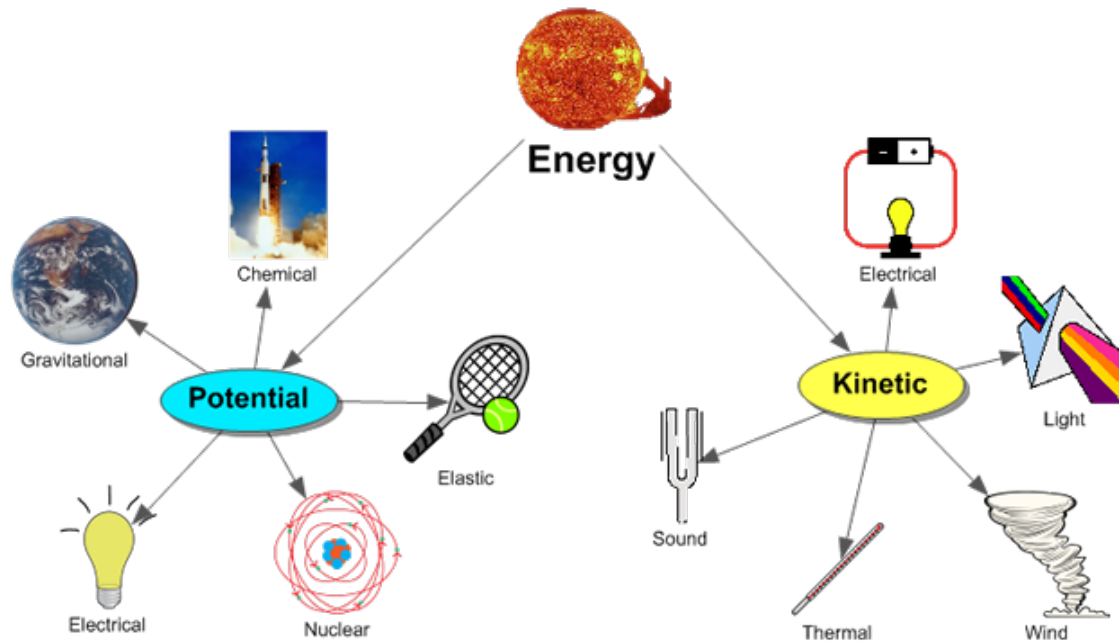


Energy

Section 15.7

Forms of Energy / Energy Transformation



Forms of Energy

The six major forms of energy are:

1. Mechanical
2. Thermal
3. Chemical
4. Electrical
5. Electromagnetic
6. Nuclear

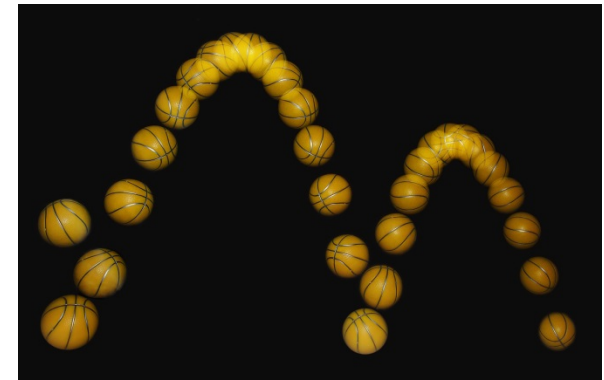
Mechanical Energy

Mechanical Energy

Energy associated with the **motion** and **position** of everyday objects.

Examples

1. Speeding Train
2. Bouncing balls
3. Sprinting Athletes



Thermal Energy

Thermal Energy

Total **potential** and **kinetic** energy all the microscopic particles in an object

Examples

1. Friction
2. Boiling Water
3. Heating Pad



Chemical Energy

Chemical Energy

Energy stored in the **chemical bonds** in compounds. When these bonds are broken, the released energy can do **work**.

Examples

1. Fireworks
2. Burning Wood
3. Gasoline



Electrical Energy

Electrical Energy

Energy associated with **electrical charges**.

Examples

1. **Lightning Bolts**
2. **Television**
3. **Toaster**



Electromagnetic Energy

Electromagnetic Energy

Energy that travels through **space** in the form of **waves**.

Examples

1. **Visible Light**
2. **X-Rays**
3. **Tanning Beds (UV Light)**



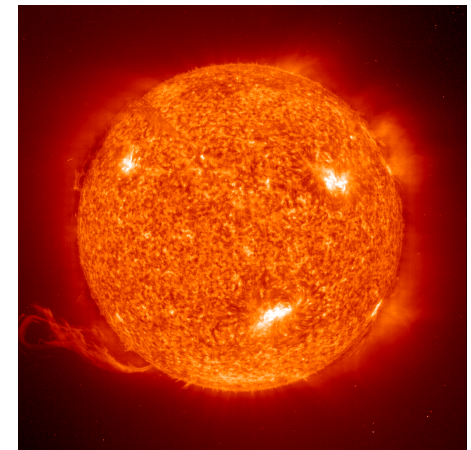
Nuclear Energy

Nuclear Energy

Energy stored in **atomic nuclei**

Examples

1. Nuclear Power Plant (Reactor)
2. Sun
3. Nuclear Weapons



Energy Conversion

Two Laws of Energy

1. Energy Conversion
2. Law of Conservation

Energy Conversion

1. Energy Conversion

Energy can be converted from one form to another

Wind-Up Toy

Elastic Potential Energy is in the compressed spring.

When the spindle unwinds, **elastic potential energy** is converted to **kinetic energy** of the toys moving parts.

Law of Conservation

2. Law of Conservation

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

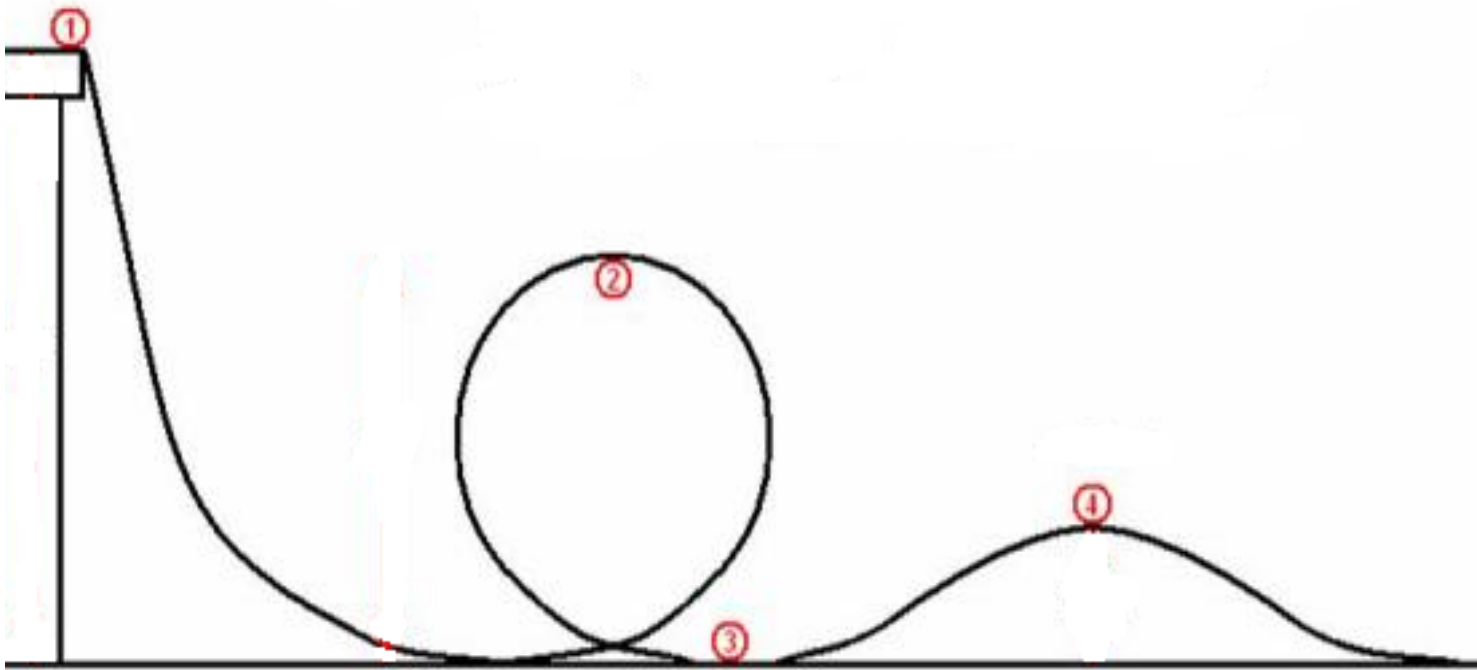
Bicycle

Where does the kinetic energy of a bike go when you stop the bike?

- The bike slowed down and stopped because of friction.
- Friction changes the kinetic energy into thermal energy.

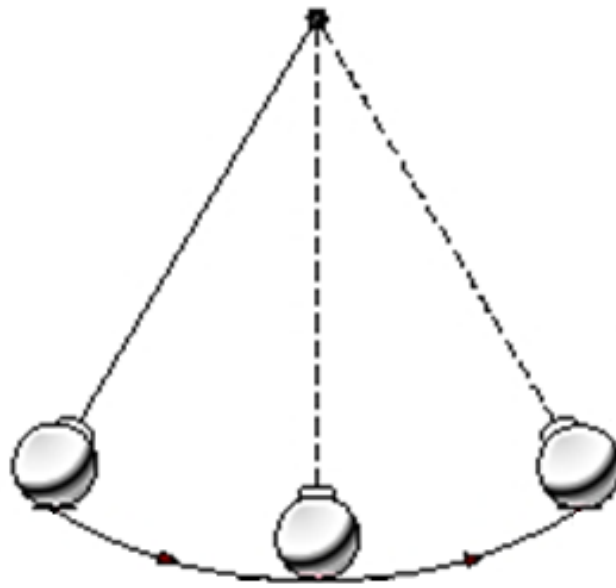
Roller Coaster

Energy Conversion / Energy Conservation



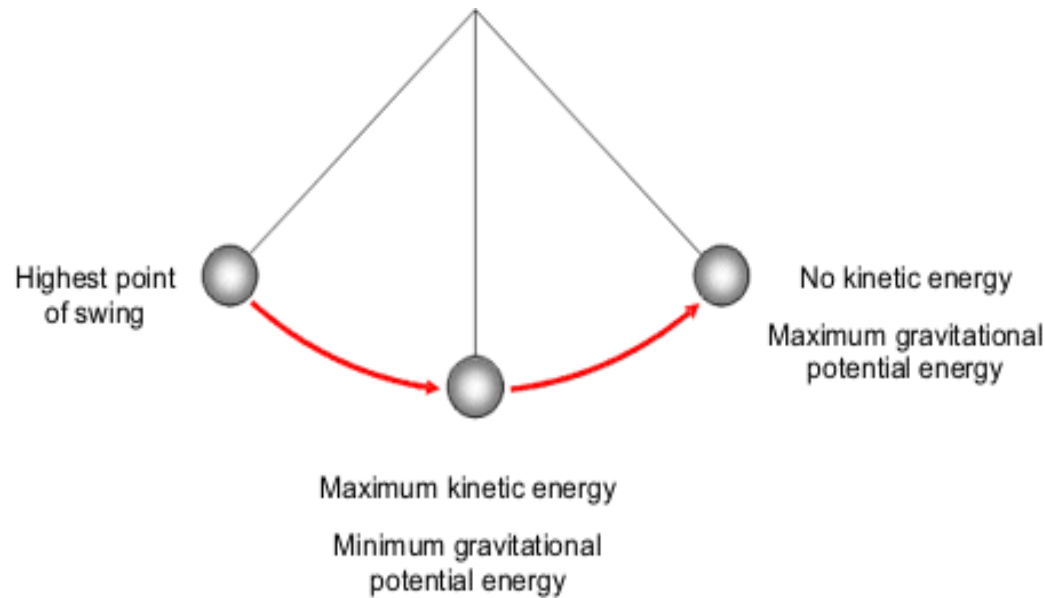
Energy

Draw a pendulum and show where potential energy is the highest, and kinetic energy is the highest



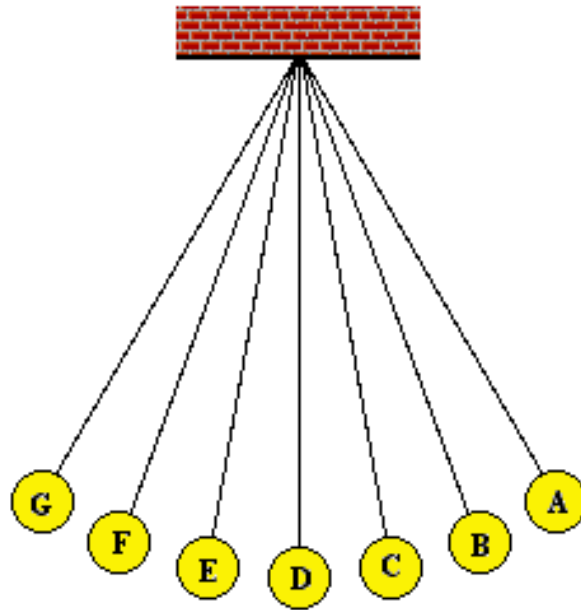
Energy

Draw a pendulum and show where potential energy is the highest, and kinetic energy is the highest



Energy

Where is the greatest PE and KE points on the following pendulum?



Quiz Time!!

#1) What type of energy cooks food in a microwave oven?

Electromagnetic Energy

#2) What type of energy is the spinning plate inside of a microwave oven?

Mechanical Energy





#3) Electrical energy is transported to your house through power lines.

When you plug an electric fan to a power outlet, electrical energy is transform into what type of energy?



Mechanical Energy



#4) What energy transformation occurs when an electric lamp is turned on?

ELECTRICAL ENERGY



ELECTROMAGNETIC ENERGY



**#5) What 2 types of energy is shown below?
(Sort of a trick question.....Think!!!)**



- **Mechanical**
- **Thermal Energy (Don't forget friction)**

#6) *What 4 types of energy is shown below?*



- **Electrical (power to TV)**
- **Mechanical (Push the button on the remote)**
- **Electromagnetic Energy (Infrared rays to TV from remote and the light rays from the TV)**
- **Chemical (Batteries to the remote)**

#7) What type of energy is shown below?



Thermal Energy

15.5 Assessment

Question #1

Which of the following phrases describes a situation in which potential energy is *not* changed into kinetic energy?

- a. An apple falling from a tree
- b. A dart being shot from a spring-loaded gun
- c. The string of a bow being pulled back
- d. A waterfall flowing over a cliff

Label the forms of energy in each example

A car's engines gears	Mechanical
Power Lines	Electrical
Friction in the engine creating heat	Thermal
Heating Soup	Thermal
Moving Automobile	Mechanical
Nuclear Fusion (sun and stars)	Nuclear
Gasoline	Chemical
Foods people eat	Chemical

Label the forms of energy in each example

Nuclear Fission (Inside the earth's core)	Nuclear
Lightning	Electrical
Radio Waves	Electromagnetic
Melting Ice Cream	Thermal
Leaping Frog	Mechanical
The car battery	Chemical
Visible Light	Electromagnetic

Activity

As a group, find the five steps (four types of energy) that a match uses to convert energy. Use a flow chart to describe

Activity – Lighting a Match

1. You use **chemical energy** in your muscles to move your hand (**mechanical**) and strike the match
2. Friction between the match and matchbox converts **mechanical energy** into **thermal energy**
3. **Thermal energy** triggers a reaction in the match tip releases stored **chemical energy** and lights the match
4. The stored **chemical energy** is converted into **thermal energy**
5. **Thermal Energy** to **electromagnetic energy** (flame waves)