

Heat Transfer

1/5 IB

Heat moves from high temp to lower temp by

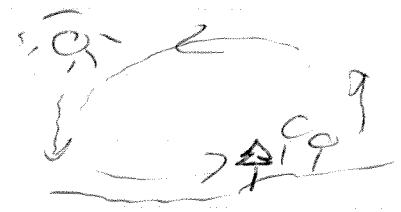
Conduction

Particles in high-temp body vibrate faster & collide w/ less energetic molecules located in the cooler part.

Ex. Coffee pot on stove

Convection

Heat is carried away by convection
cool air descends, warm air rises



Both require a medium

Furnace in house - water heated through conduction, sent through pipes/vents and heats house through convection

Radiation Energy transfer by electromagnetic waves

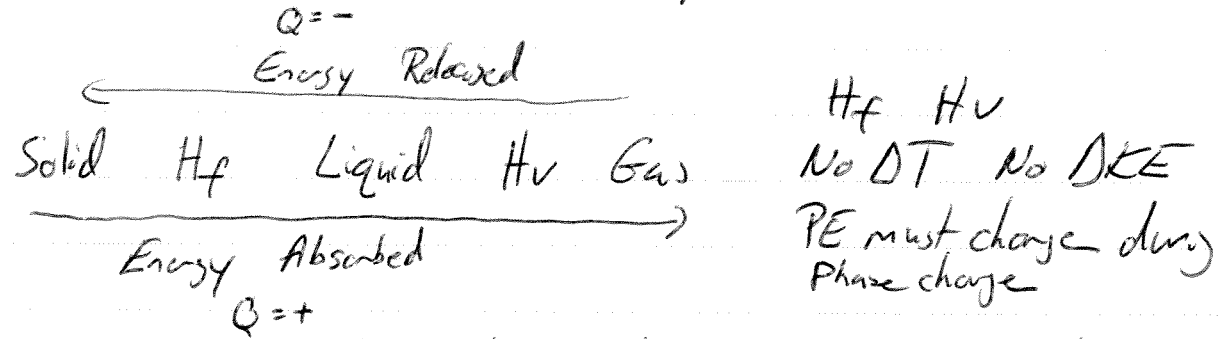


Convection above (hot air)
Radiation heats horizontally

Black clothes vs white clothes

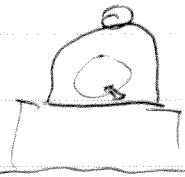
Phase Change H_f/H_v

During a phase change temp. remains constant until all substance has been converted from 1 phase to another



Evaporation Change from liquid to gas at any temp. (Surface liq. mol. have enough H_v to jump off surface)
Boiling Occurs at a specific temp. when vapor pressure of liquid and surrounding are same.

Demos:



Bubble Expands Why

$$\downarrow P \rightarrow \uparrow V$$

$$\frac{PV}{T} = \frac{PV}{T_{\text{const}}}$$



Ice

Soda Can (Put a little bit of water in)

$$\downarrow \frac{PV}{T} = \text{const} \quad P \text{ at STP}$$

$$\downarrow T \quad \downarrow T \Rightarrow \downarrow V$$

Why can crushes



Why does water boil @ room temp
 $\downarrow P \rightarrow \downarrow T$

$$\downarrow \frac{PV}{T} = \text{const.} \quad V \text{ const}$$

$$\downarrow T$$

Go over Web Assign

Piston
 $\uparrow V$



$$\uparrow V \rightarrow \uparrow T \rightarrow \uparrow KE \rightarrow \uparrow P \rightarrow \downarrow V$$

$$KE = \frac{1}{2} m v^2$$

Specific Heat - Num of Joules that must be added to raise 1kg 1°C

Highest Thermal Conductivity \rightarrow water smallest specific heat