Energy

Name:_____
Period: 1 2 3 4 5 6 7 8

**Part 1: Practice**

**KE**

1) How much kinetic energy does an 8-kg bowling ball have if it moves at 6 m/s?

2) If a 4-kg cat flung from a trebuchet has 60-J of kinetic energy, how fast is the cat moving?

3) A taco strikes a wall with a velocity of 8.5 m/s and a kinetic energy of 40-J, what is the mass of the taco?

4) A 1500-kg truck changes its velocity from 15m/s to 30m/s. What is the increase in KE of the truck?

**$PE_G$**

5) How much potential energy does an 8-kg bowling ball have if it is held 5 meters above Earth?

6) Lassie, the 20-kg astrodog, is taken to a new planet. On this planet she has 450 J of PE when she is 8 meters above the surface of the planet. What planet is she on?

7) How high is a 40-kg dog above the ground if it has 800 J of potential energy?

8) A 50 kg diver climbs from the 5 m platform at Mienke to the 10 meter one. What is the divers change in PE?

**$PE_k$**

9) An archer pulls back a 0.25kg arrow 0.6 meters. If the spring constant of the bow is 100 N/m, how much potential energy does the arrow have?

11) If a paper wad has 12-J of PE while it is pulled back by a 25 N/m rubber band, how far was the wad pulled back?

12) A bungee jumper stretches a bungee cord 30m before coming to a stop. If the jumper stores 30000 J of energy in the cord, what is the spring constant of the cord?

10) If a punk with an 80 N/m sling shot wants to inflict more pain on a squirrel doing push-ups, and pulls back a rock from 0.25 m to 0.45m, what is the increase in PE of the rock? Poor squirrel

**Part 2: Conceptual Questions**

13) If an object is not moving, can we conclude that it does not have energy?

14) If an object is moving, can we conclude that it has energy?

**Part 3: Multiple Types of Energy**

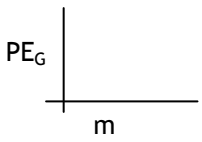
15) That punk with the slingshot missed the nutty squirrel doing push-ups. He aims again. This time he pulls the same 80 N/m sling shot back as far as he can. The nutty squirrel, Nutty the Squirrel, looks up when the rock is 0.25 meters from being out of the sling shot. If the 0.5 kg rock is moving a 15m/s at this point, what is the total energy of the rock at this point?

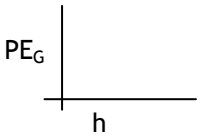
16) "Nuts!" Nutty proclaims, "Only one way out of this situation." He jumps off of the branch he was sitting on and falls towards the ground below. When the 1.2 kg squirrel (he has gained some muscle since the last worksheet) is 1.5 meters above the ground, he is traveling at 3.7 m/s. What Nutty's total energy?

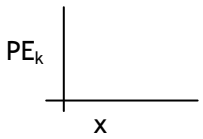
Does Nutty survive? Tune into the next worksheet.

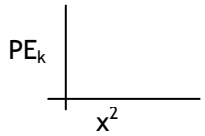
**Part 4: Graphing Relationships**

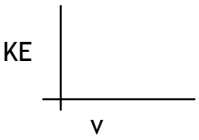
Sketch the line of the following graphs. Look at your equations and think or your math class…what does the graph $y=x^2$ look like? Apply that knowledge to this section. Please don't tell your math teacher that you actually used math for something, they are still trying to figure that out, and you will ruin the surprise.

17) 


18) 


19) 


20) 


21) 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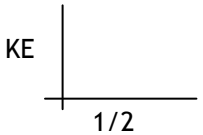
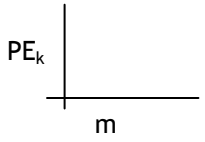
23) 


24) 


**Part 5: Backwards Problems**

Given below are situations that have been solved for you. Your job is to reconstruct the situation in words or in a labeled diagram listing the givens and unknowns.

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|---|---|
| 25) $20000\text{-J} = (0.5)(100\text{-kg})(20\text{m/s})^2$ | 27) $120\text{-J} = (20\text{-kg})(9.8\text{m/s}^2)(0.61\text{m})$ |
| 26) $1553\text{-J} = (0.5)(245\text{N/m})(3.56\text{m})^2$ | 28) $850\text{-J} = (0.5)(10\text{-kg})(5\text{-m/s})^2 + (10\text{-kg})(9.8\text{-m/s}^2)(7.4\text{-m})$ |