$\qquad$ Class: $\qquad$

## KINETIC AND POTENTIAL ENERGY WORKSHEET

Determine whether the objects in the following problems have kinetic or potential energy. Then choose the correct formula to use: $\quad \mathbf{K E}=\mathbf{1} / \mathbf{2} \mathbf{m ~ v}^{\mathbf{2}}$ OR $\quad \mathbf{P E}=\mathbf{m g h}=\mathbf{F}_{\mathbf{w h}}$
Write your equation and label your answer.

1. You serve a volleyball with a mass of 2.1 kg . The ball leaves your hand with a speed of $30 \mathrm{~m} / \mathrm{s}$. The ball has
$\qquad$ energy. Calculate it.
2. 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 $\qquad$ energy. Calculate it.
3. A car is traveling with a velocity of $40 \mathrm{~m} / \mathrm{s}$ and has a mass of 1120 kg . The car has $\qquad$ energy. Calculate it.
4. A cinder block is sitting on a platform 20 m high. It weighs 79 N . The block has $\qquad$ energy. Calculate it.
5. There is a bell at the top of a tower that is 45 m high. The bell weighs 190 N . The bell has $\qquad$ energy. Calculate it.
6. A roller coaster is at the top of a 72 m hill and weighs 966 N . The coaster (at this moment) has $\qquad$ energy. Calculate it.
7. What is the kinetic energy of a 3-kilogram ball that is rolling at 2 meters per second?
8. The potential energy of an apple is 6.00 joules. The apple is 3.00 -meters high. What is the mass of the apple?
9. Two objects were lifted by a machine. One object had a mass of 2 kilograms, and was lifted at a speed of $2 \mathrm{~m} / \mathrm{sec}$. The other had a mass of 4 kilograms and was lifted at a rate of $3 \mathrm{~m} / \mathrm{sec}$.
a. Which object had more kinetic energy while it was being lifted?
b. Which object had more potential energy when it was lifted to a distance of 10 meters? Show your calculation.

## Kinetic and Potential Energy Worksheet

Name $\qquad$ Date: $\qquad$

## Classify the following as a type of potential energy or kinetic energy (use the letters $\mathbf{K}$ or $\mathbf{P}$ )

1. A bicyclist pedaling up a hill
2. A volleyball player spiking a ball
3. The chemical bonds in sugar
4. Walking down the street
5. A bowling ball rolling down the alley
$\qquad$ 2. An archer with his bow drawn
$\qquad$ 4. A baseball thrown to second base
6. The wind blowing through your hair
7. Sitting in the top of a tree
$\qquad$
$\qquad$
8. A bowling ball sitting on the rack

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: $\qquad$
12. Kinetic: $\qquad$
13. Potential: $\qquad$
14. Potential: $\qquad$

Solve the following word problems using the kinetic and potential energy formulas (Be sure to show your work!)
15. Determine the kinetic energy of a $1000-\mathrm{kg}$ roller coaster car that is moving with a speed of $20.0 \mathrm{~m} / \mathrm{s}$.
16. If the roller coaster car in the above problem were moving with twice the speed, then what would be its new kinetic energy?
17. Missy Diwater, the former platform diver for the Ringling Brother's Circus had a kinetic energy of $15,000 \mathrm{~J}$ just prior to hitting the bucket of water. If Missy's mass is 50 kg , then what is her speed?
18. 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?
19. A $75-\mathrm{kg}$ refrigerator is located on the $70^{\text {th }}$ floor of a skyscraper ( 300 meters above the ground) What is the potential energy of the refrigerator?
20. The potential energy of a $40-\mathrm{kg}$ cannon ball is 14000 J . How high was the cannon ball to have this much potential energy?

