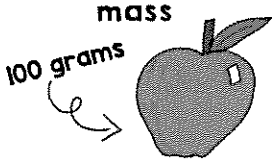
Name: _____ Class: _____ Date: KEY

ENERGY FORMS & TRANSFORMATIONS

ESSENTIAL QUESTION: How do things in the universe move and change?

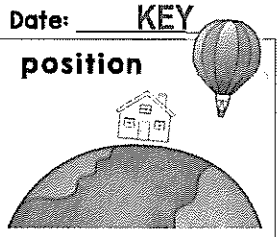
VOCAB

mass



How much matter there is in something.

position

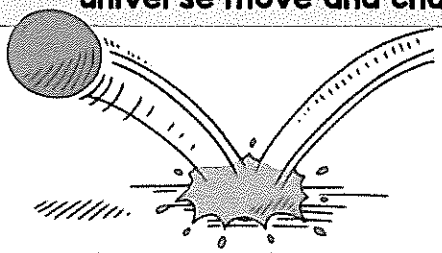


Where an object is relative to a point of reference.

TOPIC QUESTIONS:

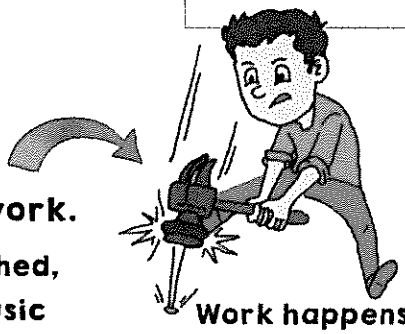
1

What is energy and how is it measured?



Energy is the ability to do work.

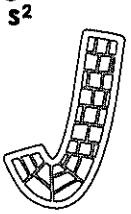
Energy cannot be seen or touched, but every time a bulb is lit, music is played, a fan spins, or food is cooked, energy made it happen.



Work happens when a force is used to move an object through a distance.

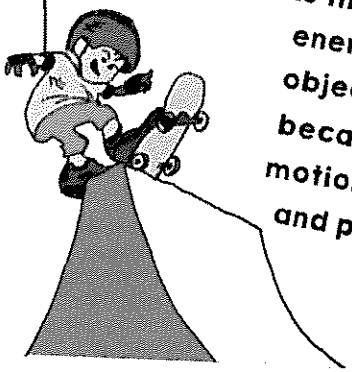
Energy is measured in the unit of Joules (J).

$1\ J = 1\ \frac{kg \cdot m^2}{s^2}$



2

What is mechanical energy?

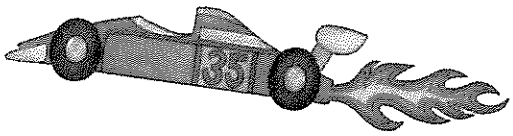


MECHANICAL ENERGY is the total energy an object has because of its motion (speed) and position.

=

POTENTIAL ENERGY is stored energy that depends on an object's mass and position or shape.

+



KINETIC ENERGY is energy of motion that depends on an object's mass and speed.

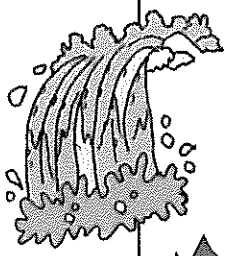
OPIC QUESTIONS:

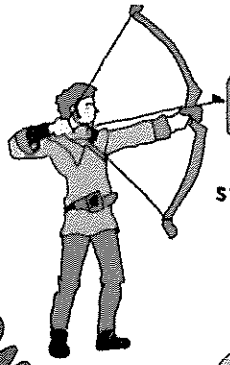
3

What are some types of potential energy (PE)?

GRAVITATIONAL POTENTIAL

Dependent on mass and height.
Examples: at the top of a rollercoaster and hydropower



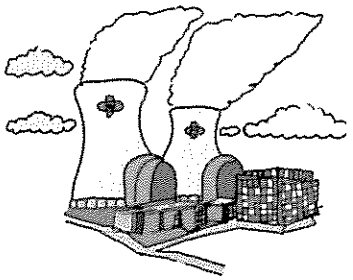


ELASTIC POTENTIAL

Stored due to being stretched or compressed.
Examples: springs and rubber bands

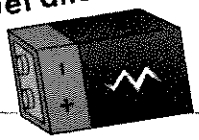
NUCLEAR POTENTIAL

Stored in the nucleus of an atom.
Most concentrated form of energy.



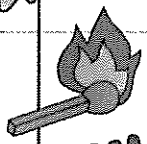
CHEMICAL POTENTIAL

Stored in bonds between atoms.
Examples: fuel and food

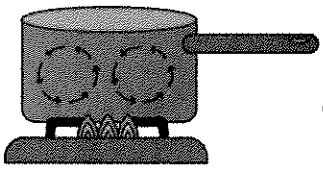


4

What are some types of kinetic energy (KE)?

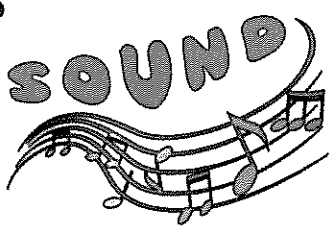


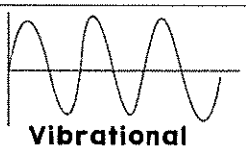
THERMAL



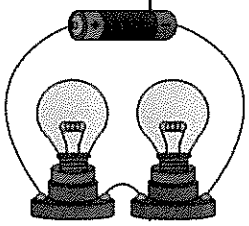
Vibration and movement of molecules, also known as heat.

SOUND





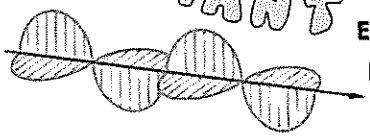
Vibrational movement through substances in waves.

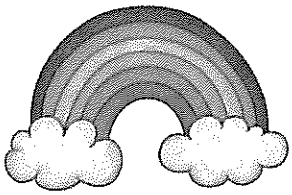


ELECTRICAL

The movement of electrons.
Examples: lightning and current in appliances

RADIANT





Electromagnetic waves.
Examples: visible light, X-rays, radiowaves

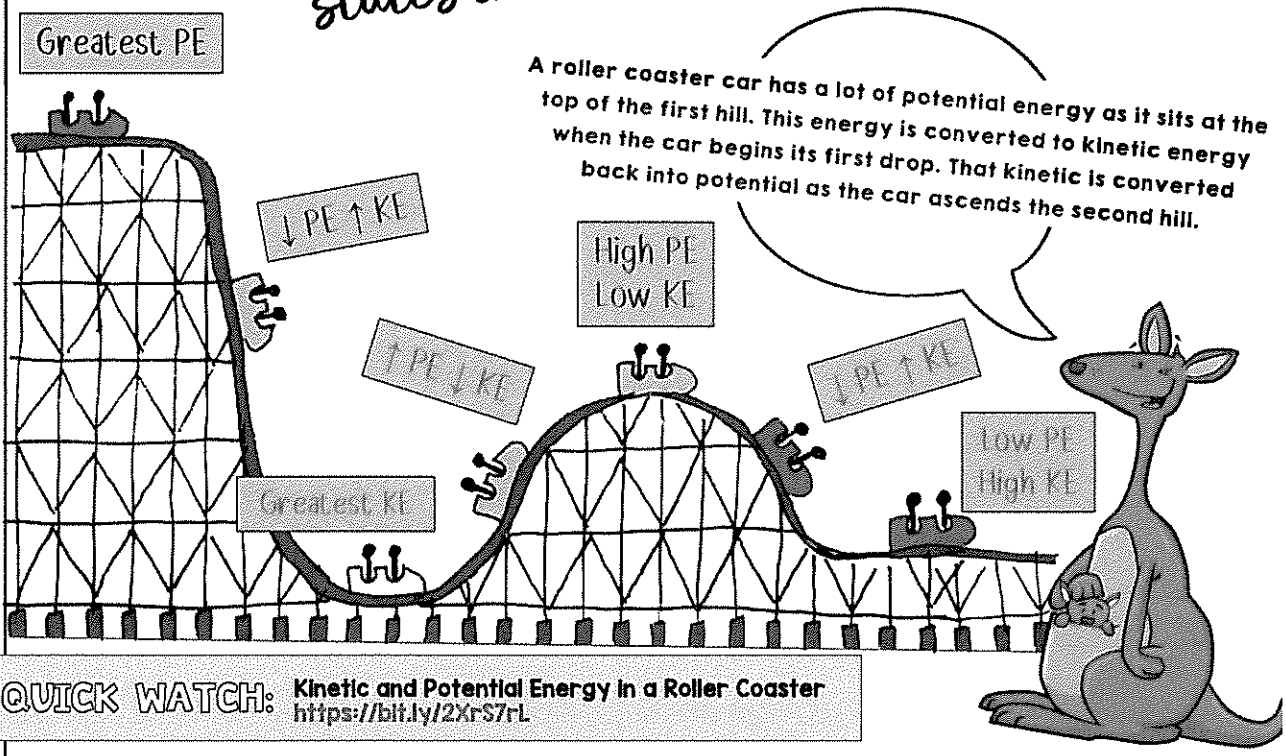
OPIC QUESTIONS:

5

What is the Law of Conservation of Energy?

the LAW OF CONSERVATION OF ENERGY states that...

Energy can change forms but it is never lost. This law means that energy can neither be created nor destroyed; rather, it can only be transformed or transferred from one form to another.



QUICK WATCH: **Kinetic and Potential Energy in a Roller Coaster**
https://bit.ly/2XrS7rL

Do **Label the empty boxes along the roller coaster track where potential energy (PE) and kinetic energy (KE) are increasing and decreasing.**

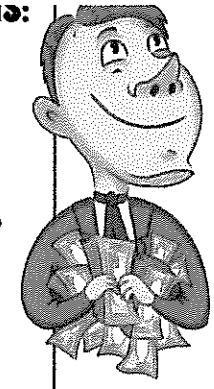
Then Do **Eventually the roller coaster car will not be able to rise up another hill ... Why is this? What happens to the energy of the car?**

The energy of the roller coaster car is being lost as heat (thermal energy) as the car rolls along the track. Eventually, the car will have lost too much kinetic energy to move up another hill.

OPIC QUESTIONS:

6

What is energy transformation?



ENERGY is a strange property of objects that is sometimes easy to see, and sometimes it is not.

It is a little bit like wealth. Sometimes you can tell that somebody is very wealthy because they have a lot of things or do exciting things.

But other times that wealth is just being stored somewhere, the way money is stored in a bank.

ENERGY TRANSFORMATION

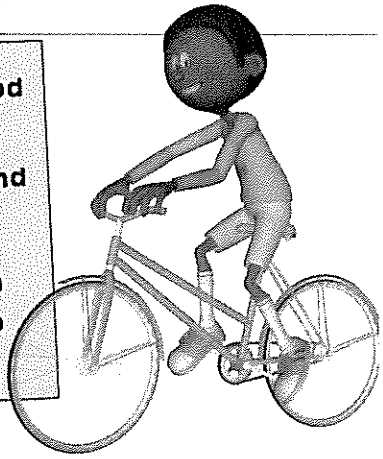
is the process of energy changing from one form to another. This transformation is often able to be seen because it produces a change in the object's motion, position, temperature, or appearance.

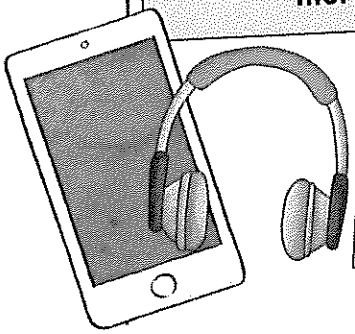
7

What are some examples of energy transformations?

Riding a bike: The chemical potential energy stored in the food that the boy ate this morning is transferred to mechanical energy as he applies force (does work) to the bike's pedals and to thermal energy (heat) as his body begins to get warmer.

The bike itself then has kinetic energy. The force of friction between the tires and the ground transform the motion into thermal energy (heat) and into sound energy.





Do Fill in the missing types of energy in the description of energy transformation below.

Listening to a Podcast: The chemical potential energy stored in the battery is transferred to electrical energy when the device is used. This energy is transferred to sound energy as you hear the recording play and to thermal energy as the device gets warm.

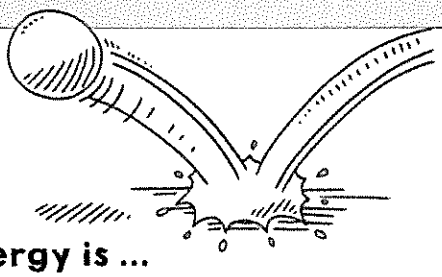
Name: _____ Class: _____ Date: _____

ENERGY FORMS & TRANSFORMATIONS

ESSENTIAL QUESTION:

TOPIC QUESTIONS:

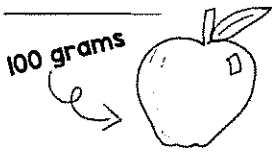
1

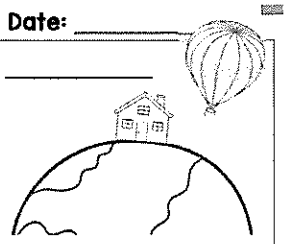


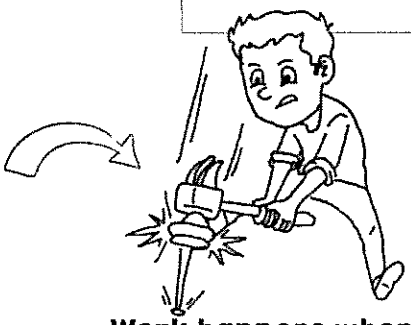
Energy is ...

Energy cannot be...

VOCAB



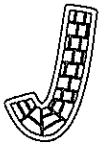




Work happens when...

Energy is measured in the unit of _____ (J).

$1\ J = 1\ \frac{kg*m^2}{s^2}$



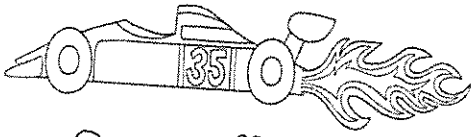
2

MECHANICAL ENERGY *is...*

=

POTENTIAL ENERGY **is ...**

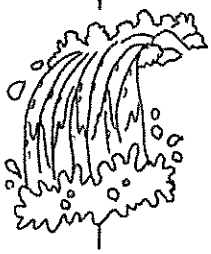
+



KINETIC ENERGY *is ...*

OPTIC QUESTIONS:

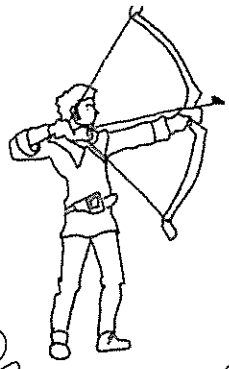
3



GRAVITATIONAL POTENTIAL

Dependent on _____ and _____.

Examples: at the top of a rollercoaster and _____



ELASTIC POTENTIAL

Stored due to being _____ or _____.

Examples: _____ and rubber bands

NUCLEAR POTENTIAL

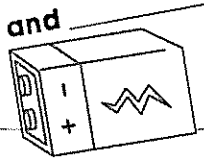
Stored in the _____ of an _____.

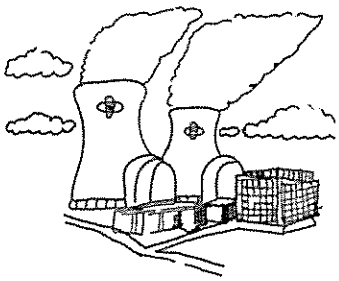
Most _____ form of energy.

CHEMICAL POTENTIAL

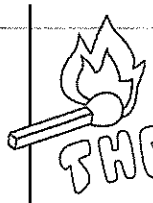
Stored in _____ between _____ and _____.

Examples: _____

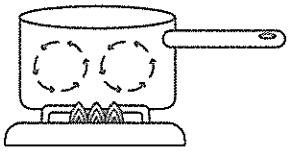




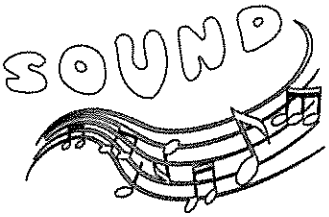
4



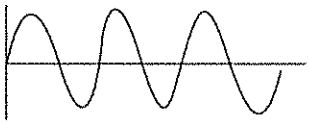
THERMAL



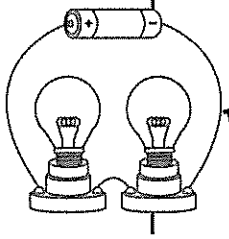
_____ and movement of molecules, also known as _____.



SOUND



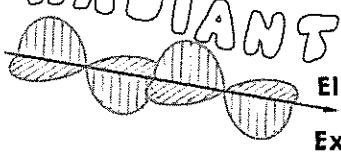
Vibrational _____ through substances in _____.



ELECTRICAL

The movement of _____.

Examples: _____ and _____ in appliances



RADIANT

Electromagnetic _____.

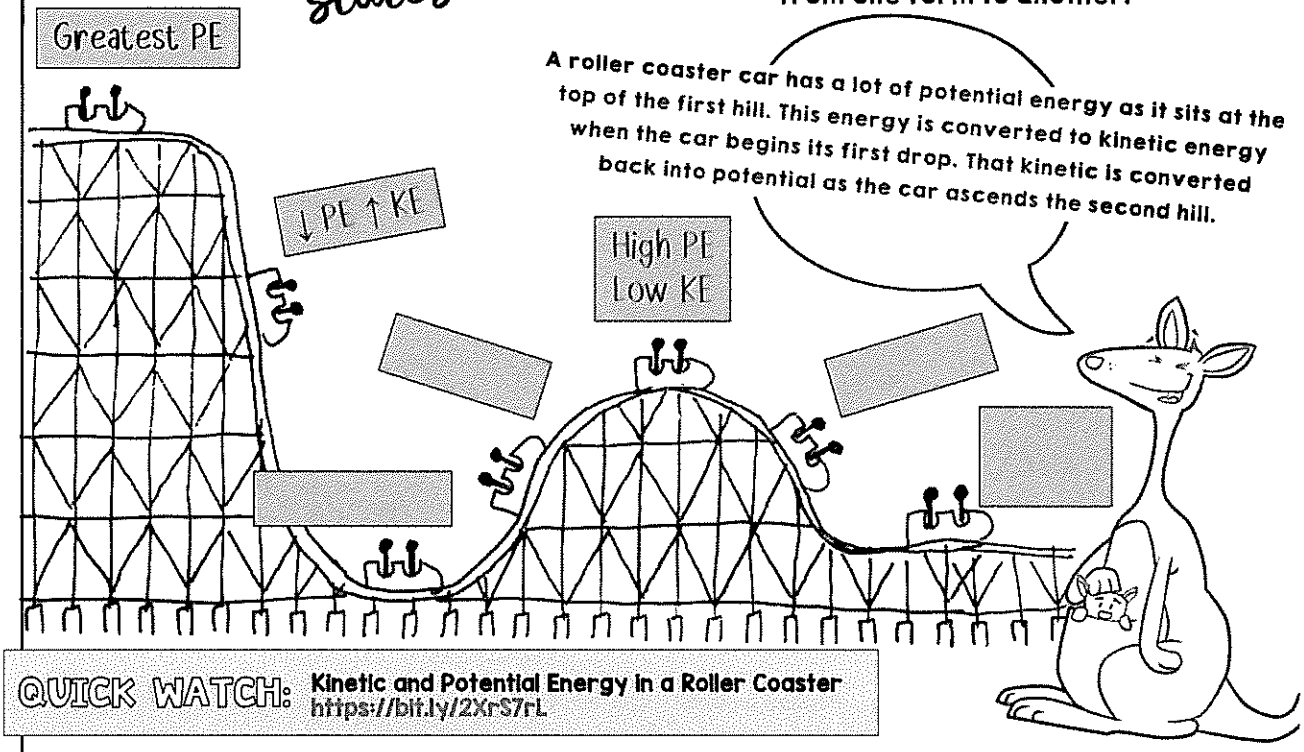
Examples: visible _____, X-rays, _____

OPIC QUESTIONS:

5

the LAW OF CONSERVATION OF ENERGY states that...

Energy can _____ forms but it is never _____. This law means that energy can neither be _____ nor _____; rather, it can only be _____ or transferred from one form to another.



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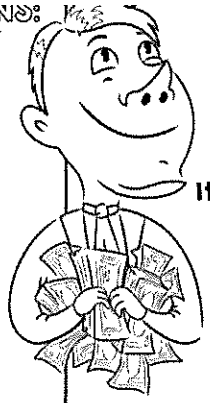
Do Label the empty boxes along the roller coaster track where potential energy (PE) and kinetic energy (KE) are increasing and decreasing.

Then Do Eventually the roller coaster car will not be able to rise up another hill ... Why is this? What happens to the energy of the car?

TOPIC QUESTIONS: K-S

6



ENERGY is a strange property of objects that...

It is a little bit like _____. Sometimes you can tell that somebody is _____ wealthy because they have a lot of things or do exciting things.

But other times that wealth is just being _____ somewhere, the way money is stored in a _____.

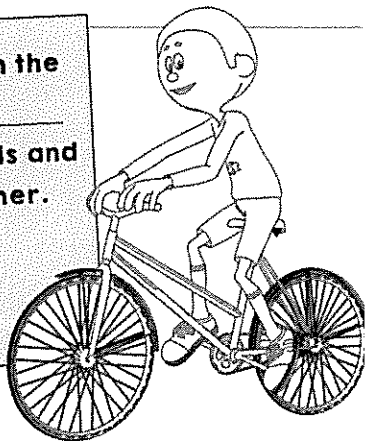
ENERGY TRANSFORMATION

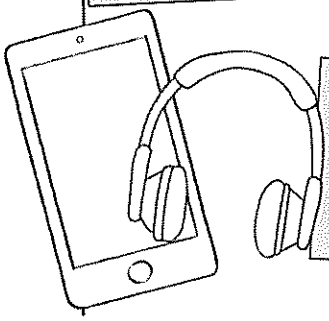
is the process of energy...

This transformation is often able to be seen because...

7

Riding a bike: The _____ potential energy stored in the food that the boy ate this morning is transferred to _____ energy as he applies _____ (does work) to the bike's pedals and to _____ energy (heat) as his body begins to get warmer. The bike itself then has _____ energy. The force of _____ between the tires and the ground _____ the motion into _____ energy (heat) and into _____ energy.





Do Fill in the missing types of energy in the description of energy transformation below.

Listening to a Podcast: The _____ energy stored in the battery is transferred to _____ energy when the device is used. This energy is transferred to _____ energy as you hear the recording play and to _____ energy as the device gets warm.

Name: _____ Class: _____ Date: _____

ENERGY FORMS & TRANSFORMATIONS: SUM IT UP!

1. Match each word with its correct definition by writing the letter on the line.

_____ energy	A. the standard unit for measuring the amount of energy something has
_____ work	B. how much matter there is in something
_____ joule	C. where an object is relative to a point of reference
_____ position	D. when a force is used to move an object through a distance
_____ mass	E. the ability to do work

2. Write "PE" next to the types of potential energy and "KE" next to the types of kinetic energy.

_____ gravitational	_____ sound
_____ chemical	_____ nuclear
_____ radiant	_____ thermal
_____ elastic	_____ electrical

3. Write MECHANICAL, POTENTIAL, or KINETIC on the line next to each description below:

_____ : depends on an object's mass and position (height)

_____ : depends on an object's motion (speed) and position (height)

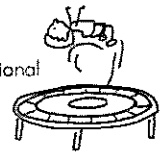
_____ : depends on an object's mass and speed

4. Complete each sentence below by circling the correct word.

- If two objects of different masses are about to be dropped from the same height, the heavier one has (GREATER / LESS) gravitational potential energy.
- If two marbles are rolled down a ramp from the same height toward a container, the (LIGHTER / HEAVIER) marble will move the container farther because it has more (POTENTIAL / KINETIC) energy as it reaches the bottom of the ramp.
- If one water balloon is held 1 meter above the ground and another water balloon of the same size is held 3 meters above the ground, the (HIGHER / LOWER) balloon has the greater amount of gravitational potential energy. When the balloons are dropped, the (HIGHER / LOWER) balloon will hit the ground with more force because it will have (MORE / LESS) kinetic energy.

5. Choose the correct energy transformation sequence from the word bank for the action happening in each example below. Write the letter on the line.

A. Gravitational Potential → Sound → Thermal
B. Chemical Potential → Mechanical → Elastic Potential → Gravitational
C. Electrical → Sound → Thermal → Radiant
D. Chemical Potential → Radiant → Thermal



_____ _____ _____

How are you feeling about the basics of Energy Forms and Transformations? Circle one: