ENERGY TRANSFORMATIONS

NAME________________________ DATE__________ PERIOD___

OBJECTIVES:

To be able to name different kinds of energy.

To be able to identify and explain different types of energy transformations.

To describe how a field can exert a force and cause an object to move.

PURPOSE:

You will move through the different stations to explore different aspects of energy, the forces that fields exert on one another and the energy transformations that can take place between objects.

BACKGROUND:

Energy is the ability to do work, which is a transfer of energy from one object to another. Work is done when an object moves a distance in the direction of an applied force.

A field is a region of space that is characterized by the existence of a force. Think of Earth's gravitational field which pulls objects, such as a thrown ball, toward the surface of the Earth. As it falls the ball loses potential energy (PE) and gains kinetic energy (KE). The total amount of its Mechanical energy (ME) is always the same however. The work that the gravitational field does is converted to the energy of motion of the ball, then to heat when the ball hits the ground.

The total amount of energy is always conserved, or kept the same.

PROCEDURE:

1. In this activity you will move in teams to different stations around the room. You will make observations about energy and its transfer.
2. Start at the station designated and follow directions “Station Instructions” for each station.
3. When you have completed all the stations, answer the questions individually. Then discuss the answers with your team. Write the answers clearly and neatly on a separate sheet of paper.

STATION INSTRUCTIONS

STATION 1 (The Radiometer)

1. Try to get the radiometer to spin each of the devices at the station.
2. Record your observations on your lab sheet.
3. Record the type of energy transformations that took place.
4. What type of energy will make the radiometer spin?

STATION 2 (The Electromagnet)

1. Pick up the loose nail and use it to try to pick up some of the paper clips. What happens?
2. Connect the wires to the battery. You have created an electromagnet. How many paper clips can you pick up with the electromagnet (the nail)?
3. Record your data.
4. Disconnect the circuit and record your observations about the types of energy transformations.

STATION 3 (Closed circuit)

1. Connect the circuit that is set up at the station. Feel the light bulb for the first 15 seconds only that the circuit is closed.
2. Disconnect the circuit.
3. Record your observations about any energy transformations.

STATION 4 (Stretching It)

1. Stretch each of the objects at the station.
2. Record your observations about the types of energy transformations on your lab sheet.
3. What type of energy was produced when the elastic was stretched?

STATION 5 (Toyland)

1. Wind up each of the objects and observe what they do.
2. Record your observations on your lab sheet about energy transformations.
3. What type of energy was needed to use the toys?

STATION 6 (Hand Generator)

1. Crank the generator for at least 20 turns. Observe the results and record on your lab sheet.
2. Record the types of energy transformations.
3. What type of energy was needed to light the bulb? Where did it come from?
4. What happens when you alter the speed of turning the crank?

STATION 7 (Magnetic attraction)

1. Make sure the magnet is centered under the container.
2. Sprinkle some iron filings into the box.
3. Tap the edge of the box gently to distribute the filings.
4. Draw a diagram of what you see. Return the filings to the container.
5. What type of energy is being transferred?

STATION 8 (Pendulum)

1. Pull one of the metal spheres back until it is at its highest point. Release it and record what happens when it hits the other spheres.
2. Now pull the pendulum back about half way. Release and record your observations.
3. What type of energy is being transferred?

ANALYSIS:

1. At which station did you observe electrical fields?
2. How do you know that a magnetic field was present in station 7?
3. At which stations did you observe heat energy?
4. When did you see the presence of potential energy transforming to kinetic energy?
5. What stations used heat energy to produce movement?
6. What stations showed mechanical to potential to kinetic?
7. What stations showed kinetic energy to sound energy?
8. What stations showed kinetic energy to electrical energy to light energy?

CONCLUSION:

What can you conclude about energy transformations? Mention the law of conservation of energy in one of your statements.

ENERGY TRANSFORMATIONS
Lab results

STATION NAME	OBSERVATIONS	ENERGY TRANSFORMATIONS