



# Heat Study Guide



Name \_\_\_\_\_ Test Date: \_\_\_\_\_

## Heat Unit Terms

**heat**-the movement of thermal energy from warmer objects to cooler objects

**thermal energy**-the energy created by moving particles in matter

**friction**-the force that happens when two objects rub against each other

**solar energy**-heat energy from the sun

**conductor**-any material that heat easily passes through

**insulator**-any material that heat does not easily pass through

**temperature**-a. the measure of how hot or cold an object is b. the measure of how much heat energy an object has

**conduction**-the process that allows heat energy to transfer between two solids that are touching

**convection**-the process through which heat energy moves through liquids and gases

**radiation**-the process through which heat energy moves through waves between objects that are not touching

**advection**-the process through which heat moves in a horizontal direction

**thermometer**-the instrument that is used to measure an object's temperature

**degrees**-unit of temperature

## What are the sources of heat energy (ways heat energy is produced?)



The sun (solar energy)



Friction-rubbing objects together



Motion-kinetic energy



Mixing chemicals/chemical reaction and/or change



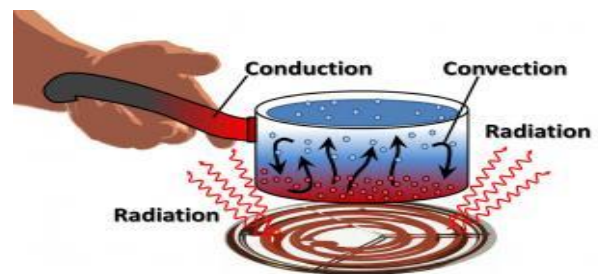
electricity



Fire or burning fuels or objects

## How does heat energy travel or transfer from one object to the next?

Heat energy travels from warmer objects to cooler objects through convection, conduction or radiation.



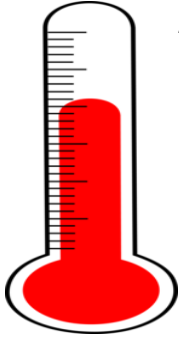
Heat energy travels in a circular path during **convection**. This is how liquids and gases are heated. (i.e.-boiling water or soup)

Heat energy travels from one object to another when they touch during **conduction**. (i.e. -your hand touching a hot stove)

**Radiation** allows heat energy to travel in waves between objects that are not touching. (i.e.-solar energy)

**Advection** allows heat energy to travel in a horizontal path (i.e.-wind blowing heat energy)

## How does a thermometer work to measure temperature?



A thermometer is the instrument used to measure temperature. As the temperature rises (gets hotter or goes up), the liquid inside the thermometer expands and moves up the tube. As the temperature decreases (gets colder or goes down), the liquid inside the thermometer contracts and moves down the tube.

### Here are some temperatures to remember:

98.6°F or 38°C-average normal body temperature      212°F or 100°C-water boils  
32°F or 0°C-water freezes  
F means Fahrenheit.      C means Celsius.

## How do molecules affect the flow of heat energy?

The closer molecules are together, the slower heat moves through them. The molecules of solids are close together. Therefore, heat moves slower through solids than liquids and gases. Molecules are a little farther apart in liquids. So, heat energy will travel through liquids faster than solids. However, heat energy will not travel through liquids as fast as it will travel through gases. The molecules in gases are spread far apart. This allows heat to travel through them quickly.

The speed of molecules affects the flow of heat energy as well. Colder objects have slower molecules and do not produce much heat. Molecules are colder in solids than the other states of matter. This is another reason why heat moves slower through solids than the other states. Hot molecules move faster and produce more heat energy. Gases have the hottest molecules. Therefore, gases produce more heat and allow heat to travel through them quicker than the other states of matter.

Conductors are any materials that allow heat to flow easily through them. Insulators are any materials that do not allow heat to move easily through them.

### Examples of conductors:

- Metals
- Iron
- Silver
- Gold
- Copper
- Aluminum
- Water
- Tin
- Brass
- Air

### Examples of insulators:

- Cork
- Wood
- Plastic
- Wool
- Styrofoam
- Rubber
- Fiberglass
- Oven mitts
- Glass
- asbestos
- Teflon

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_