

Potential energy has to do with height

And if it's in a place of height

Gravity and magnetism drive

If objects can be squashed or stretched, again

Like elastic bands or strings

Elastic potential energy



The law of conservation of energy

Can't materialize and never be destroyed

Whenever anything happens with energy

It has no choice it's just changed into a different form

Oh, Oh, Oh



GY

Unit 3

September 16, 2016

DO: I will be able to identify and explain potential and kinetic energy.

EQ: Explain the characteristics of Potential and Kinetic Energy.

WARM UP:

Potential Energy is

Kinetic Energy is

Guiding Questions:

1. Where does energy come from?
2. How is energy used?
3. What forms of energy can we see and where?

- **Energy**: Causes changes
- ANY type of activity requires energy.



Potential and Kinetic Energy

ALL ENERGY...

Comes from the SUN!



Potential Energy

Energy that is not being used is stored energy. Just like you store unused flour in a container, notebook paper in your binder, or food in a pantry, you can also store energy. Stored energy is called potential energy.

Key Point:

Potential Energy is STORED ENERGY.

Potential Energy

The higher something is from the surface of the Earth, the greater its potential energy. This is because it has more room to move.

You can calculate the Potential energy of something:

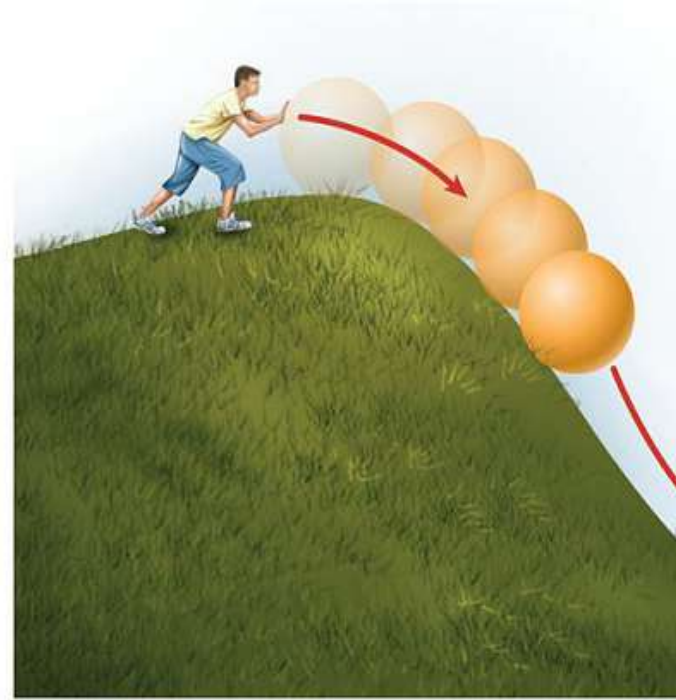
$$PE = \text{mass} \times \text{height}$$

Key Point:

Things sitting up high have more potential energy than things sitting on the ground.



ial energy



(b) Kinetic energy

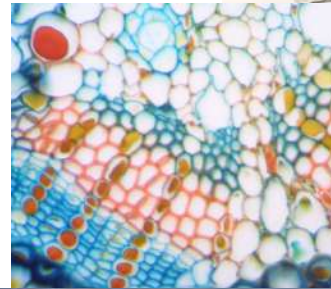
Potential Energy

The ball at the top of the hill has a great deal of potential energy.

Potential Energy

There are many places where you can find potential energy stored besides up high!

- In a candy bar! (chemical)
- In a battery! (chemical)
- In your cells! (chemical)
- At a power facility! (nuclear)
- In a rubber band! (elastic)
- In a bow and arrow (elastic)



Potential Energy



Kinetic Energy

Energy that is being used is creating action of some kind. All things that move contain the energy of motion, and we call this kinetic energy. When you tap into the stored stuff you have (food from the pantry or paper from your binder), then you are using that resource at the moment. The same goes with energy-when we tap into it, it becomes active energy.

Key Point:

Kinetic energy is ENERGY OF MOTION.

Kinetic Energy

Two things can affect the amount of kinetic energy of something.

1. Its mass.... Simply put, the bigger something is, the greater its energy.
2. Its velocity(speed).... Again, pretty simple. The faster it moves, the more energy it has.

$$\mathbf{KE = M \times V}$$

(This might remind you of the formula for force....

How do force and energy relate to each other?)

Kinetic Energy

Anytime you see something moving, you are seeing kinetic energy. It's the energy of a moving bus, a roller coaster, a plane flying, and a paratrooper jumping.

Key Point:

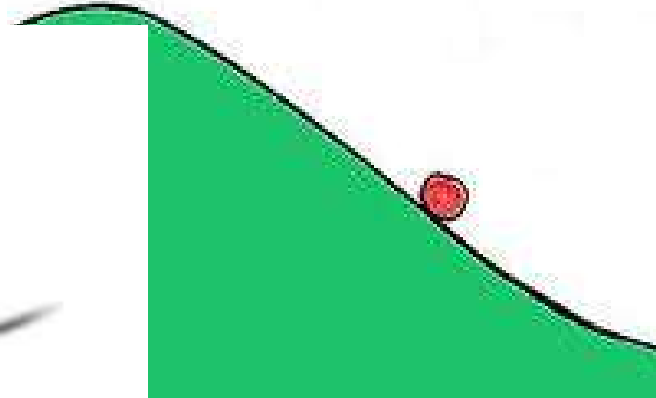
Nothing moves without energy. Nothing.

Kinetic Energy

-

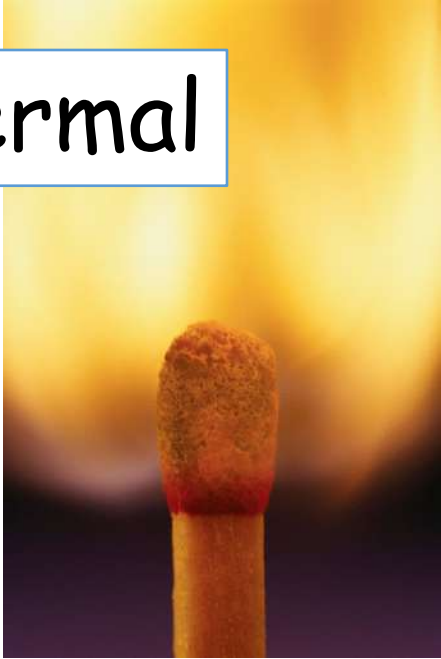


Kinetic Energy

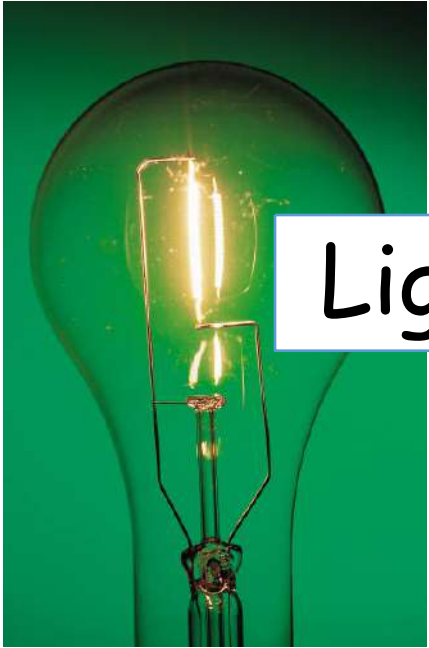
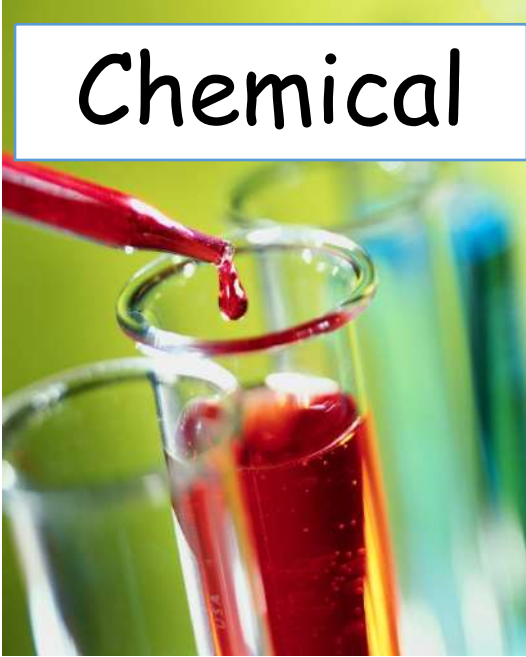


Types of Energy

Thermal

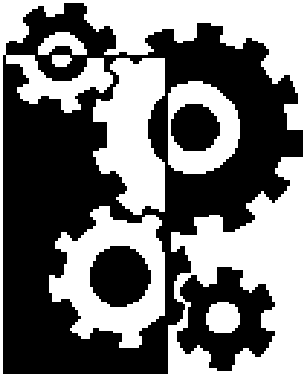
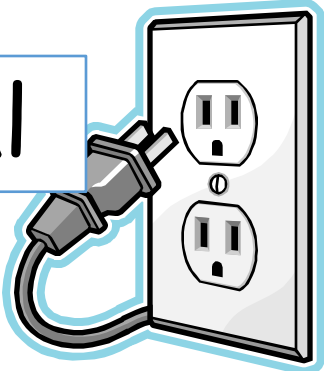


Chemical



Light

Electrical



Mechanical

Sound

September 19th, 2016

DO: I will be able to breakdown the relationships as well as unique characteristics the forms and types of energy by creating my own graphic organizer.

EQ: Explain the characteristics of Potential and Kinetic Energy.

WARM UP:

Which situation describes a conversion from kinetic energy into potential energy?

- An apple falling from a tree
- A duck moves through water
- A rubber band wrapped around stalks of broccoli
- A can rolls along the floor



...converted to kinetic energy

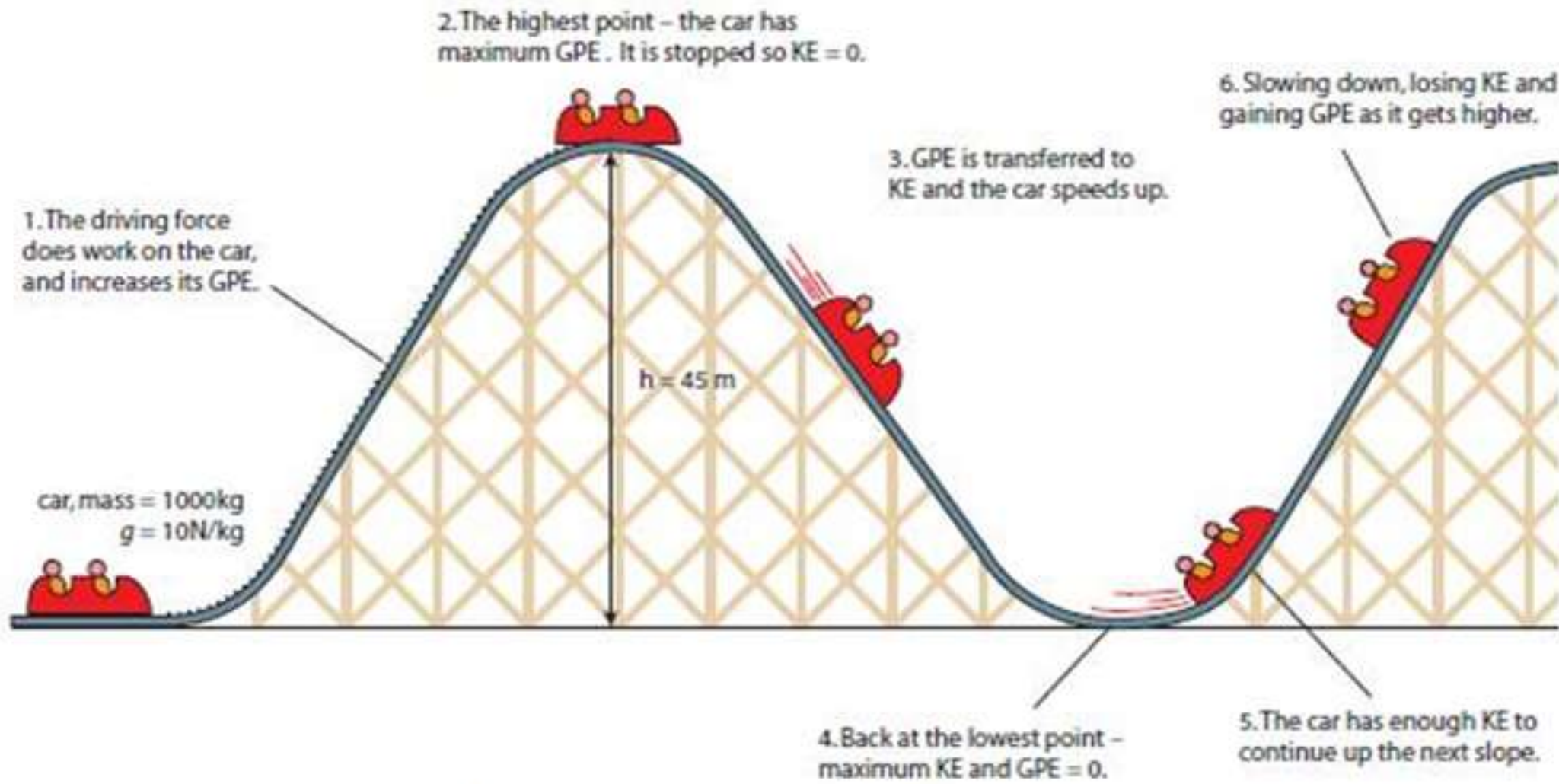
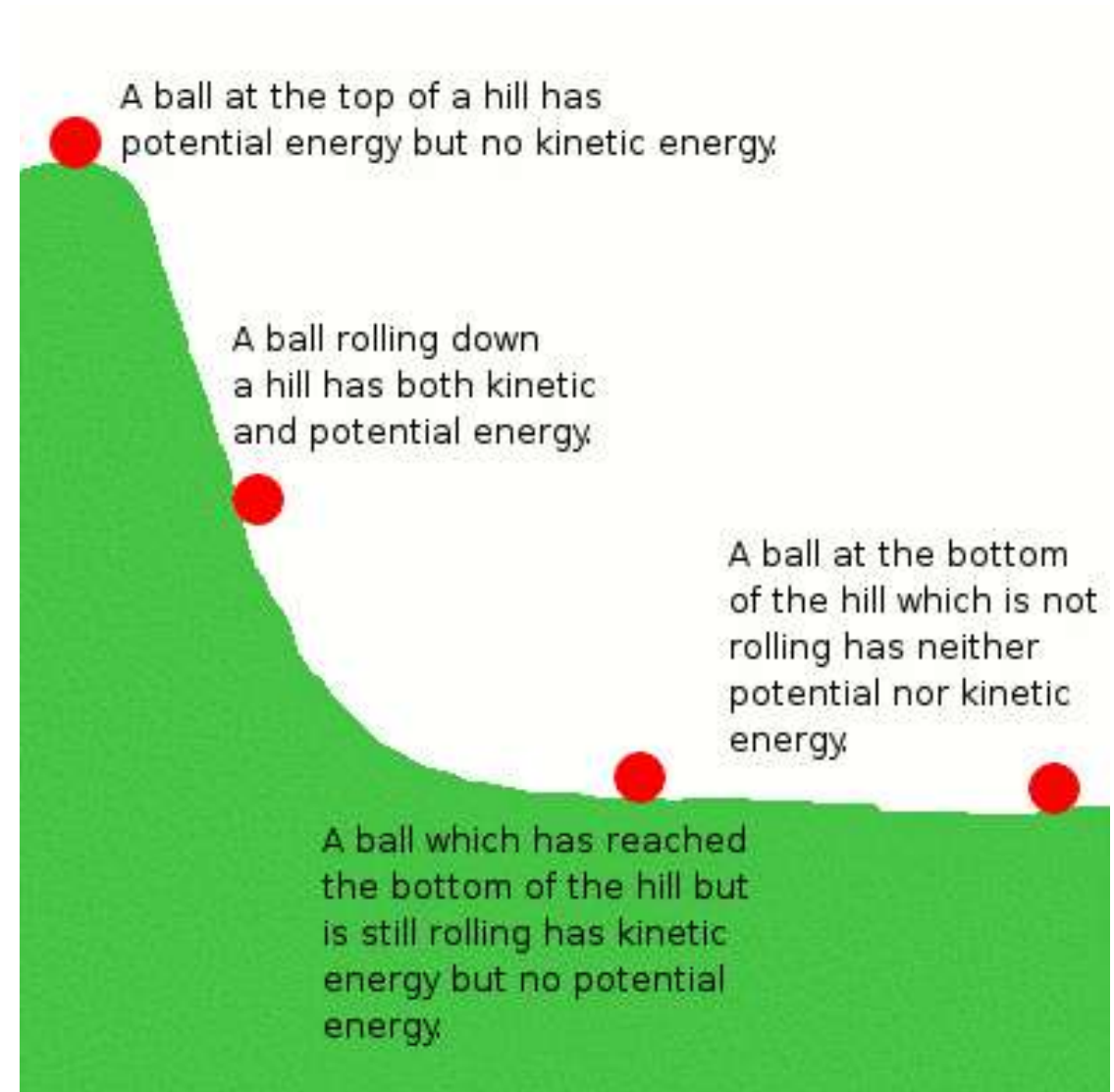
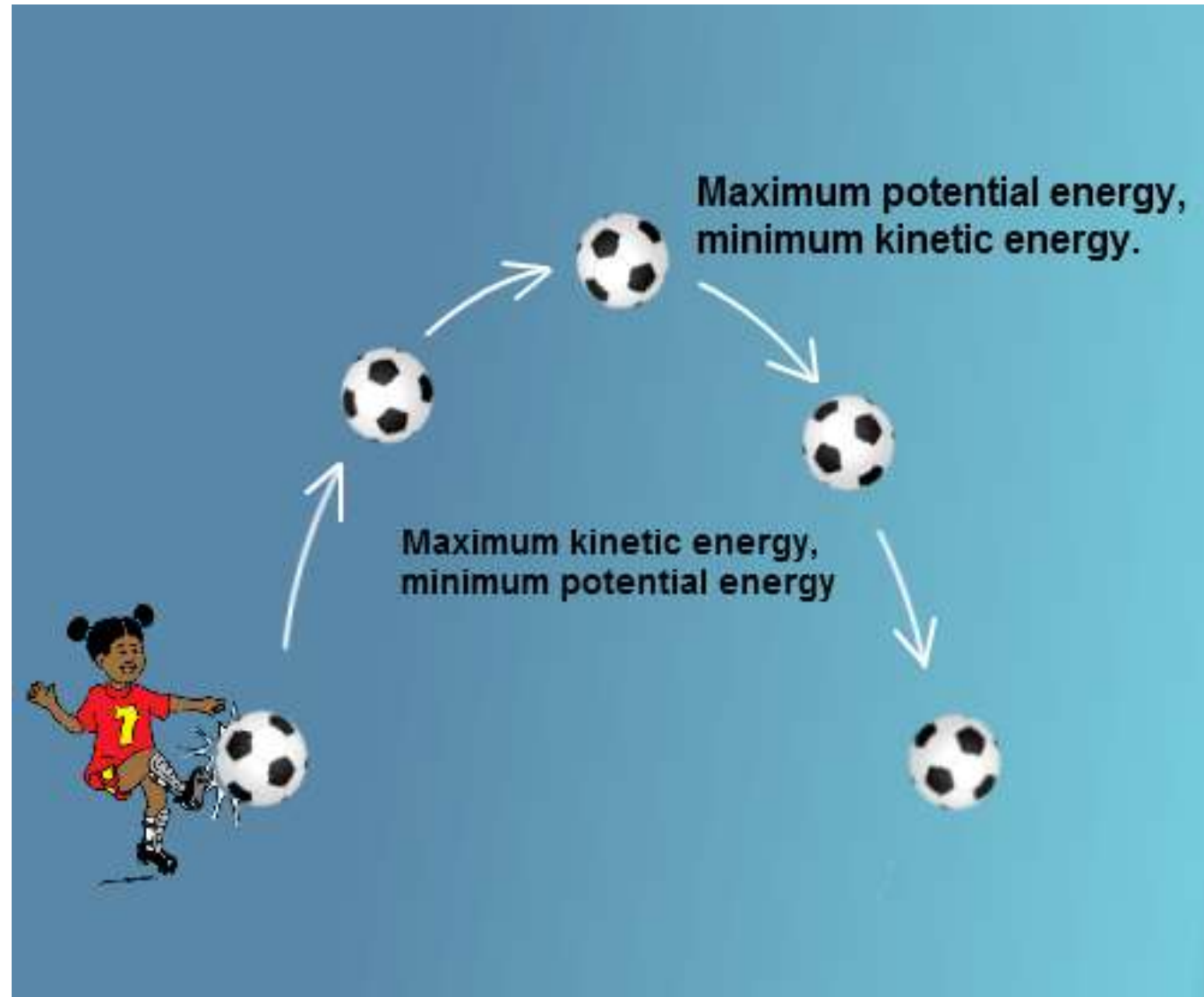
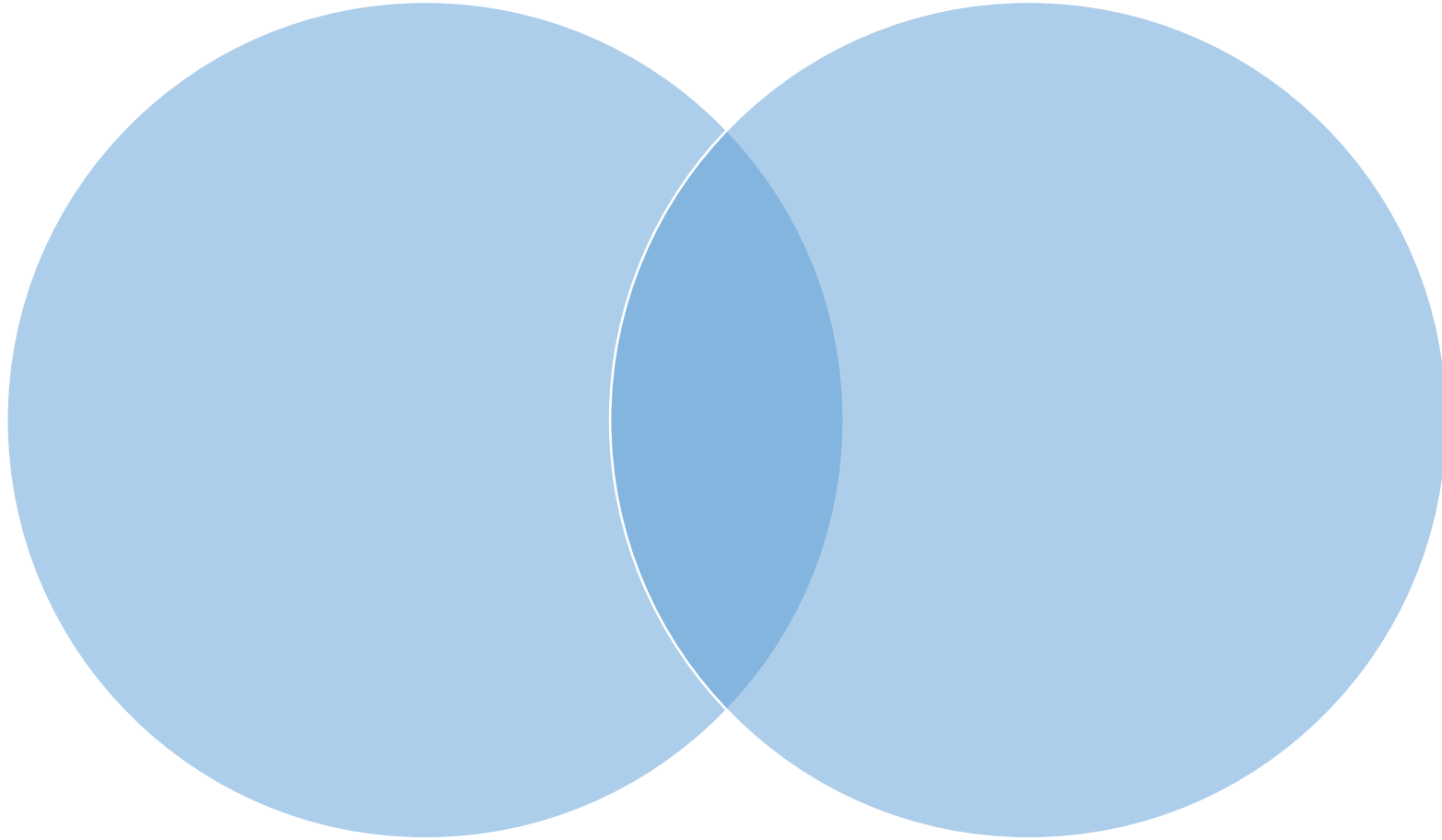


Fig. 9.16 Transferring energy from GPE to KE and back again.



Compare and Contrast: Potential and Kinetic energy



Kinetic Energy

- Kinetic energy is also known as energy of motion.
- Which object has more kinetic energy? Why?



Kinetic Energy Depends on Two Things

- Greater mass = greater kinetic energy
- Greater speed = greater kinetic energy



Lets check your understanding

- The amount of kinetic energy an object has depends on what two things?
 - Speed and Mass
- What is a unit of work called?
 - Joule
- The Hulk carries a 200N car a distance of 10 meters. How much work has he done?
 - $\text{Work} = \text{Force} \times \text{Distance}$ $\text{Work} = 200\text{N} \times 10 \text{ Meters}$ $\text{Work} = 2000 \text{ Newton/Meters}$ or 2000 Joules

What are some other forms of energy?

Kinetic Energy

- M
- R
- S
- F
- E
- T

Potential Energy

- G
- E
- N
- C

Chemical

- Chemical energy is the energy stored within the bonds between atoms.



Thermal (Heat)

- Energy from the kinetic motion of molecules.



Radiant (Light)

- Energy from the sun.

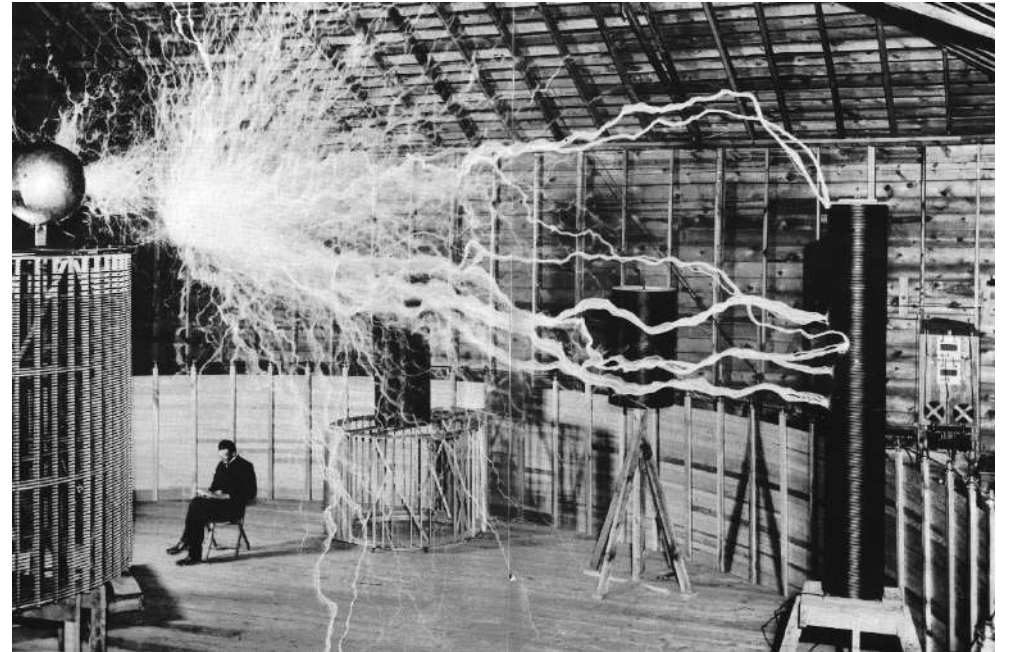


Electrical

- Energy from the flow of electrons.

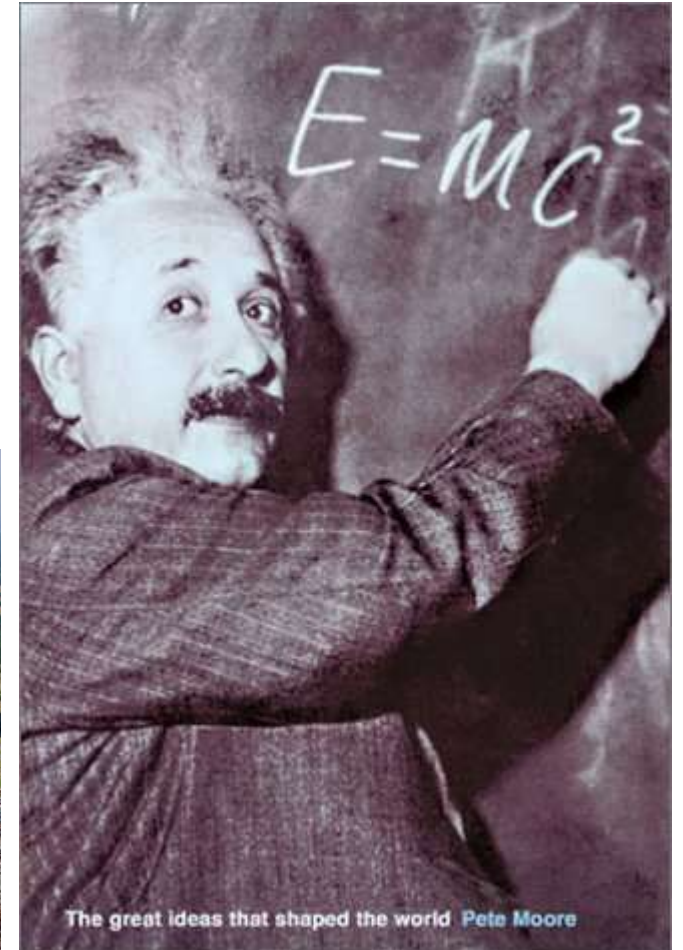


High voltage



Nuclear

- Energy from the mass of atoms.



Creative Writing:

Create a story about MRS FET and GEN-C.
Pneumonic Device for types of energy.

Write a sentence about each letter in the
Pneumonic Device MRS. FET and GEN-C.

Ex.

M-Mrs. Fet is a very energetic lady, she is in constant **Mechanical Motion** moving her feet as she walks down the street.

KINETIC

M- Mechanical

R- Radiant

S- Sound

F-Friction

E-Electrical

T-Thermal

POTENTIAL:

G- Gravitational

E- Elastic

N- Nuclear

C-Chemical

Closure:

Create an example of a system that has 2 transformations of PE and KE.

- Ex: I put gas in my car (potential energy) the was transformed into mechanical energy (kinetic energy) as the engine began to move.

September 20th 2016

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WARM UP:

Which situation describes a conversion from kinetic energy into potential energy?

- a. An apple falling from a tree
- b. A duck moves through water
- c. A rubber band wrapped around stalks of broccoli
- d. A can rolls along the floor

Creative Writing:

Create a Pneumonic Device for types of energy.

Example

KINETIC
M- Mechanical
R- Radiant
S- Sound
F-Friction
E-Electrical
T-Thermal

POTENTIAL:
G- Gravitational
E- Elastic
N- Nuclear
C-Chemical

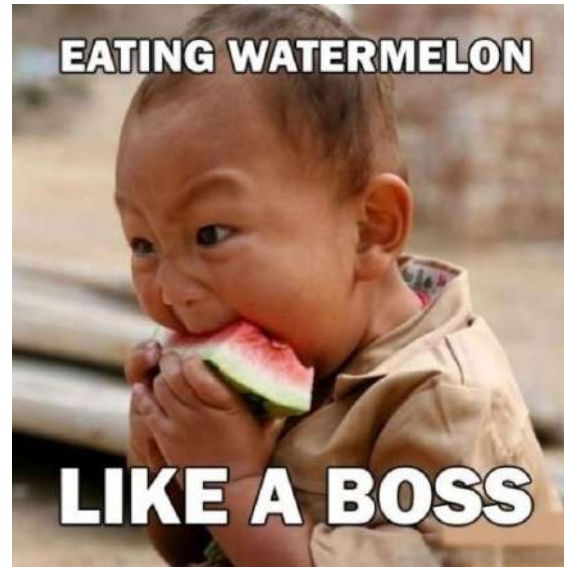
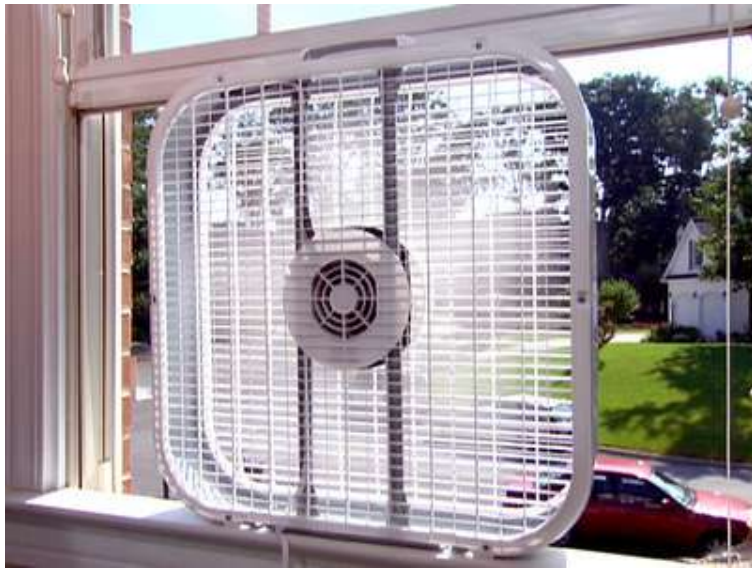
NBI-1st and 5th Only:

Mini Anchor Charts: Create your own graphic organizers with your group.

First make a list of all of the energy words that you are confident that you can explain. Create an organizer for these words (take a picture). Then create a new organizer that is based on new criteria for example: the use, a transition, etc. (take a picture). Then create a graphic organizer anchor chart with definitions, explanations, and pictures using the classification that your group preferred most from the activity.

Energy Transformations

- Energy is constantly being transformed from one form to another.
- Identify the energy transformations in these pictures:



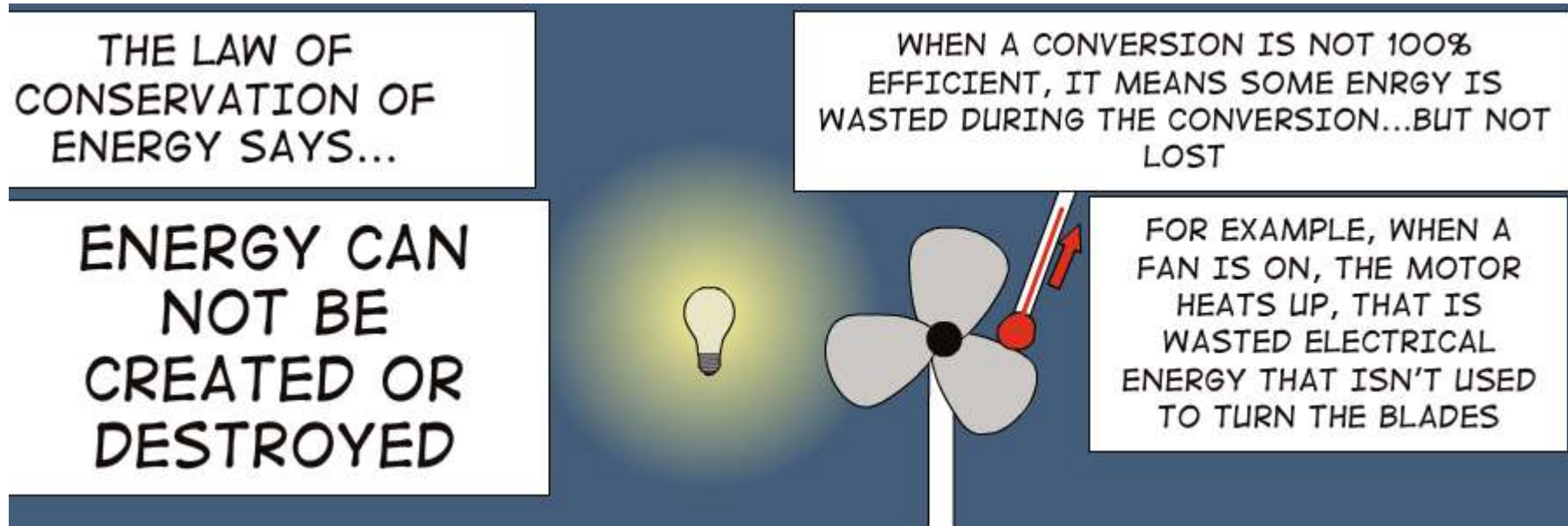
Energy is never transformed 100%

- Engines do not transform 100% of the chemical energy from gasoline into kinetic energy.
- Bicycles do not transform 100% of the energy from the biker into motion.
- Energy is NOT “lost”, it’s just transformed to heat.



The Law of conservation of Energy

- Energy cannot be created or destroyed, it can only change form.



Calorie

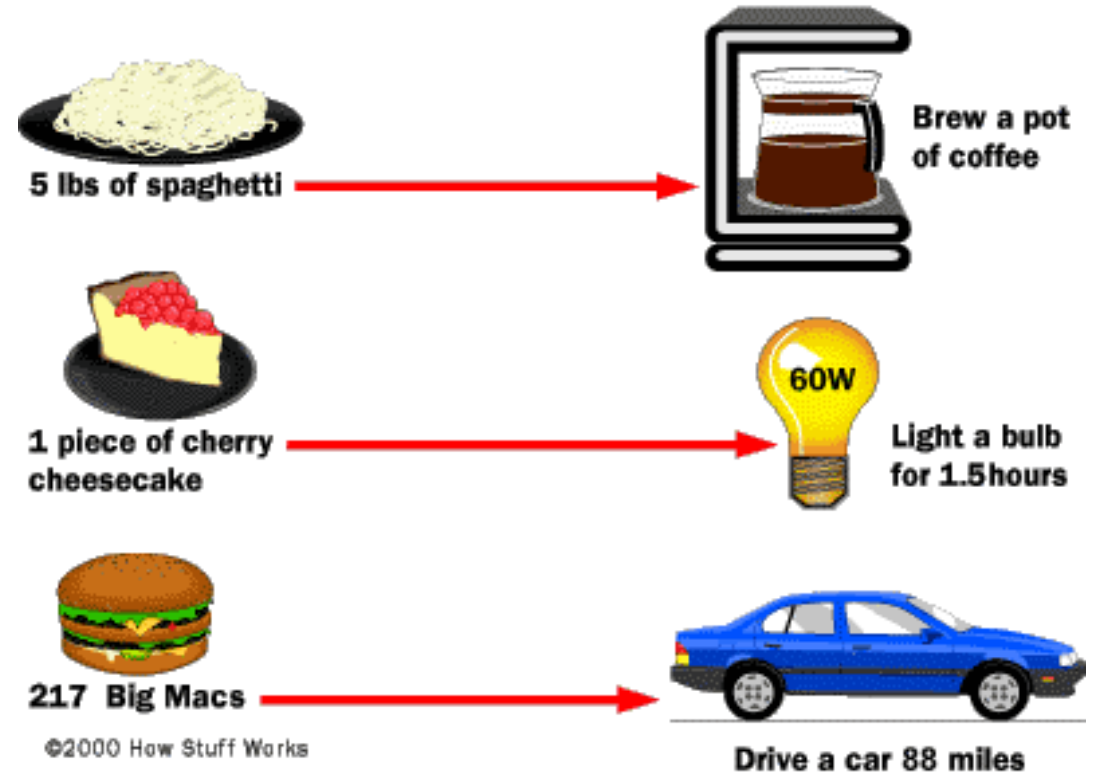
- Energy of heat can also be measured in Calories.
- 1 Calorie is = 4.18 Joules
- 1 Calorie is the amount of heat needed to raise 1gram of water 1⁰ Celsius.
- How do food scientists determine the amount of calories in a food item? [\(VIDEO\)](#)



Calories continued

- What does 200 calories look like?

The Calories in these items could:



Just for fun

October 21st 2016

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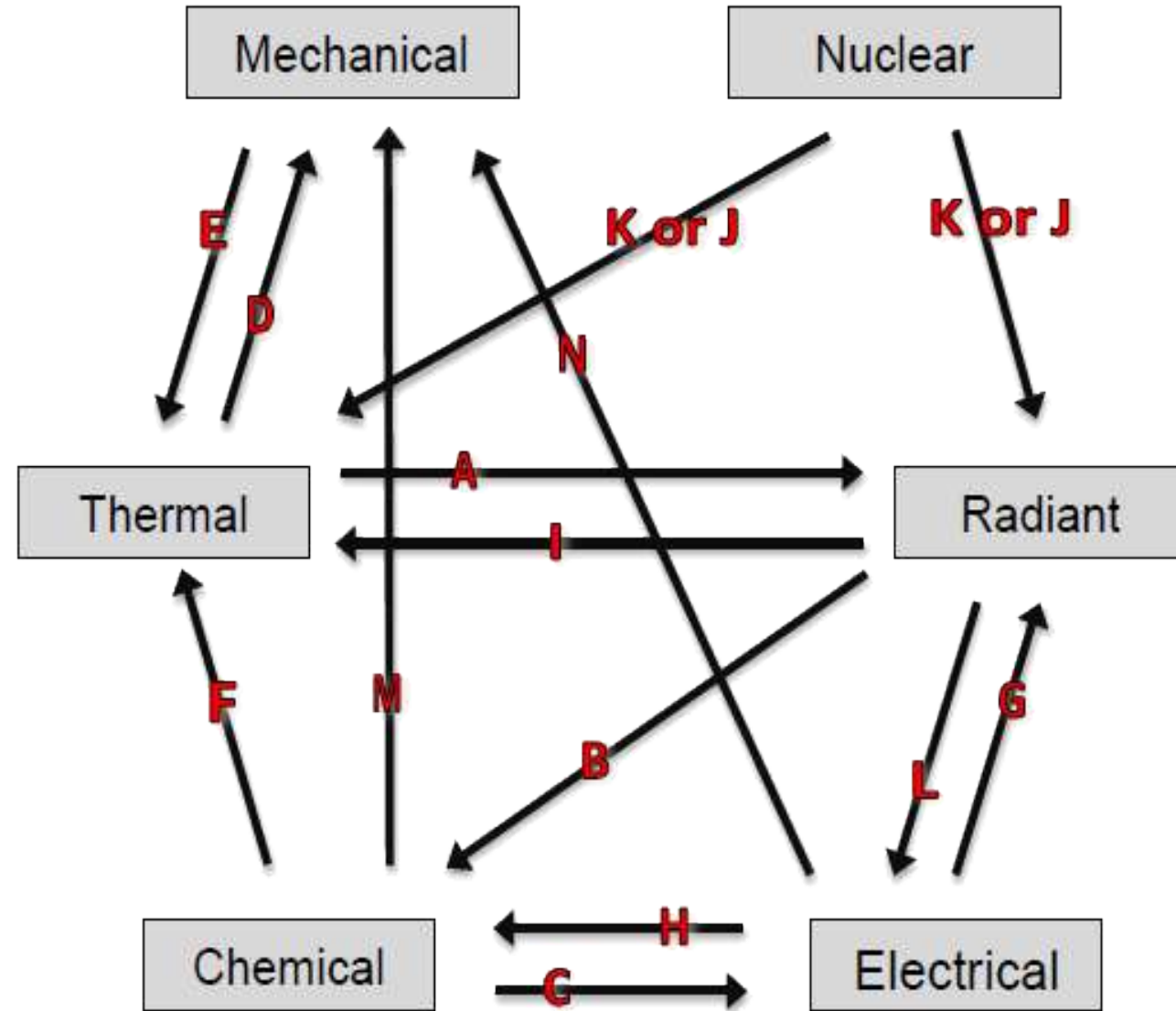
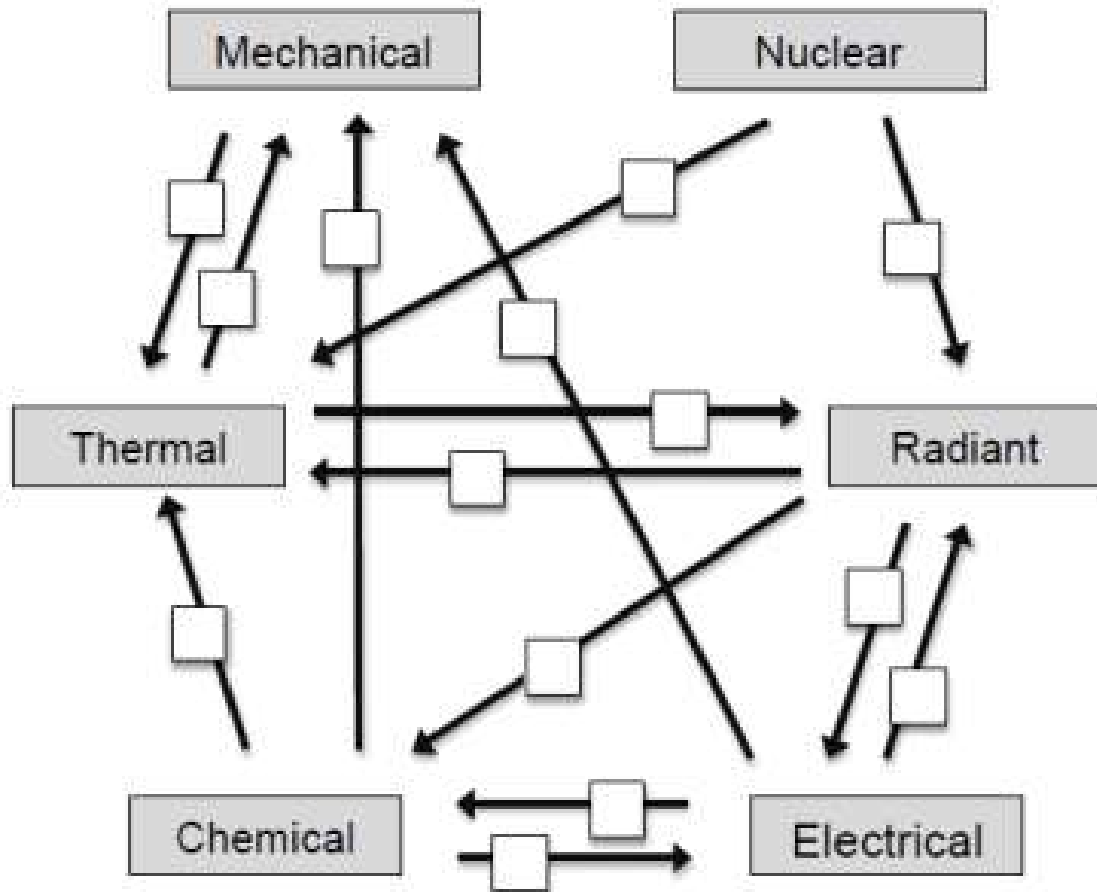
WARM UP:

Create two examples of energy transformations.

Each should be three steps or more.

Student Assessment Page

Label the boxes in the diagram using the choices from the table below. There can only be one answer per box and you can only use each letter once.



A. Fire	B. Photosynthesis	C. Battery	D. Steam/gas engine
E. Friction	F. Burning coal	G. Lightening	H. Battery charger
I. Solar cooker	J. Sun	K. Fission	L. Solar panel
M. Moving muscles	N. Motor		

Examples

FORMS OF ENERGY

All forms of energy fall under two categories

POTENTIAL

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

KINETIC

Kinetic energy is motion - the motion of waves, electrons, atoms, molecules and substances

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.

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.

NUCLEAR ENERGY

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

THERMAL ENERGY

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

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.

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 motion energy.

ELECTRICAL ENERGY

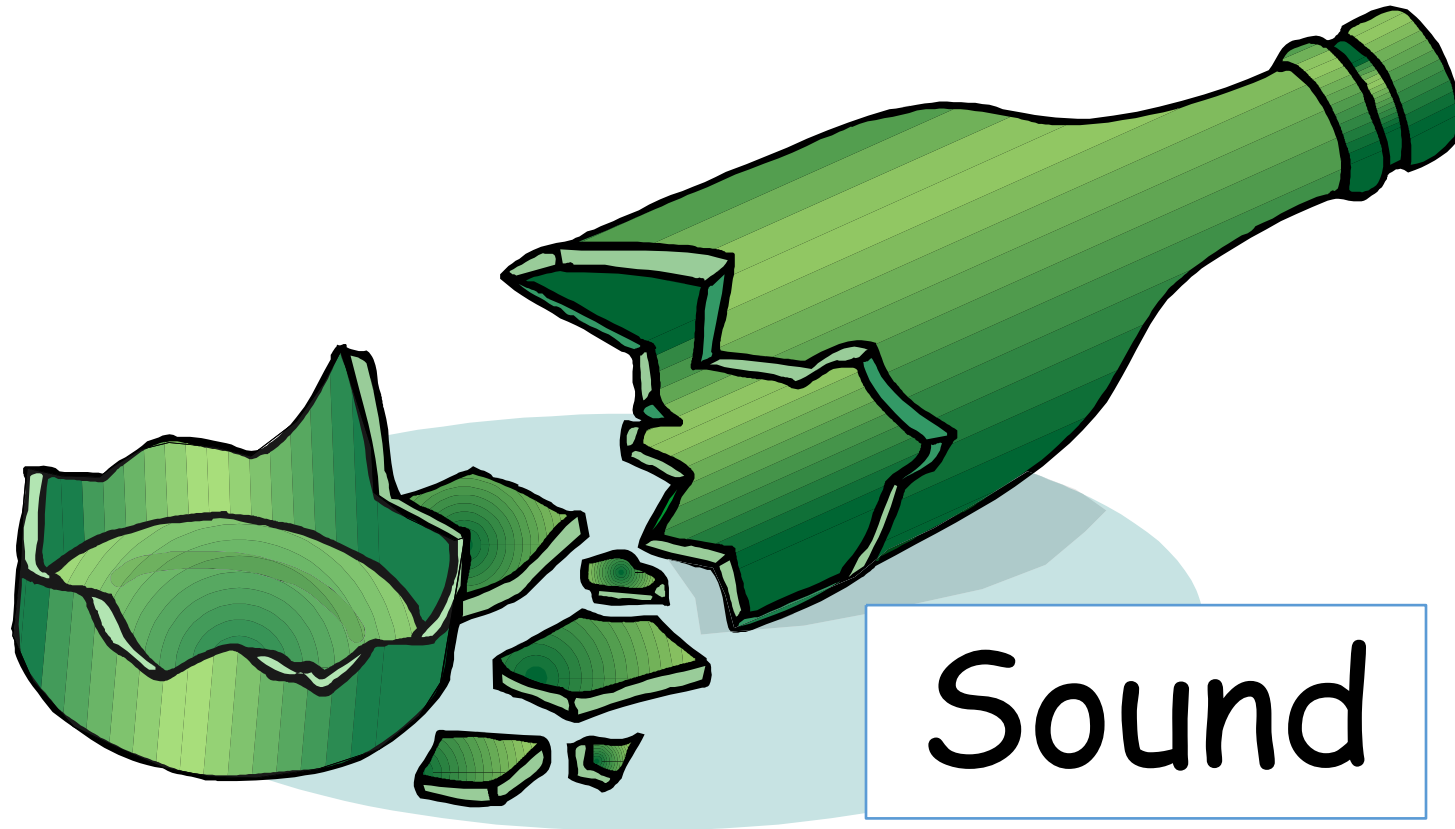
Electrical energy is the movement of electrons. Lightning and electricity are examples of electrical energy.

Examples

What type of energy is given off when ice melts?



What type of energy is given off when glass is dropped?

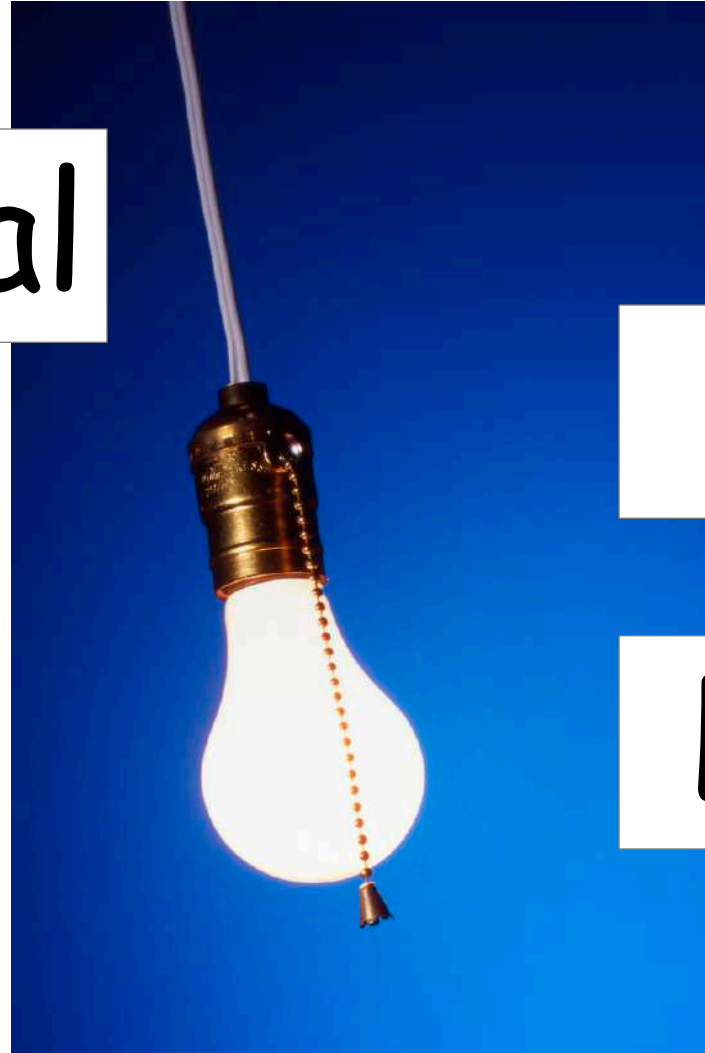


What type of energy is given off when a light is turned on?

Thermal

Sound

Light



What type of energy is given off when fireworks explode?

Thermal

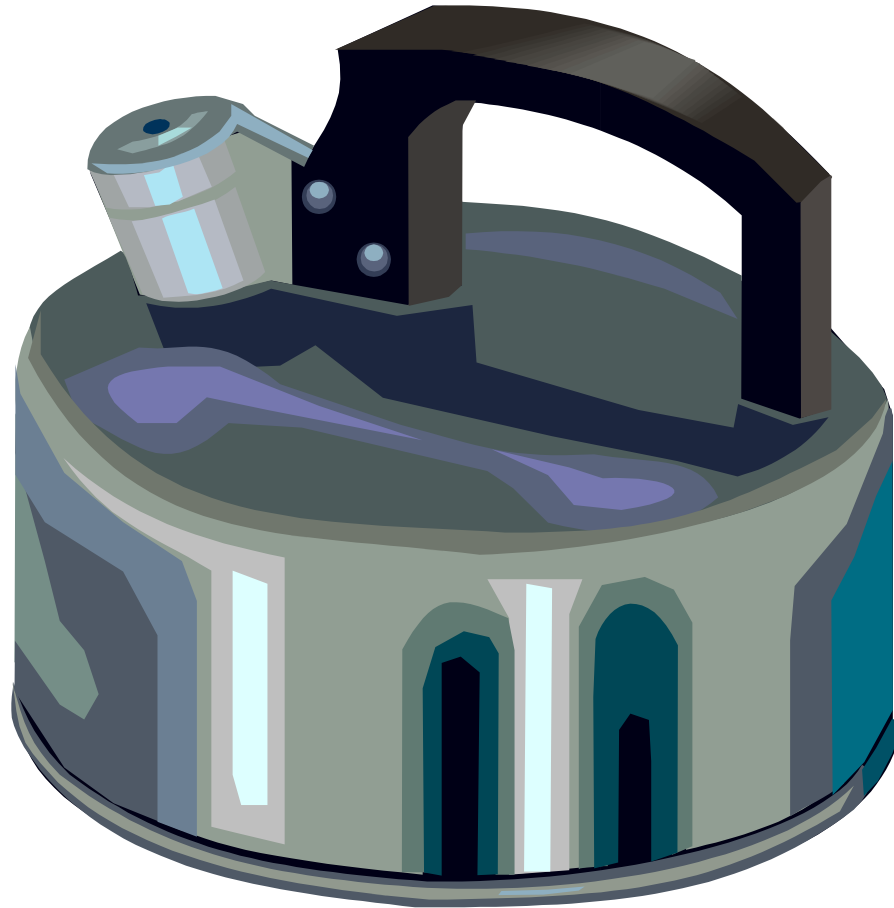
Sound

Light

Mechanical



What type of energy is given off when water boils in a kettle?



Sound

Thermal

What type of energy is given off when wood is cut with a saw?



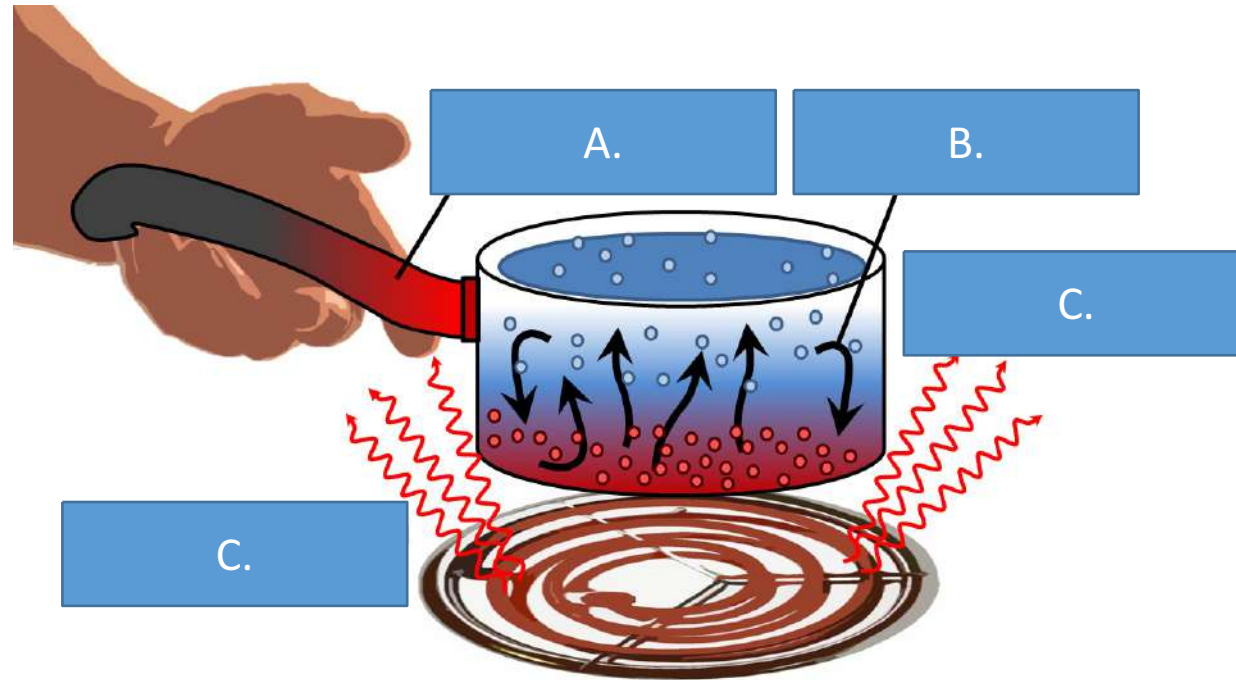
Sound

Thermal

September 2016

DO: I will be able to breakdown the relationships as well as unique characteristics the forms and types of energy by creating my own graphic organizer.

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WARM UP:

Explain the types of heat transfer occurring in the picture.

A.



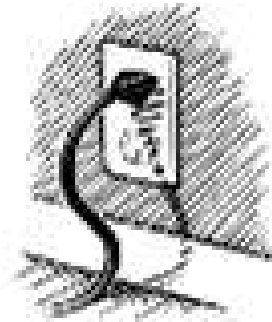
B.



C.



D.



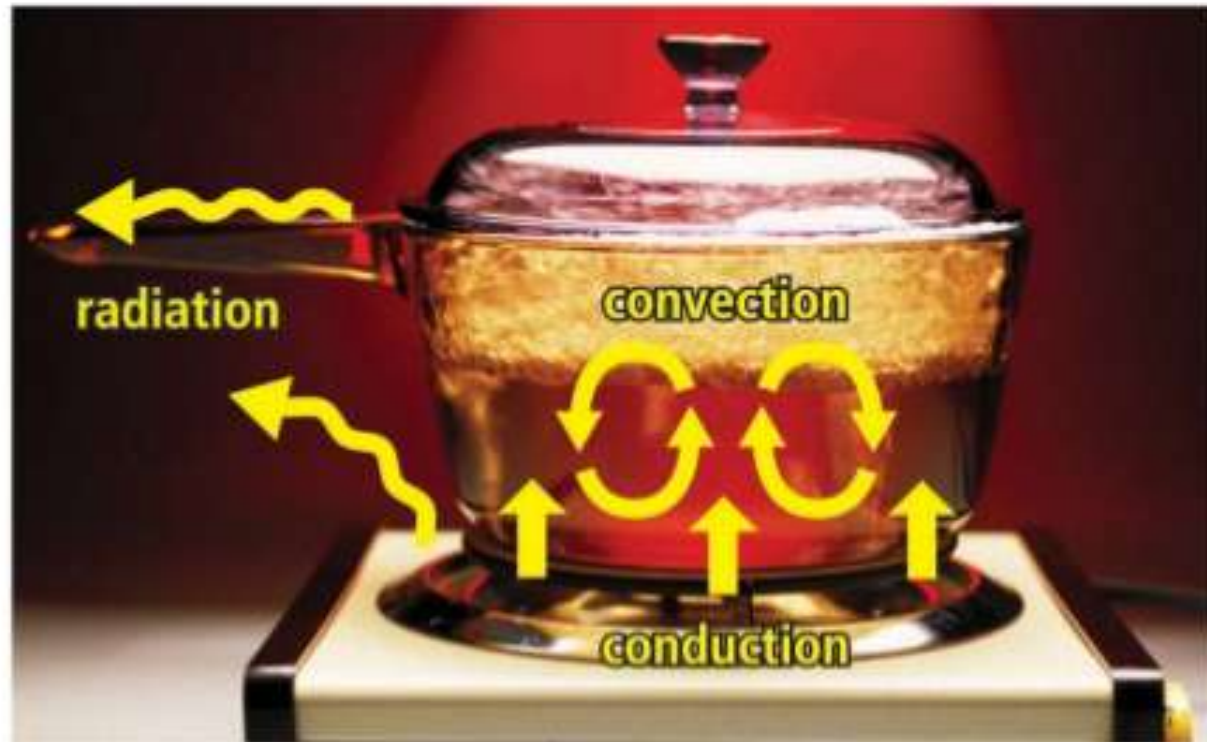
Heat Transfer

Heat can be transferred in 3 ways:

Conduction

Convection

Radiation



	Definition	Example on the Sun	Example on the Earth
Convection	Currents are created when there are differences in temperature and density within a fluid	Convective currents swirl around until they pass through the photosphere	Cooling yourself by using a fan
Conduction	The transfer of heat by direct contact between two materials with different temperatures	NA (Remember that the Sun has no solid surfaces — it is a “ball of gas.”)	Heat loss through an exterior house wall
Radiation	The movement of heat waves	The way energy from the Sun’s core moves to the Sun’s surface	Cooking food in a solar oven

September 23rd 2016

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EQ: Explain the characteristics of Potential and Kinetic Energy.

WARM UP:

Create two examples of energy transformations.

Each should be three steps or more.

Journal 9-23

1. Explain how energy transitions relate to the ecological cycles that govern the earth?
2. How does human interference impact the conditions of the globe?

