

Energy Hunt

Strand	Force, Motion, and Energy
Topic	Discovering transformations of electrical energy around us
Primary SOL	4.3 The student will investigate and understand the characteristics of electricity. Key concepts include d) the ability of electrical energy to be transformed into light and motion, and to produce heat.
Related SOL	4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which a) distinctions are made among observations, conclusions, inferences, and predictions; m) current applications are used to reinforce science concepts.

Background Information

Electrical energy can be transformed into light or motion, and can produce thermal energy. Many household appliances use electrical energy and transform it into a desirable form of energy. When electrical energy is transformed into an intended energy, often times a waste energy, or energy that is not useful for the product, is an outcome. Inventors continuously try to find ways to make their devices more efficient so that electrical energy is not wasted but is instead transformed into the intended energy. For example, traditional incandescent light bulbs emit much more heat and use more energy than the more efficient compact florescent bulbs.

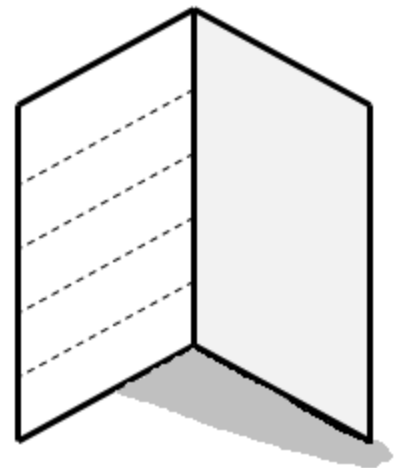
Another example available in most classrooms is the projector. Electrical energy is transformed to light energy, but heat is also produced. Inventors found that heat is such a problem in this invention they had to add a fan to get rid of the heat. This is electrical energy changing into mechanical energy, but now besides heat, another waste energy is formed: sound. Now scientists have to make sure they are creating a fan that is also efficient. Inventors continuously battle a war against waste energies to create the most efficient product that wastes the least amount of energy.

Materials

- Class set of foldables made of light colored construction paper, folded in half with the left half cut into five sections
- Copies of the attached Energy Hunt worksheet for each student

Vocabulary

thermal energy, radiant energy, mechanical energy, transform, efficient



Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Ask students what different forms of energy inventors might try to create from transforming electrical energy: thermal (heat), radiant (light), and mechanical (motion). A good example to get students thinking might be sharing about the different forms of energy from the overhead projector or computer projector in your classroom.
2. Share with the students the intended energy as well as the waste energy that results from the projector.

Procedure

1. Once students have brainstormed a list, let them know that they will be going on an energy hunt to find more examples.
2. Share with students that they will be hunting for energy all throughout the classroom or school. Encourage the students to find unique machines that no other student would think of that transform electricity into other forms of energy.
3. Pass out the Energy Hunt worksheets for each student.
4. Have students search and find electrical appliances throughout the school building.
5. Allow students the opportunity to discuss with their group what forms of energy are intended and what forms of energy are waste.

Conclusion

1. As students complete their observation journal, have them prepare the most unique or eye-opening observations to present to the class.
2. Have each student publish their findings in their foldable by using the following format.

Top Cover

- Diagram of appliance with energy labels

Left inside

- Intended and waste energies

Right inside

- Explanation of possible efficiency problems of the invention and how to make it more efficient. Students will need to focus on waste energies.

Assessment

• **Questions**

- What is another form of energy to which electrical energy can be transformed?
- What is a major problem that inventors and engineers have to deal with when making a new product that transforms electrical energy into another form of energy?

• **Journal/writing prompts**

- If you were to invent an electrical appliance what would it be? How would it work? Make sure to name the intended transformed energy and the possible waste energies.

- Write about an appliance in your house that you think is inefficient. What are the problems? Are there possible solutions for the problems?
- **Other**
 - Have students draw diagrams of appliances labeling transformed energies.
 - Grade the flip book.
 - Have students produce a slideshow of products from home with transformed energies named and explained.
 - Assign a homework assignment for children to search items at home for transformed electrical energy.

Extensions and Connections (for all students)

- Have students research the history of one or more products that have been improved upon several times. Have students mention how the inventors were able to make their product more efficient.
- Take an older unused small appliance and have the students dissect it, observing the electrical connections and other parts where electricity is transformed.
- Have some high school physics students visit the class and do an energy demonstration.

Strategies for Differentiation

- Allow students to use an audio recorder or a video recorder.
- Give clues to struggling students that point them in the right direction of appliances.

Energy Hunt

Name: _____ Date: _____

Observation Journal

Directions: Do your best to work together as a team to complete the following chart. Try to find electrically powered machines that you don't think anyone else will notice and be careful to find all energy forms that were transformed from electricity: intended energy and waste energy.

Machine Picture and Name	Intended Energy	Waste Energy