

Name \_\_\_\_\_

Date 1/4/19  
NOTES

Aim: I can describe the two types of energy.

Now:

Notes:

Energy:

- An agent of change.
- Capacity to do work.
- Measured in Joules (J).
- All forms of energy exist as Kinetic energy or potential energy.



Kinetic Energy: On the Move

- Energy in the form of motion.
  - The greater the mass and velocity of a moving object, the greater the kinetic energy.
- more mass + more velocity  
more Kinetic energy

Examples: Which has a greater kinetic energy?

1. A. 100 km/hr  
B. 100 km/hr

**Answer**

A SAME speed greater mass

2. A. 100 km/hr  
B. 80 km/hr

**Answer**

B SAME MASS but greater Speed

List the vehicles in order of increasing kinetic energy.

Least → greatest  
B, C, A

**Answer**

A greatest mass highest speed  
B smallest mass

See back

Calculating Kinetic Energy

$$KE = \frac{1}{2}mv^2$$

or  $\frac{mv^2}{2}$

$$\text{Kinetic Energy} = \frac{1}{2} \text{mass} \times \text{velocity}^2$$

Joules

kg

m/s<sup>2</sup>

Calculating Kinetic Energy

$$KE = \frac{1}{2}mv^2$$

A girl and her dog are running. The dog has a mass of 20 kg. The girl has a mass of 60 kg. Suppose both the dog and the girl run at a velocity of 2 m/s. Calculate their kinetic energies.

Kinetic Energy of dog:  $KE = \frac{1}{2}mv^2 = \frac{1}{2} \cdot 20 \text{ kg} \cdot 2 \text{ m/s}^2 = 20 \text{ J}$

Kinetic energy of girl:  $KE = \frac{1}{2}mv^2 = \frac{1}{2} \cdot 60 \text{ kg} \cdot 2 \text{ m/s}^2 = 60 \text{ J}$

**Answer**

KE = 20 J  
KE = 60 J

## Potential Energy: Ready and Waiting

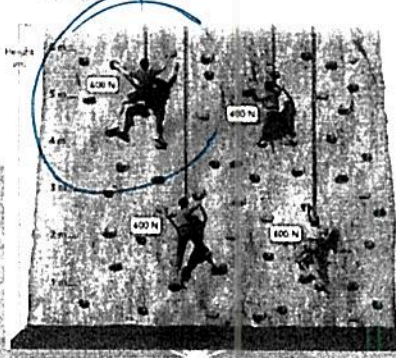
- Stored Energy
- Depends upon its position and Condition and gravity ← MASS

Which has more potential energy? A



### Gravitational Potential Energy (GPE)

- Potential Energy that depends on the height of the object.



1. Circle the rock climber with the greatest potential energy.
2. Calculate the rock climbers GPE. The height to be used is at the rock climbers lowest foot.

$$\text{GPE} = \text{Weight} \times \text{Height}$$

### Elastic Potential Energy (EPE)

- Potential Energy is the energy associated with objects that can be compressed or stretched.
- The energy in a stretched object, such as in the trampoline is EPE.



Shade in the circle of the trampoline that has the greatest EPE.

Front

CAR A

$$KE = \frac{1}{2} mv^2$$

$$KE = \frac{1}{2} 100 \cdot 30^2$$

$$KE = \frac{1}{2} 100 \cdot 900$$

$$KE = \frac{1}{2} (90,000)$$

$$KE = 45,000 \text{ J}$$

CAR B

$$KE = \frac{1}{2} mv^2$$

$$KE = \frac{1}{2} 10 \text{ kg} \cdot 20 \text{ m/s}^2$$

$$KE = \frac{1}{2} 10 \cdot 400$$

$$KE = \frac{1}{2} (4000)$$

$$KE = 2000 \text{ J}$$

CAR C

$$KE = \frac{1}{2} mv^2$$

$$KE = \frac{1}{2} 50 \text{ kg} \cdot 20 \text{ m/s}^2$$

$$KE = \frac{1}{2} 50 \times 400$$

$$KE = \frac{1}{2} (20,000)$$

$$KE = 10,000 \text{ J}$$