Name STATION #1 Date _____

Kinetic and Potential Energy Worksheet

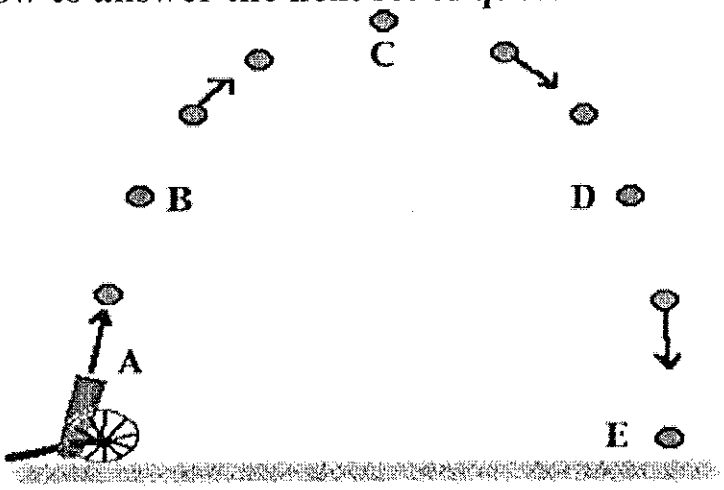
Classify the following as a type of potential energy or kinetic energy (use the letters K or P)

1. A bicyclist pedaling up a hill _____
2. An archer with his bow drawn _____
3. A volleyball player spiking a ball _____
4. A baseball thrown to second base _____
5. The chemical bonds in sugar _____
6. The wind blowing through your hair _____
7. Walking down the street _____
8. Sitting in the top of a tree _____
9. A bowling ball rolling down the alley _____
10. 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: _____
12. Kinetic: _____
13. Potential: _____
14. Potential: _____

Use the diagram below to answer the next set of questions



A) At what letter does the ball have the greatest kinetic energy? _____

B) Which letter shows the ball when it has the maximum potential energy? _____

C) Which letter shows the ball when it has the least potential energy? _____

D) What can be said about the PE and KE at positions B and D?

_____

_____

_____

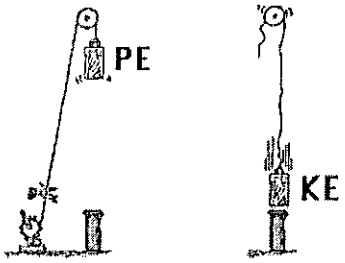
_____

STATION #2

Name: _____

Two Types of Mechanical Energy: Kinetic & Potential Energy

New Vocabulary:
Kinetic Energy is the energy of motion.
Potential Energy is energy that is stored.

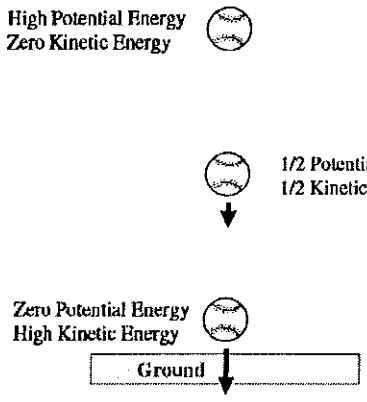


Which type(s) of mechanical energy do the following contain?

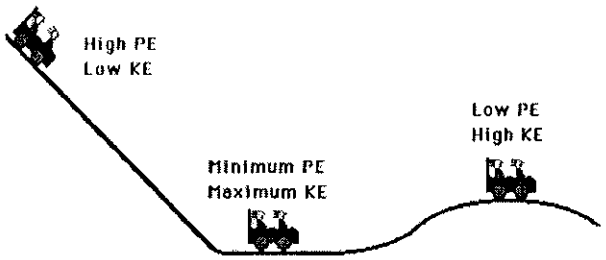
	Description	Kinetic Energy	Potential Energy
(1)	A car traveling at 100 mph along a flat road.		
(2)	A rubber band that has been stretched.		
(3)	A bowling ball rolling down a lane.		
(4)	A piano lifted to a second story window.		
(5)	A snowboarder jumping off a ramp		
(6)	An airplane traveling at 30,000 feet and at a speed of 450 m.p.h.		

We have already talked about other energy transformations and how one type of energy can get changed into a different type of energy. The same is true for kinetic and potential energy. When a ball falls, it gains speed as it falls. The ball starts with all potential energy (energy stored by gravity) but ends with all kinetic energy just before it hits the ground. Half way down, it has ½ potential energy and ½ kinetic energy.

Energy Transformation for a Dropped Baseball



Most roller coasters use potential energy stored by gravity on the first hill to provide the energy for the rest of the ride. As the roller coaster goes down the hill, potential energy is transformed into kinetic energy. At the bottom of the first hill, the roller coaster has the highest speed. This is where the roller coaster has the most kinetic energy and very little potential energy.



As a coaster car loses height, it gains speed; PE is transformed into KE. As a coaster car gains height it loses speed; KE is transformed into PE. The sum of the KE and PE is a constant.

An electric motor pulls a roller coaster car up the first hill by a chain. The roller coaster car gains speed as it falls down to the bottom of

the first hill. The roller coaster car then goes up a second smaller hill. Describe the energy transformations:

The _____#7_____ energy in the wires are transformed into mechanical energy by the motor.

The mechanical energy of the motor is transformed into _____#8_____ energy of the roller coaster at the top of the first hill.

As the roller coaster falls, its _____#9_____ energy is transformed into mostly _____#10_____ energy at the bottom of the hill.

As the roller coaster climbs to the top of the second, smaller hill, some of its _____#11_____ energy is transformed into _____#12_____ energy.

An Olympic high jumper starts running. As she approaches the bar, she pushes off the ground and lifts her body off the ground and flies over the bar. She then falls down into a large padding on the ground. Describe the energy transformation:

The _____#13_____ energy in food that she had eaten is transformed into _____#14_____ energy of her moving body.

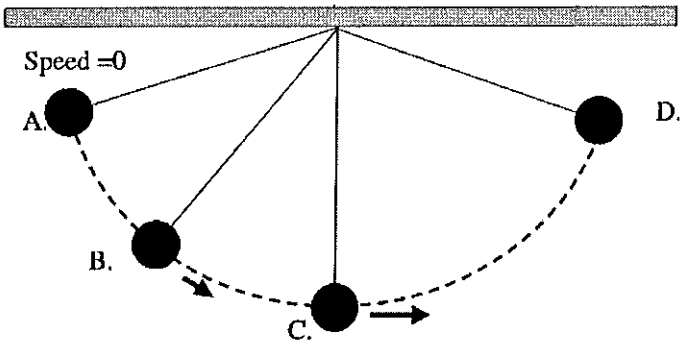
The _____#15_____ energy of her moving body is transformed into mostly _____#16_____ energy and some _____#17_____ energy as she passes over the bar.

The _____#18_____ energy and _____#19_____ energy is transformed into _____#20_____ energy as she falls.

When she hits the padding, her _____#21_____ energy is transformed into _____#22_____ energy by the padding.

STATION #3

Potential and Kinetic Energy Transformation of a Pendulum



(1) Describe the energy transformation from A. to B.

(2) Describe the energy transformation from B. to C.

(3) Describe the energy transformation from C. to D.

(4) If not pushed, why does the pendulum not go as high when it swings back. Where does lost potential energy go?

Name: STATION #4

Potential vs. Kinetic Energy

Directions: Determine the best match between basic types of energy and the description provided. Put the correct letter in the blank.

_____1. A skier at the top of the mountain

_____2. Gasoline in a storage tank

_____3. A race-car traveling at its maximum speed

_____4. Water flowing from a waterfall before it hits the pond below

_____5. A spring in a pinball machine before it is released

_____6. Burning a match

_____7. A running refrigerator motor

(a) Kinetic Energy

(b) Potential Energy

(c) Both forms of Energy

Definitions of Energy.

Directions: Write down the definition for each of the following terms after reading the article.

(8) ENERGY:

(9) KINETIC ENERGY:

(10) POTENTIAL ENERGY:

Directions: Determine the type of energy for each form (Kinetic, Potential, or Both) and give an example.

Form	Definition	Type (KE, PE, or Both)	Example (for each type if both)
Mechanical (motion) energy	An object's movement creates energy	#11	#12
Thermal (heat) energy	The vibration and movement of molecules	#13	#14
Radiant energy	Electromagnetic waves	#15	#16
Electrical energy	Movement of electrons	#17	#18
Chemical energy	Stored in bonds of atoms and molecules	#19	#20
Nuclear energy	Stored in the nucleus of an atom; released when nucleus splits or combines	#21	#22
Sound energy	Vibration of waves through material	#23	#24
Gravitational energy	Energy of position or height	#25	#26

Name: STATION #5

Kinetic and Potential Energy Calculations

1. If we know the total energy in a system is 30 J, and we know the PE is 20 J. What is the KE?_____

(2) which one has more Potential energy and briefly explain why.

A. A 25 kg mass or a 30 kg mass at the top of a hill?
B. A car at the top of the hill or the bottom of a hill?
C. A plane on the ground or a plane in the air?
D. A full plane or an empty plane (both are flying)?

(3) which one has more Kinetic energy and briefly explain why.

A. A 25 kg mass or a 30 kg mass going 5 m/s.
B. Two 10 kg masses, one going 75 m/s, one going 45 m/s.
C. A car at rest or a car rolling down a hill.
D. A heavy bike or a light bike.

For the following questions.....PE or KE?

4. ____ A car is traveling 45 mph.
5. ____ A rock is on a ledge 5 meters high.
6. ____ A car is resting at the top of a hill.
7. ____ A ball is thrown into the air and is still moving.
8. ____ A ball rolling on the ground.