**Chapter 14 Study Guide**

Lesson 1: What is energy?

* What is kinetic energy?
  + How does mass effect kinetic energy?
* What is potential energy?
  + In the example on page 451 of the book, at what point does the toy car have the most potential energy (at the top, bottom, or the hills in between)?
* \*Describe what happens to the potential energy and the kinetic energy of a ball as it rolls down a hill from a position of rest at the top of the hill.
* What is nuclear energy?
* Energy can change from one form to another, but it cannot be made or destroyed. How does energy change:
  + In a radio?
  + In fireworks?
* Food provides humans with a type of chemical energy. Using the chart on page 453, which is based on calories, which food provides the least amount of energy? bagel, apple, brownie, hot dog

Lesson 2: What is sound energy?

* How are pitch and frequency related?
* How do different materials (iron, wood, water, air) affect sounds waves?

Lesson 3: What is light energy?

* What happens to light rays in a convex lens?
* What happens to light rays in a concave lens?
* \*Compare the frequency and energy of infrared rays to the frequency and energy of visible light.

Lesson 4: What is thermal energy?

* \*Explain the direction thermal energy naturally flows in.
* In which type of substance do particles move the fastest? (Ice cube, apple juice, ocean water, or hot chocolate) Why?
* \*Describe the three methods of heat transfer & give an example of each type.

**Chapter 14 Study Guide Answer Key**

Lesson 1: What is energy?

* What is kinetic energy? Kinetic energy is energy due to motion.
  + How does mass effect kinetic energy? The greater the mass of an object, the more kinetic energy it will have.
* What is potential energy? It is stored energy.
  + In the example on page 451 of the book, at what point does the toy car have the most potential energy (at the top, bottom, or the hills in between)?
* Describe what happens to the potential energy and the kinetic energy of a ball as it rolls down a hill from a position of rest at the top of the hill. At the top of the hill, the ball will have the greatest amount of potential energy and the least amount of kinetic energy. As the ball rolls down the hill, its potential energy will change to kinetic energy.
* What is nuclear energy? Nuclear energy is a type of energy that is released when protons are knocked out of an atom’s nucleus.
* Energy can change from one form to another, but it cannot be made or destroyed. How does energy change:
  + In a radio? It changes from electrical energy to sound energy.
  + In fireworks? It changes from chemical energy to sound, light and thermal energy.
* Food provides humans with a type of chemical energy. Using the chart on page 453, which is based on calories, which food provides the least amount of energy? bagel 195 cal., apple 90 cal., brownie 160 cal., hot dog 145 cal.

Lesson 2: What is sound energy?

* How are pitch and frequency related? The greater the frequency the higher the pitch and vice versa.
* How do different materials (iron, wood, water, air) affect sounds waves? Sound waves travel the fastest through water (1498 m/s) and then slowdown through wood (4110 m/s), iron (3240 m/s), and dry air (331 m/s).

Lesson 3: What is light energy?

* What happens to light rays in a convex lens? The rays bend and focus to a point.
* What happens to light waves in a concave lens? The rays bend and spread out.
* \*Compare the frequency and energy of infrared rays to the frequency and energy of visible light. Infrared rays have lower frequencies and energies than visible light waves because of the length of the wavelength. The longer the wavelength, the lower the frequency and energy.

Lesson 4: What is thermal energy?

* \*Explain the direction thermal energy naturally flows in. Thermal energy naturally flows from warmer substances to cooler ones.
* In which type of substance do particles move the fastest? Ice cube, apple juice, ocean water, or hot chocolate. Why? Particles move the fastest in warmer objects because they have more kinetic energy.
* \*Describe the three methods of heat transfer & give an example of each type.
  + Conduction is the transfer of heat between objects that are touching, like a pan on a stove top burner.
  + Convection is the transfer of heat by a moving liquid or a gas. An example is a heater in a fish tank or the ovens in the school cafeteria.
  + Radiation is the transfer of heat through electromagnetic waves. An example is the sun warming the earth.