Science: Matter and Energy

Mr. Myers

## Chapter 5 Study Guide—Heat

1. Nature of Heat
   1. Thermal energy
   2. Temperature
   3. Heat—the transfer of thermal energy—measured in joules
   4. Heat capacity—an object’s ability to absorb and store thermal energy; heat capacity = heat/temperature change
   5. Specific heat=the heat capacity of an object divided by the object’s mass
   6. Calorimeter—instrument used to measure specific heat
2. Expansion and Heat Transfer
   1. Expansion increases with higher heat and decreases with lower heat
   2. Thermostat
   3. Bimetallic strip
   4. Types of heat transfer
      1. Conduction
      2. Convection
      3. Radiation
3. Heat as Energy
   1. Thermodynamics—the branch of science that deals with thermal energy, heat, and their relationships to other forms of energy
      1. First law of thermodynamics—energy gained or lost by a system is equal to the energy gained or lost by the surroundings
      2. Second law—natural processes tend to go only one way, toward less usable energy and greater disorder
         1. Entropy—a measure of the amount of disorder in a system
         2. The perpetual motion dream
   2. Mechanical equivalent of heat—the relationship between mechanical energy and heat
4. Heat and Changes of State
   1. Melting (fusion)
   2. Freezing
      1. Freezing point depression—lowering the freezing point of a substance by adding solutes to the liquid
   3. Latent heat
   4. Heat of fusion
   5. Evaporation
      1. Volatile
      2. Nonvolatile
      3. Boiling
      4. Heat of vaporization
   6. Condensation
      1. Vapor pressure
      2. Critical temperature
   7. Heat pumps, refrigerators, air conditioners
   8. Sublimation
   9. Deposition
   10. Plasma