

Instructions: Forms of Energy

1. Print, cut, laminate, and trim the Information/Definition/Title Cards, Picture Cards, and Control Charts. **Control Chart #2 prints on 8½ x 14" legal paper**
2. To make a set of 3-part cards from the picture cards; print two sets of cards, keep the labels attached to 1 set, cut the labels off the second set. Learn how to prepare 3-part cards here: http://www.montessoriprintshop.com/Prepare_3-Part_Cards.html
3. Use the Information Cards to introduce the basic concepts of energy.
4. Explore the concept of Kinetic and Potential Energy. Use the Kinetic & Potential Energy Picture Cards to classify and discuss the difference between the two.
5. Use the Definition Cards to explain each form of energy in this set.
6. Lay out the Title Cards and show the children how to classify the Picture Cards for each form of energy under the appropriate Title Cards. The Control Chart can be used to check if the sorting/classifying is correct.
7. Discuss how energy is changed using the "Bicycle Ride" example. Have the children explain (using another activity) how energy is changed.

Information Cards

Energy

Energy is the ability to do work. Work is moving something against a force, like gravity.

Energy makes change possible. There are a lot of different kinds of energy in the universe, and that energy can do different things. Energy is light, heat, and energy makes things grow. Energy makes things run, and also makes things move.

Two Types of Energy

There are two types of energy:
Kinetic and Potential.

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

Potential energy is stored energy and the energy of position.

Potential Energy

Potential energy is the energy that an object has the possibility of producing. It can be thought of as "stored energy".








Examples
apples on a tree
compressed spring
drawn bow

Kinetic Energy

Kinetic energy is the energy of a moving object.

Examples
airplane flying
ball bouncing
swimming

Forms of Energy

- Chemical 
- Nuclear 
- Thermal 

- Radiant 
- Mechanical 
- Sound 

Changing Energy

Energy can be stored, transported, bought and sold.

**Energy can not be created or destroyed,
only changed from one form into another.**

A toaster changes electrical energy into heat and light energy.

A television changes electrical energy into light and sound energy.

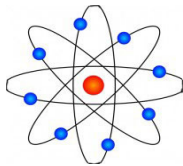
A car uses stored chemical energy in gasoline to move. The engine changes the chemical energy into heat and kinetic energy to power the car.

Definition Cards

Chemical Energy

Chemical energy is the energy stored in the bonds of atoms and molecules.

Examples: coal, wood, food



Nuclear Energy

Nuclear energy is produced when you split or fuse atoms. A tremendous amount of energy is released when this happens.

Examples: stars, atomic bomb, uranium



Thermal Energy

Thermal energy is the internal energy in substances; it is the movement and vibration of atoms and molecules.

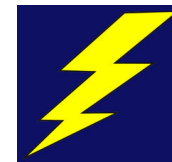
Examples: geyser, boiling water, iron



Electrical Energy

Electrical energy is the energy carried by moving electrons in an electric conductor.

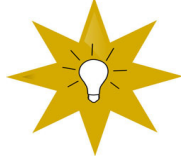
Examples: lightning, power lines, television



Radiant Energy

Radiant energy is the form of energy related to the movement of light, electromagnetic waves, or particles.

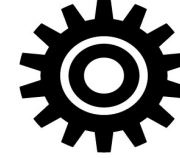
Examples: sun, light bulb, microwave



Mechanical Energy

Mechanical energy is the energy that is possessed by an object due to its motion or due to its position.

Examples: water, car, windmill



Sound Energy

Sound energy is the energy generated by sound vibrations as they travel through a medium.

Examples: whisper, echolocation, music



Kinetic Energy



airplane flying



ball bouncing

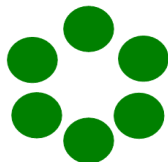


moving vehicle



swimming

Kinetic
Energy



Kinetic energy is the energy of a moving object.

Kinetic Energy

airplane flying, ball bouncing,
swimming

Potential Energy



apples on a tree



compressed spring



car on a hill



drawn bow

Potential
Energy



Potential energy is the energy that an object has the possibility of producing. It can be thought of as "stored energy".

Potential Energy

apples on a tree, drawn bow,
compressed spring

Chemical Energy



food



coal

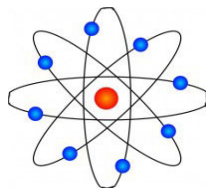


gasoline



wood

Chemical
Energy



Chemical energy is the energy stored in the bonds of atoms and molecules.

Chemical Energy

coal, wood, food

Radiant Energy



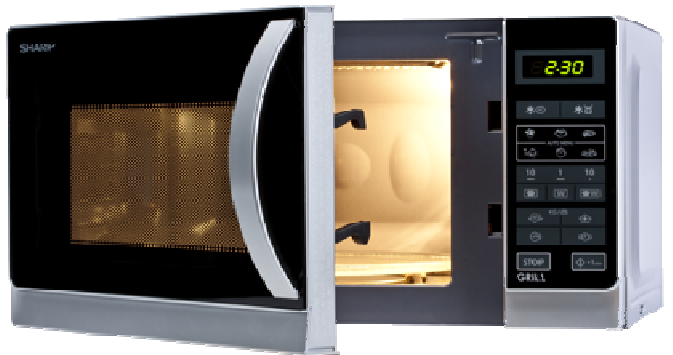
light bulb



x-ray

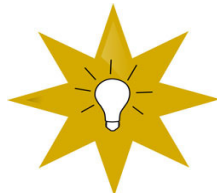


sun



microwave

Radiant Energy



Radiant energy is the form of energy related to the movement of light, electromagnetic waves, or particles.

Radiant Energy

sun, light bulb, microwave

Thermal Energy



iron



geyser



toaster



boiling water

Thermal Energy



Thermal energy is the internal energy in substances; it is the movement and vibration of atoms and molecules.

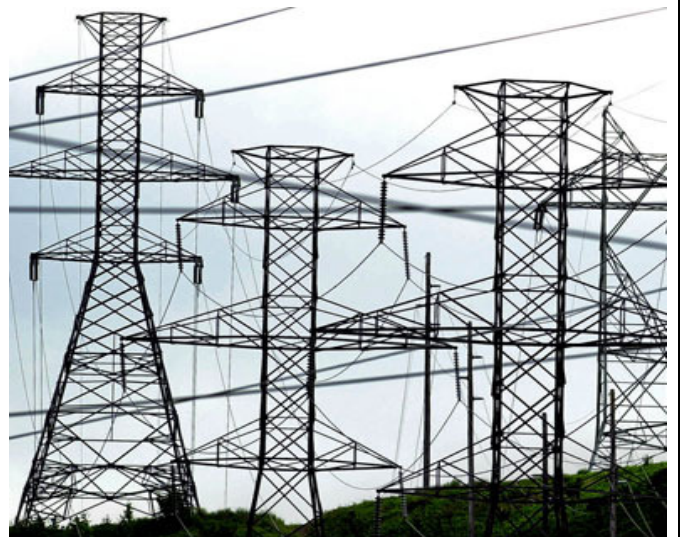
Thermal Energy

geyser, boiling water, iron

Electrical Energy



lightning



power lines

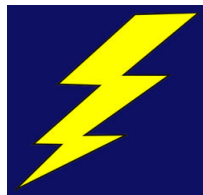


television



vacuum

Electrical
Energy



Electrical energy is the energy carried by moving electrons in an electric conductor.

Electrical Energy

lightning, power lines, television.

Nuclear Energy



nuclear reactor



stars



atomic bomb



uranium

Nuclear
Energy

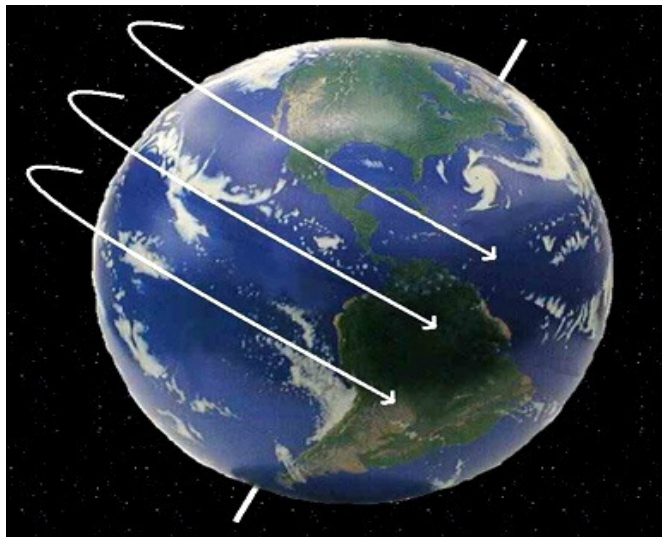


Nuclear energy is produced when you split or fuse atoms. A tremendous amount of energy is released when this happens.

Nuclear Energy

stars, atomic bomb, uranium

Mechanical Energy



Earth's rotation



water



car



windmill

Mechanical
Energy



Mechanical energy is the energy that is possessed by an object due to its motion or position.

Mechanical Energy

water, car, windmill

Sound Energy



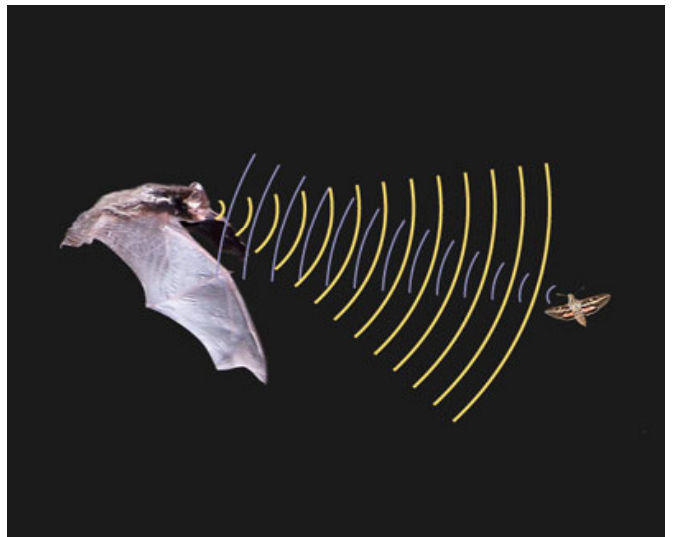
whisper



takeoff

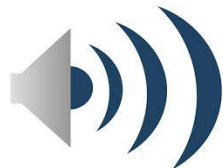


music



echolocation

Sound
Energy



Sound energy is the energy generated by sound vibrations as they travel through a medium.

Sound Energy

whisper, echolocation, music

Forms of Energy

Energy is the ability to do work.

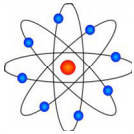
Work is moving something against a force, like gravity.

Modern civilization is possible because we have learned how to capture energy in various forms, and change energy from one form to another. We use energy to do work for us and to allow us to live more comfortably.

There are **2 types of energy**: kinetic energy (which is energy in motion) and potential energy (stored energy).

Energy can not be created or destroyed, only changed from one form into another. There will always be the same amount of energy in the world, but more and more of it will be changed into heat. Most of that heat will go into the air. It will still be there - but it will be hard to use.

There are **many forms of energy**:



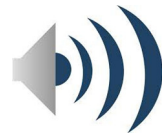
Chemical Energy



Nuclear Energy



Thermal Energy



Sound Energy



Electrical Energy



Radiant Energy



Mechanical Energy

Use the cards included to complete the following:

1. Describe what energy is.
2. Understand the difference between kinetic and potential energy.
3. Describe the basic principle of each form of energy.
4. Give examples of each form of energy.
5. Categorize the picture cards in to each form of energy.
6. Work through the process of how energy is changed from one form to another using the example of someone riding a bicycle.
7. Describe how energy is changed from one form to another using a new example from your real life.

**Energy can not be created or destroyed,
only changed from one form into another.**



1. Before going on a bike ride you eat your lunch (sandwich, apple, milk). This gives your body **chemical energy**.
2. When you ride your bike, your muscles change your **chemical energy into kinetic energy**, and this makes your bike move.
3. As your bike moves along the road, the friction of your tires on the road transforms the **kinetic energy into sound energy and thermal energy**.
4. If you apply the breaks, the **kinetic energy is transformed into thermal energy** and the wheels on the bike will become warmer.
5. If someone gets in your way on the path, you might ring your bell to warn them you're coming. You use **kinetic energy to ring the bell, which then turns into sound energy**.
6. If you're riding at night you need to have lights on your bike. These lights use batteries to power them. The batteries have **chemical energy which is turned into electrical energy, which in turn creates light energy**.
7. Cycling up a hill means you have to pedal very hard. While pedaling, you are giving your bike **potential energy**.
8. It's easy to go down the hill as the **gravitational potential energy that you gained going uphill is converted to kinetic energy on your way down**.

**Energy can not be created or destroyed,
only changed from one form into another.**



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Potential Energy



apples on a tree



compressed spring

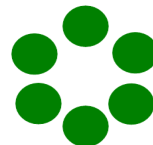


car on a hill

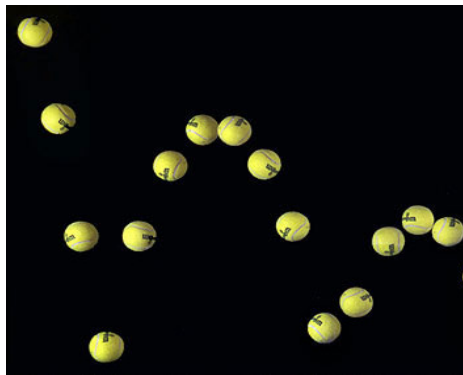


drawn bow

Kinetic Energy



airplane flying



ball bouncing

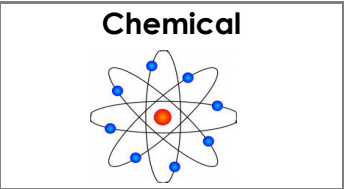


swimming



moving vehicle

Forms of Energy



food



coal



wood



gasoline



atomic bomb



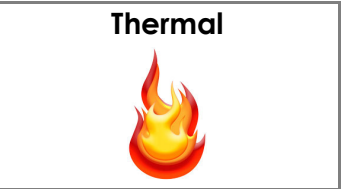
nuclear reactor



stars



uranium



geyser



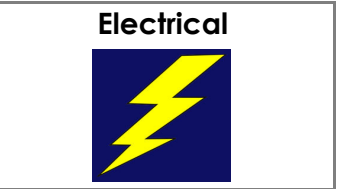
iron



boiling water



toaster



vacuum



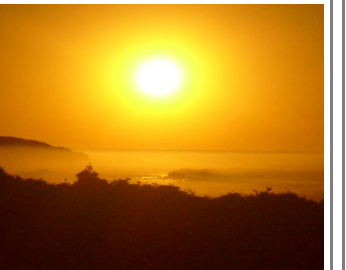
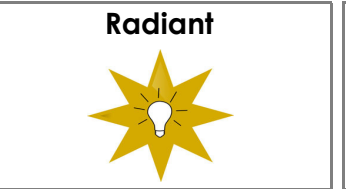
lightning



television



power lines



sun



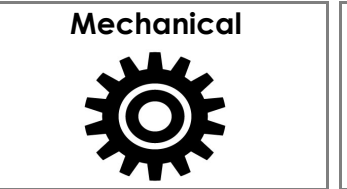
microwave



light bulb



x-ray



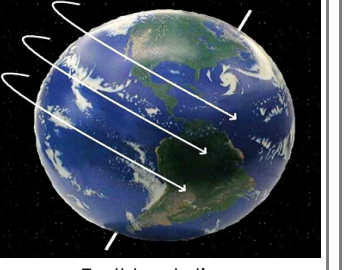
car



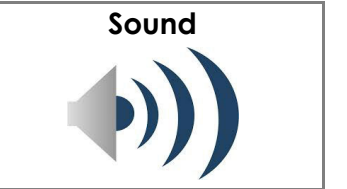
windmill



water



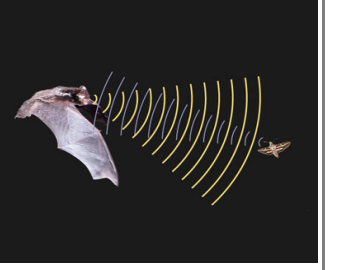
Earth's rotation



whisper



takeoff



echolocation



music