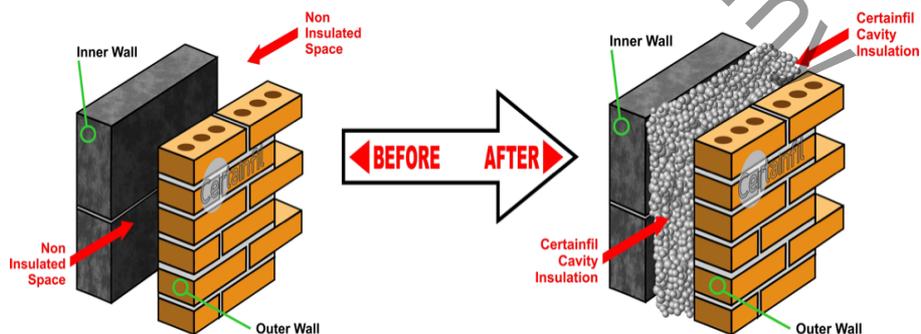


Reducing kinetic friction using lubricant

II- Insulation:

- Insulation reduces the rate of energy transfer by heating
- Thicker walls with low thermal conductivity helps to reduce the rate of energy transfer by heating
- Use Thermal insulation here is the some examples

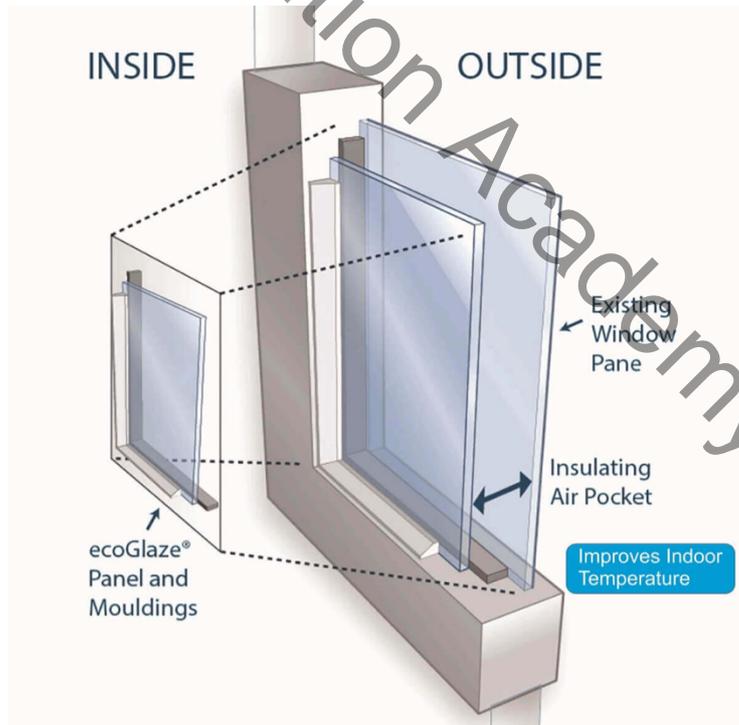
a) **Cavity wall insulation:** cavity wall made up of inner and outer walls with air gap in the middle. These air gap reducing energy transfer by conduction. if these air gaps filled with foam helps to reduce energy transfer by convection.



b) loft insulation: can be laid across the floor and ceiling. Fibreglass wool are mostly used as loft insulation which helps to reduce the energy transfer by conduction and convection.



c) Double glazed window: work same as cavity wall.



d) **Draught excluder:** across the doors and windows helps to reduce energy transfer by convection.



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