Chapter 12 Energy Study Guide

1. What is energy? the ability to do work
2. Work is the transfer of energy
3. What is the relationship between work and energy? Work is the transfer of energy and Energy is the ability to do work. You can’t have one without the other.
4. Potential Energy is the energy of position or shape (stored energy).
5. Kinetic Energy is the energy of motion
6. Mechanical Energy is the total energy of motion and position of an object.

Forms of Potential Energy
8. Energy stored in stretched out items is called elastic potential energy.
9. Stored energy given to an object after it has been lifted or elevated is called gravitational potential energy.
10. Stored energy released from chemical reactions is called chemical potential energy.

Forms of Kinetic Energy
11. The total energy of an object due to the kinetic energy of its atoms & molecules (heat energy) is called Thermal energy.
12. Energy made available by the flow of an electric charge through a conductor is called electrical energy.
13. Energy caused by electromagnetic radiation is called light energy.
14. Sound energy is energy associated with the vibration or disturbance of matter.
15. The energy associated with the changes in the nucleus of an atom through fission or fusion is called nuclear energy.

16. Give an example of each type of energy. Write the example beside the name of the energy.
   a. Elastic – teeth on a comb
   b. Light – Flashlight
   c. Nuclear – sun
   d. Gravitational – apple on a tree
   e. Sound – iPod
   f. Electrical – pencil sharpener
   g. Mechanical – stapler
   h. Chemical – gasoline for the car
   i. Thermal – a fire
17. A change from one form of energy into another is called an **Energy Conversion**.

18. Name the different forms or types of energy you would have jumping on a trampoline. Kinetic, Potential, Sound, Chemical, Electrical, & Thermal

19. At what point does a roller coaster have the greatest potential energy?
   - At the top of the biggest (first) hill – A because it is lifted to the highest point

20. At what point does a roller coaster have the greatest kinetic energy?
   - At the bottom of the biggest (first) hill – C because it is the last point before it goes back up

21. What is happening at Point B on the roller coaster?
   - The kinetic energy is increasing while the potential energy is decreasing

22. How does mass and speed effect energy? Kinetic energy is directly proportional to the Mass. This means if you double the mass, you double the energy needed. Kinetic Energy is proportional the square of the velocity (Speed). This means that you multiple the speed by itself (EX. $2^2$ is $2 \times 2 = 4$ and $4^2$ is $4 \times 4 = 16$).
   - The formula for Kinetic Energy is $\frac{1}{2} \text{ mass} \times \text{Velocity}^2$

23. What is the energy conversion for each of the following items:
   - **a.** Alarm clock? Electrical converts to light, sound, thermal and kinetic
   - **b.** Battery? Chemical converts to electrical and thermal
   - **c.** Light bulb? Electrical converts to light and thermal
   - **d.** Blender? Electrical converts to kinetic, sound, thermal and sound
   - **e.** Photosynthesis? Light converts to chemical

   - Energy can change from one form into another, but the total amount of energy is always the same.

25. You have 20 joules of chemical energy in a log. Once you put the log on the fire, the energy is converted. How much light energy will you have if you have 10 joules of thermal energy and 2 joules of sound energy? 8 joules.
   - The total energy must equal 20. $10 + 2 = 12$ joules, so $20 - 12 = 8$ joules