
Physical Science: Blizzard Bag #1

Section Title: Energy Problems

Activity

Today we are going to spend time focusing on the equations for potential and kinetic energy. Here is some information that will help.

Energy is measured in Joules (J).

Mass is measure in kilograms (Kg).

Velocity is measured in m/s.

Time is measured in seconds (s).

Force is measure in Newton's (N).

The acceleration due to gravity is 9.8 m/s^2 .

Equations yow will need:

- ✓ $\text{KE} = \frac{1}{2} \text{ mass} \times \text{velocity}^2$
- ✓ $\text{PE} = \text{mass} \times \text{gravity} \times \text{height}$
- ✓ $\text{Weight} = \text{mass} \times \text{gravity}$

Directions:

Complete the following problems.

REMEMBER!!!!!!

1. Identify what you know
2. Choose your equation
3. Write down your equation

4. Plug in numbers
5. Do the Math
6. Show final answers with units

1. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30 m/s. Calculate the kinetic energy.

2. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12 kg.
 - a. The carriage has what type of energy? _____
 - b. Calculate it.

3. A car is traveling with a velocity of 40 m/s and has a mass of 1,120 kg.
 - a. The car has what type of energy? _____
 - b. Calculate it.

4. A cinder block is sitting on a platform 20 m high and weighs 79 N.
- The block has what type of energy? _____
 - Calculate it.
5. There is a bell at the top of a tower that is 45 m high and weighs 190 N.
- The bell has what type of 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 what type of energy? _____
 - Calculate it.
7. A model glider has a mass of 1 kg. How much potential energy does it have 2 m off the ground?
8. A full-sized glider and pilot have a weight of 5,725 N. If it is 1,000 meters off the ground, how much potential energy do the plane and pilot have?
9. You serve a volleyball with a mass of 10.1 kg. The ball leaves your hand with a speed of 80 m/s.
- The volleyball has what type of energy? _____
 - Calculate it.

10. A baby carriage is sitting at the top of a hill that is 123 m high. The carriage with the baby has a mass of 154 kg.
- The carriage has what type of energy? _____
 - Calculate it.
11. A car is traveling with a velocity of 12.6 m/s and has a mass of 3,567 kg.
- The car has what type of energy? _____
 - Calculate it.
12. A brick is sitting on a platform 45.5 m high. It has a mass of 5 kg.
- The block has what type of energy? _____
 - Calculate it.
13. A ball has a kinetic energy of 500 J and a velocity of 20 m/s. What is the mass?
14. A water bottle is on the edge of the desk and has a potential energy of 1,050J and is 0.5 Kg. How high is the water bottle off the ground?