Heat Energy

The sun does not shine for a few trees and flowers, but for the wide world's joy.

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http://www.science-class.net/8th_Notes/8th_Notes_MainPage.htm

HEAT

- Thermal energy
- The energy of moving molecules
- States (phases) of matter
  - Solids
  - Liquids
  - Gases
  - Phase changes

- The **kinetic theory of matter**:
  - atoms and molecules (particles) are in constant motion
  - the higher the temperature - the higher the speed
    - increased heat energy make atoms and molecules move faster

- **Gases** have:
  - more kinetic energy - higher temperatures - more heat
  - particles that move quickly and randomly
  - no fixed shape or volume

- **Liquids** have:
  - less kinetic energy - lower temperatures - less heat
  - particles move quickly
  - a fixed volume, but take the shape of containers

- **Solids** have:
  - the least kinetic energy - lowest temperatures - less heat
  - particles vibrate in place
  - a fixed volume and shape
• **Phase changes** (changes of state) require a gain or loss of energy to occur.
  ○ gas to liquid
    ▪ condensation
    ▪ energy loss
    ▪ endothermic
  ○ liquid to solid
    ▪ freezing
    ▪ energy loss
    ▪ endothermic
  ○ solid to liquid
    ▪ melting
    ▪ energy gain
    ▪ exothermic
  ○ liquid to gas
    ▪ evaporation
    ▪ energy gain
    ▪ exothermic
  ○ gas to solid
    ▪ crystalization (snowflakes)
    ▪ energy loss
    ▪ endothermic
  ○ solid to gas
    ▪ sublimation
    ▪ energy gain
    ▪ exothermic

• The transfer of thermal energy between objects is called **heat**

• **Thermal energy** (heat energy) moves from one place to another because of the difference in temperature between them. The energy transfer is always from hot to cold.

• Heat can be transferred (moved) three ways:
  
  **Conduction**
  ▪ The movement of heat from one molecule to another
  ▪ Needs direct contact
  ▪ *Heat flows from a higher-temperature area to a lower-temperature one*

  **Convection**
  ▪ The movement heat by currents in liquids or gases
  ▪ circulation through a fluid
  ▪ cool air sinks down, while warmer air rises to the top

  **Radiation**
  ▪ Energy movement through electromagnetic waves
  ▪ A way in which energy is transferred from place to place in the form of a wave

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