

POTENTIAL AND KINETIC ENERGY

U1L4

Energy can be considered either to be either kinetic energy, which is energy of motion, or potential energy, which depends on relative position. **(4.1e)**

Topic: Energy- Potential and Kinetic

Goal: I will be able to create my own definition for potential and kinetic energy.

HW: Take home quiz due

Do Now: What was MOSA trying to figure out with the cyclops roller coaster?

Stop & Jot -2 minute

- Think of a time when your body had a lot of energy. What did that feel like?
- Think of a time when your body had very little energy. What did that feel like?

How does your body use energy?

- Allows us to do things
- Energy is the ability to cause change or move something by applying a force

People have energy, can objects have energy?

- How can objects get energy?
 - *Energy is never created or destroyed, just transferred.*
 - *Humans get energy from food.*
 - *Car hits a bike, the bike falls over.*

Create a definition

- With your group, write down your groups definition of energy.
- Our definition of energy:

- Energy: The ability to do work or cause a change in position
- Work: using a force to move an object a distance
- Force: push or pull upon an object resulting from the object's interaction with another object.

- ALL Energy falls into two categories
 - *Potential*
 - *Kinetic*

Turn and Talk- 45 seconds

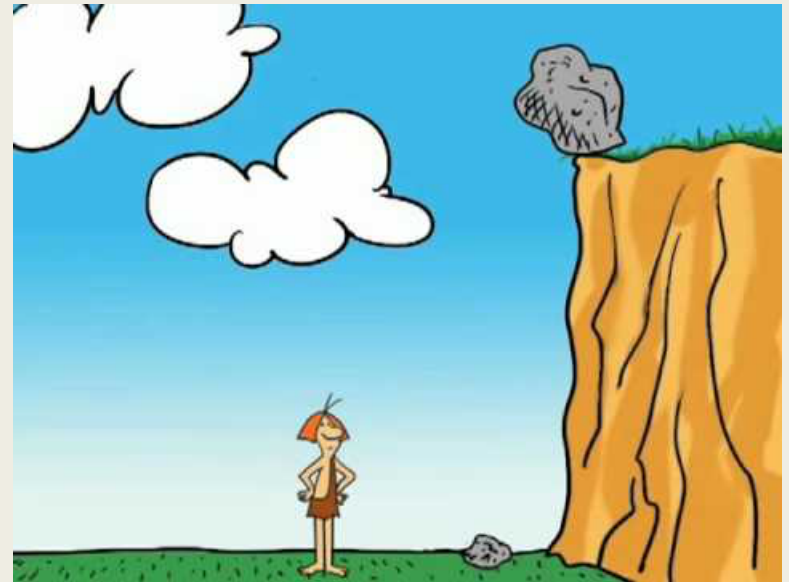
- Come up with an example of potential and kinetic energy from the MOSA Mack video
- What are some other examples of potential and kinetic energy?

■ Potential Energy: stored energy that can be called upo for use at a later time.

– Based on position

– *Examples:*

- A rock on top of a cliff.
- Lump of coal because it CAN be burned to produce energy.



Calculating Potential Energy

Potential energy = weight x height

Example) Which object has the greater potential energy?

Block A: weighs 40 Newtons and is 5 meters above the ground

OR

Block B: Weights 50 Newtons and is 6 meters above the ground

Potential energy can increase when an object has more weight or height.

■ Kinetic Energy: Energy that an object has because it is moving.

– *Examples:*

- Rock falling off a cliff
- Waterfall
- Heat given off by burning coal.



Increasing Kinetic Energy

Kinetic Energy increases with

- 1) The weight of an object
- 2) The speed of an object

Ex) a baseball and a bowling ball are both moving at 10 m/s, which one has more kinetic energy?

FORMS OF ENERGY

All forms of energy fall under two categories

POTENTIAL

Potential energy is stored energy and the energy of position (gravitational)



CHEMICAL ENERGY

Chemical energy is the energy stored in the bonds of atoms and molecules. Biomass, petroleum, natural gas, propane and coal are examples of stored chemical energy.

NUCLEAR ENERGY

Nuclear energy is the energy stored in the nucleus of an atom. It is the energy that holds the nucleus together. The nucleus of a uranium atom is an example of nuclear energy.

STORED MECHANICAL ENERGY

Stored mechanical energy is energy stored in objects by the application of a force. Compressed springs and stretched rubber bands are examples of stored mechanical energy.

GRAVITATIONAL ENERGY

Gravitational energy is the energy of place or position. Water in a reservoir behind a hydropower dam is an example of gravitational potential energy. When the water is released to spin the turbines, it becomes kinetic energy.

KINETIC

Kinetic energy is energy in motion. It is the motion of waves, electrons, atoms, molecules and substances



RADIANT ENERGY

Radiant energy is electromagnetic energy that travels in transverse waves. Radiant energy includes visible light, x-rays, gamma rays and radio waves. Solar energy is an example of radiant energy.

THERMAL ENERGY

Thermal energy (or heat) is the internal energy in substances; it is the vibration and movement of atoms and molecules within substances. Geothermal energy is an example of thermal energy.

MOTION

The movement of objects or substances from one place to another is motion. Wind and hydropower are examples of motion.

SOUND

Sound is the movement of energy through substances in longitudinal (compression/rarefaction) waves.

ELECTRICAL ENERGY

Electrical energy is the movement of electrons. Lightning and electricity are examples of electrical energy.

Exit Ticket

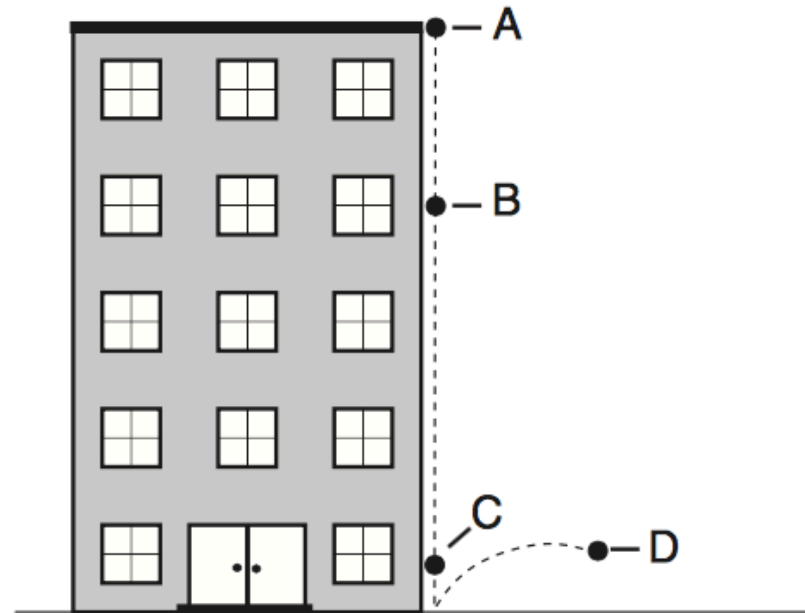
A represents when the ball has JUST left the top of the roof and is moving.

B represents the ball mid-fall.

C represents the ball right before it hits the ground

D Represents the ball after it has hit the ground and bounces back up

A ball is dropped from the roof of a building. Points *A*, *B*, *C*, and *D* in the diagram below represent positions of the ball as it falls.



At which position will the ball have the greatest kinetic energy?

- (1) *A*
- (2) *B*

- (3) *C*
- (4) *D*