**Kinetic and Potential Energy Worksheet**

Classify the following as a type of potential energy or kinetic energy (use the letters K or P)

1. A bicyclist pedaling up a hill \_\_K\_\_\_

2. An archer with his bow drawn \_P\_\_\_\_

3. A volleyball player spiking a ball \_\_K\_\_\_

4. A baseball thrown to second base \_\_K\_\_\_

5. The chemical bonds in sugar \_\_P\_\_\_

6. The wind blowing through your hair \_\_K\_\_\_

7. Walking down the street \_\_K\_\_\_

8. Sitting in the top of a tree \_\_P\_\_\_

9. A bowling ball rolling down the alley \_\_K\_\_\_

10. A bowling ball sitting on the rack \_\_\_P\_\_

What examples can you find in your home that are examples of kinetic and potential energy? (name two for each type of energy)

11. Kinetic: \_\_\_\_\_\_\_Washing Machine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Kinetic: \_\_\_\_\_\_\_\_Ceiling Fan\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. Potential: \_\_\_\_\_\_\_Snow sitting on my roof\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. Potential: \_\_\_\_\_\_\_All the junk on my top shelf in my office\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Kinetic Energy – what does it depend on?**

The more \_\_mass\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object moves, the more \_\_\_\_potential energy\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_it has.

The greater the \_\_\_velocity\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a moving object, the more \_\_kinetic energy\_\_\_\_\_\_\_\_\_\_it has.

Kinetic energy depends on both \_\_\_mass\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_velocity\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Solve the following word problems using the kinetic and potential energy formulas (Be sure to show your work!)

**Formulas:**

**KE = 0.5 x m x v2 OR PE = m x g x h**

*v = velocity or speed m = mass in kg g = 9.81m/s2  h = height in meters*

1. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30 m/s. The ball has \_\_\_\_KINETIC\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy. Calculate it and show your work.

KE = 0.5 x 2.1 x 302 KE = 945J

1. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby has a mass of 1.5 kg. The carriage has \_POTENTIAL\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy. Calculate it and show your work.

PE = 1.5 x 9.81 x 21 PE = 309.015J

1. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg. The car has \_KINETIC\_\_\_\_\_\_\_\_\_\_\_ energy. Calculate it and show your work.

KE = 0.5 x 1120 x 402 KE = 896 000J

1. A cinder block is sitting on a platform 20 m high. It weighs 7.9 kg. The block has \_\_\_\_\_POTENTIAL\_\_\_\_\_ energy. Calculate it and show your work.

PE = 7.9 x 9.81 x 20 PE = 1549.98J

1. A roller coaster is sitting at the top of a 72 m hill and has 94646J. The coaster (at this moment) has \_\_POTENTIAL\_\_\_\_\_\_\_\_\_\_ energy. What is its mass? Calculate it and show your work.

M = PE / G x H M = 94646 / (9.81 x 72) M = 134kg

1. There is a 19kg bell at the top of a tower that is storing 15745J of energy. The bell has \_\_POTENTIAL\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy. What is the height of the tower? Calculate it and show your work.

H = PE / G x M H = 15745J / (9.81 x 19) H = 84.47m

1. Determine the **kinetic** energy of a 1000-kg roller coaster car that is moving with a speed of 20.0 m/s.

KE = 0.5 x 1000 x 202 KE = 200 000J

1. If the roller coaster car in the above problem were moving with **twice the speed**, then what would be its new **kinetic** energy?

KE = 0.5 x 1000 x 402 KE = 3 200 000J

1. A cart is loaded with a brick and pulled at constant speed along an inclined plane to the height of a seat-top. If the mass of the loaded cart is 3.0 kg and the height of the seat top is 0.45 meters, then what is the **potential** energy of the loaded cart at the height of the seat-top?

PE = 3.0 x 9.81 x 0.45 PE = 13.24J

1. A 75-kg refrigerator is located on the 70th floor of a skyscraper (300 meters above the ground) What is the **potential** energy of the refrigerator?

PE = 75 x 9.81 x 300 PE = 220 725J

1. The potential energy of a 40-kg cannon ball is 14000 J. How high was the cannon ball to have this much **potential** energy?

H = PE / (G x M) H = 14000 / (9.81 x 40) H = 35.68M

The Law of Conservation of Energy states that:

* Energy can be neither \_\_CREATED\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nor \_\_\_DESTROYED\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Energy can be \_\_TRANSFORMED\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one form to another.
* The total amount of \_\_\_\_\_ENERGY\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the \_\_SAME\_\_\_\_\_\_\_\_\_\_\_ before and after any energy transformation.