

	Temperature	Heat
Definition	how hot/cold objects are	form of energy transferred from one region to another, due to a diff in temperature
SI unit	Kelvin (K)	Joule (J)
Other unit	degree Celsius (°C)	kilowatt hour (kWh)

→ ALWAYS flow from a region of higher temperature to a region of lower temperature

Heat absorbed, Temp ↑
Heat emitted, Temp ↓

All solids, liquid and gas **expand** when heated
contract when cooled

① volume

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

volume ↑, density decrease
volume ↓, density increase

② density

Energy transfer!

Conduction

- transfer of heat energy through a substance without any flow of the substance
- * transferred within a medium from one particle to another through vibrations and collisions of the particles

good conductor
metals

poor conductor
non-metals
liquid
gas.

- Factors that affect:
- ① free electrons
 - ② how close particles are from one another.

Applications

- ① metal pan, wooden handle
- ② wool clothes = trap air
- ③ double-glazed window

Convection

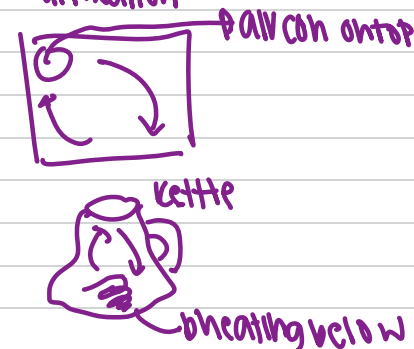
transfer of energy from one place to another by the physical movement of a medium

- ① heat water, water expands becomes less dense and rises
- ② cooler water, denser starts to sink and gets heated
- ③ rise and sink continues until convection current formed.



- ① air particles heated, expand, become less dense and rise
- ② smoke particles denser, sink and replace to get heated.
- ③ ∴ smoke goes from right to left chimney.

Application



only happens in liquid or gas.

Radiation

- transfer of energy from a hotter body to a cooler body without the need for a medium (e.g. sun to us) → Temp ↓
- radiation can be absorbed or reflected or emitted
- ① greenhouse effect (trap heat to support life but if too much = global warming :))

Factors affecting radiation

- ① Temp, if ↑, emit more
 - ② surface area, if ↑, emit more, absorb more
 - ③ black & rough vs white & smooth
- good emit and absorb vs poor emit and absorb

Applications



solar panels

white coloured buildings (in warm countries)

silver pots & kettles