

**Note-taking
Worksheet**

Thermal Energy

Section 1 Temperature and Heat

- A. _____—related to the average kinetic energy of an object's atoms or molecules
- B. _____—the sum of the kinetic and potential energy of all the atoms in an object
1. Thermal energy _____ as temperature increases.
 2. At constant temperature, thermal energy increases if _____ increases.
- C. Thermal energy that flows from something at a higher temperature to something at a lower temperature is called _____.
- D. _____—amount of heat needed to raise the temperature of 1 kg of a material by 1 degree C or K
- E. Changes in thermal energy can be calculated as *change in thermal energy equals* _____ *times change in temperature times specific heat.*
1. When heat flows into an object and its temperature rises, the change in temperature is _____.
 2. When heat flows out of an object and its temperature decreases, the change in temperature is _____.
 3. A _____ is used to measure specific heat.

Section 2 Transferring Thermal Energy

- A. _____—transfer of thermal energy through matter by direct contact of particles
1. Kinetic energy is transferred as particles _____.
 2. _____, particularly metals, are good heat conductors.
- B. The transfer of energy by the motion of heated particles in a fluid is called _____.
1. Convection _____ transfer heat from warmer to cooler parts of a fluid.
 2. Convection currents create _____ and _____ over different regions of Earth.

Note-taking Worksheet (continued)

- C. _____—energy transfer by electromagnetic waves
1. Some radiation is _____ and some is _____ when it strikes a material.
 2. Heat transfer by radiation is _____ in a gas than in a liquid or solid.
- D. Most living things control the flow of heat by using special features such as fur, _____, or scales.
- E. _____—material that does not let heat flow through it easily
1. Gases such as _____ usually make better insulators than liquids or solids.
 2. A _____ layer in a thermos is a good insulator because it contains almost no matter to allow conduction or convection to occur.

Section 3 Using Heat

- A. _____ systems—warm homes and buildings
1. _____ system—fuel heats air, which is blown through ducts and vents; cool air is returned to the furnace to be reheated
 2. _____ system—hot water or steam in a radiator transfers thermal energy to the air
 3. _____ heating system—electrically heated coils in ceilings or floors heat air by conduction
- B. _____—energy from the Sun
1. _____ solar heating does not use mechanical devices to move heat.
 2. Active solar heating systems use _____ to absorb radiant energy, which is circulated through the building.
- C. _____—an engine that converts thermal energy into mechanical energy
1. An _____ **engine** burns fuel inside the engine in chambers or cylinders.
 2. Internal combustion engines convert only about _____% of the fuel's chemical energy to mechanical energy.

Note-taking Worksheet (continued)

- D. _____—device that removes thermal energy from one location and transfers it to another location at a different temperature
1. A _____ contains a coolant that absorbs heat from the inside of the refrigerator and releases it on the outside as heat.
 2. _____ cool warm air.
 3. _____ can both cool and warm air.
 4. The human body stays cool by _____ of sweat.