

# LO4

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## Convection

- Heat transfer by fluid
- Air, water, etc
- Not usually solids
- Vertical;
- Rising of hot air and sinking of cold air
- Uneven heating and cooling of earth's surface
- Cold air is denser
- Thermals are pockets of warmer air
- Rising bubble of air

## Radiation

- Doesn't require the space between being heated
- Travels as EM waves (properties of electricity and magnetism)
- Travels at speed of light in a vacuum
- Light bends as it slows down
- Measured by frequency and wavelength
- Smaller wavelengths have more energy per wave/photon
- 1 micrometer =  $0.000001 \text{ m} = 10^{-6} \text{ m}$
- Smaller wavelengths at higher temperatures (usually)
- Everything with a temperature above absolute 0 emit radiation
- The wavelengths of radiation emitted by objects depends on the object's temperature. The higher the object's temperature, the shorter the wavelengths emitted
- Objects with a high temperature emit radiation at a greater rate or intensity than objects with a lower temperature

## Phase Change

- Hidden transfer
- Temperature is the measure of the average speed of atoms and molecules
- Heat is energy in the process being transferred from one object to another because of the temperature difference between them
- Latent heat (hidden heat)
- Sensible heat (heat we feel)
- Liquid water to water vapor

- More energetic molecules escape from a droplet of water, decreasing avg molecular motion
- Energy is needed from other sources
- Cooling process
- latent heat
- Water vapor to liquid water
- Energy will reappear as sensible heat
- Warming process
- Sublimation
- Deposition
- Water vapor to ice
- Colder to warmer phase: cools environment
- Warmer to colder phase: warms environment

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