

SUBJECT NAME : Heat Transfer

SUBJECT CODE : 3151909

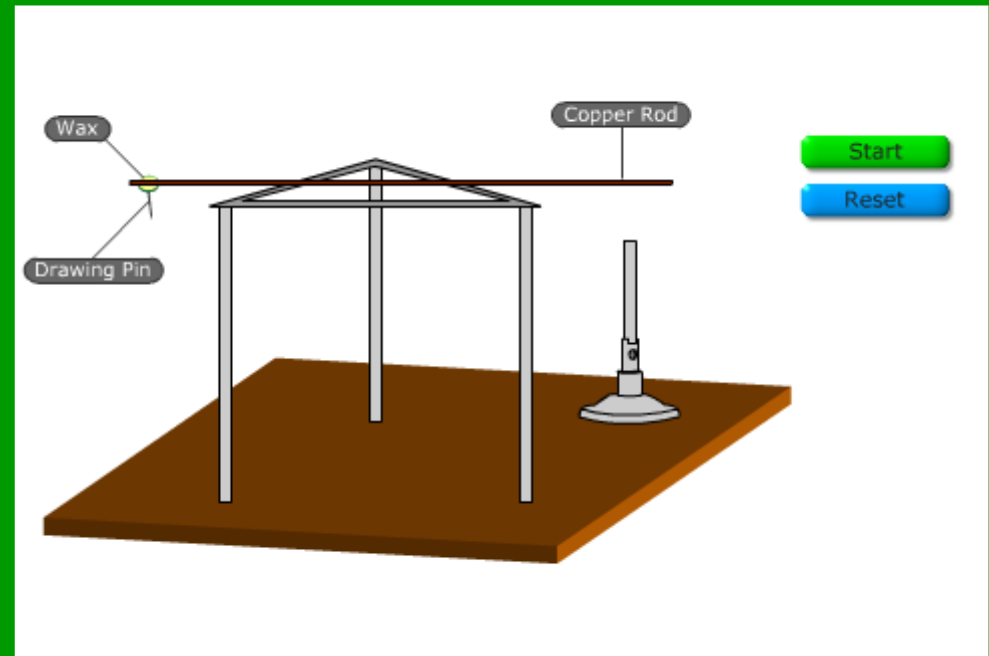
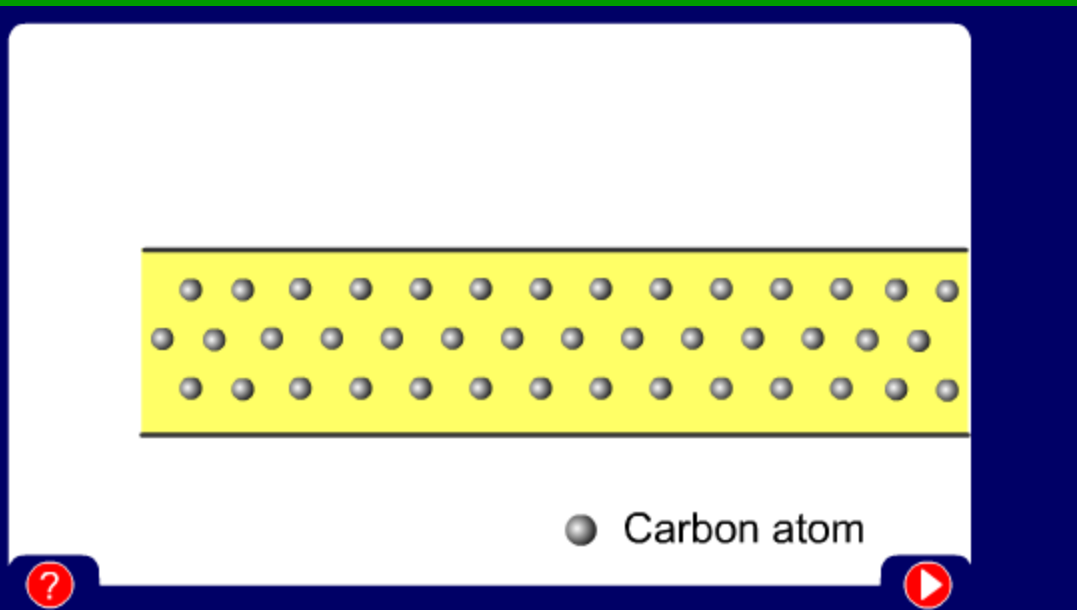
Topic: Difference between Conduction and Convection

Prof. Krunal Khiraiya

Conduction

- **Conduction** is the flow of heat in a substance due to exchange of energy between Molecules having more energy and molecules having less energy
- Conduction is the transfer of heat from **one part of substance to another part of the same substance** , or **from one substance to another substance in physical contact with it, without considerable** displacement of molecules forming the substance

Example of Conduction



Mechanism in Heat Conduction

1. Lattice vibration (Solid)

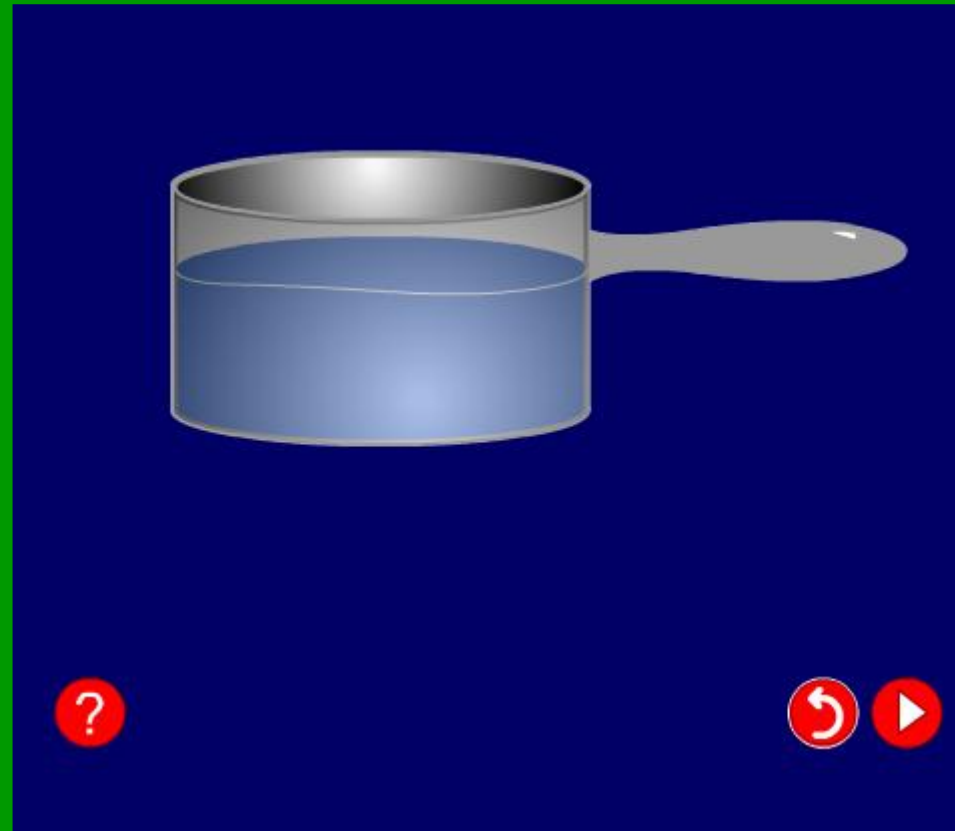
2. Motion of Free Electron (Metal)

- In liquid and gases degree of freedom is more compare to solid
- Heat transfer due to molecule collision in liquid and gas is called heat conduction but fluid particles must be at rest at microscopic view
- It is the micro from of heat transfer.
- But liquid and gas made to move at macroscopic view

Convection

- The Transfer of Energy from one region to another due to macroscopic motion in fluid, addition to the energy transfer by conduction is called heat transfer by convection
- Convection refers to the mode of heat transfer in which the heat transported by the moving fluid particles
- **Convection = conduction + mixing**

Mechanism in Heat Convection



Types of convection

- Forced convection
 - Fluid motion caused by external Agency
- Natural Convection
 - Fluid motion occurs due to density variation caused by Temperature Difference

Radiation

- All physical matter emits thermal radiation in the form of electromagnetic waves because of vibrational and rotational movements of molecules and atoms which make up the matter
1. Rate of emission increases with temperature level
 2. No material medium required for energy transfer

DIFFERENCE BETWEEN THREE MODES OF HEAT TRANSFER

SR. NO.	CONDUCTION	CONVECTION	RADIATION
1	NO RELATIVE MOTION OF PARTICLES OF A BODY	THERE IS RELATIVE MOTION OF PARTICLES OF THE FLUID	NOT SUCH CONDUCTION AND CONVECTION
2	NO DIFFERENCE IN DENSITY OF THE PARTICLES	THERE IS DIFFERENCE IN DENSITY OF THE PARTICLES	NOT SUCH CONDUCTION AND CONVECTION
3	REQUIRED MATERIAL MEDIUM	REQUIRED MATERIAL MEDIUM	NO MATERIAL MEDIUM REQUIRED, EVEN IT CAN EXIT IN VACCUM

