Guided Notes: Energy Forms and Changes

Nature of Energy

* Energy is all around you!
  + You can hear energy as sound.
  + You can see energy as light.
  + And you can feel it as wind.
* You use energy when you:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a softball.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your book bag.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a spring.
* Living organisms need energy for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* What is energy that it can be involved in so many different activities?
  + Energy can be defined as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
  + If an object or organism does work \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ) the object or organism uses energy.
* Because of the direct connection between energy and work, energy is measured in the same unit as work: joules (J).
* In addition to using energy to do work, objects gain energy because work is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on them.
* The five main forms of energy are:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Heat Energy

* The internal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the atoms is called heat energy, because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles produce heat.
* Heat energy can be produced by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* Heat energy causes changes in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of any form of matter.

Chemical Energy

* Chemical Energy is required to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms together.
* And when bonds are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , energy is released
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are forms of stored chemical energy.

Electromagnetic Energy

Power lines carry electromagnetic energy into your home in the form of electricity

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a form of electromagnetic energy.
* Each color of light (Roy G Bv) represents a different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electromagnetic energy.
* Electromagnetic Energy is also carried by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light.

Nuclear Energy

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an atom is the source of nuclear energy.
* When the nucleus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ), nuclear energy is released in the form of heat energy and light energy.
* Nuclear energy is also released when nuclei collide at high speeds and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ).
* Nuclear energy is the most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form of energy

Mechanical Energy

* When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is done to an object, it acquires energy.
* The energy it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is known as mechanical energy.
* When you kick a football, you give \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy to the football to make it move.
* When you throw a balling ball, you give it energy. When that bowling ball hits the pins, some of the energy is transferred to the pins (transfer of momentum).

Energy Conversion

* Energy can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one form to another.
* Changes in the form of energy are called energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* All forms of energy can be converted into other forms.
  + The sun’s energy through solar cells can be converted directly into electricity.
  + Green plants convert the sun’s energy (electromagnetic) into starches and sugars (chemical energy).
  + In an electric motor, electromagnetic energy is converted to mechanical energy.
  + In a battery, chemical energy is converted into electromagnetic energy.
  + The mechanical energy of a waterfall is converted to electrical energy in a generator.
  + In an automobile engine, fuel is burned to convert chemical energy into heat energy. The heat energy is then changed into mechanical energy.

States of Energy

* The most common energy conversion is the conversion between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.
* All forms of energy can be in either of two states:
  + Potential
  + Kinetic
* Kinetic Energy is the energy of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
* Potential Energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

Kinetic Energy

* The energy of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is called kinetic energy.
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object moves, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kinetic energy it has.
* The greater the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a moving object, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kinetic energy it has.
* Kinetic energy depends on both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Potential Energy

* Potential Energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in fuel, the nucleus of atom, and in foods.
  + Or stored because of the work done on it:
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a rubber band.
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a watch.
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ back on a bow’s arrow.
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a brick high in the air.
* Potential energy that is dependent on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ potential energy.
* Energy that is stored due to being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is called elastic potential energy.

Gravitational Potential Energy

* “The bigger they are the harder they fall” is not just a saying. It’s true. Objects with more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have greater G.P.E.
* The formula to find G.P.E. is G.P.E. = Weight X Height

The Law of Conservation of Energy

* Energy can be neither \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by ordinary means.
  + It can only be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one form to another.
  + If energy seems to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , then scientists \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for it – leading to many important discoveries