Name _____ Period _____

Kinetic and Potential Energy

$E_K = ½ mv^2$ (½ x mass x velocity x velocity)

E_P = mgh (or wh) (mass x gravity x height) (gravity = 9.8 m/s^2)

1. If a ball weighs 6 kg and is traveling at 1 kps (kilometer per second), what is its kinetic energy?

2. A 10 kg weight is held 2 meters in the air. What is its potential energy?

3. Which has more potential energy, a 5 kg ball or a 10 kg ball held above the ground at 2 meters?

4. A 20 kg person runs at 2 mps (meters per second). What is that person's kinetic energy?

5. This isn't as hard as it looks if you do it step by step. A 98 kg man is shot into the air at a speed of 10 mps (meters per second). How high does he go into the air?

Step 1 - What is the kinetic energy? (write it) _____

Step 2 - Let $E_K = E_P$
(Place the number from step 1 into the potential energy formula.) _____ = mgh

Step 3 - Divide by mass and gravity _____

Finally - What is the h?

Determine whether the objects in the following problems have kinetic or potential energy. Remember, kinetic energy is the energy of motion and potential energy is stored energy due to an object's shape or position. Then, choose the correct formula to use:

6. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30m/s. The ball has _____ energy. Calculate it.

7. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12 N. The carriage has _____ energy. Calculate it.

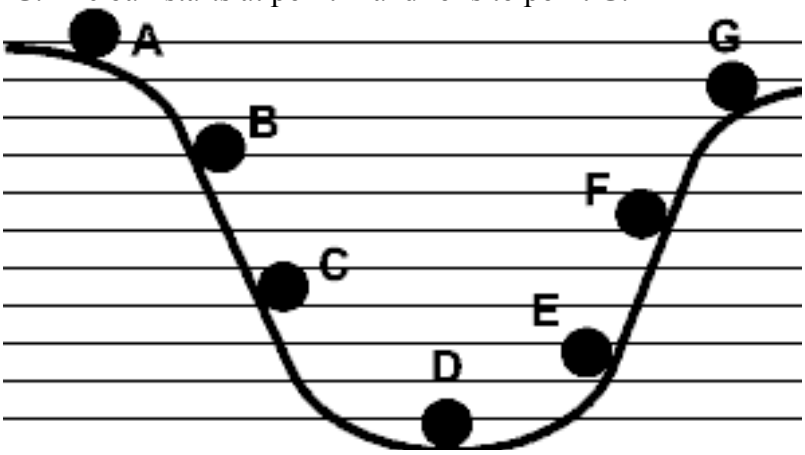
8. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg. The car has _____ energy. Calculate it.

9. A cinder block is sitting on a platform 20 m high. It weighs 79 N. The block has _____ energy. Calculate it.

10. There is a bell at the top of a tower that is 45 m high. The bell weighs 190 N. The bell has _____ energy. Calculate it.

11. A roller coaster is at the top of a 72 m hill and weighs 966 N. The coaster (at this moment) has _____ energy. Calculate it.

This graph shows a ball rolling from A to G. The ball starts at point A and rolls to point G.



12. At what letter does the ball have the greatest kinetic energy?

13. Which letter shows the ball when it has the maximum potential energy?

14. Which letter shows the ball when it has the least potential energy?

15. Why is point G slightly lower than point A? In other words, why couldn't the ball go back to the same height at which it started?