



The Cost of Electricity

4th Grade Summative Activity

Mark Short

Content Expectations

P.EN.04.12 Identify heat and electricity as forms of energy.

P.EN.04.41 Demonstrate how temperature can be increased in a substance by adding energy.

P.EN.04.41 Demonstrate how temperature can be increased in a substance by adding energy.

P.EN.04.43 Describe how heat is produced through electricity, rubbing and burning.

P.EN.04.51 Demonstrate how electrical energy is transferred and changed through the use of a simple circuit.

Rationale for Lesson:

The following lesson is intended as a summative activity that is a take home project to bring depth to the student's knowledge of electricity, but also to spread the knowledge of the importance of energy conservation within the student's household.

Big Ideas

- Heat and electricity are forms of energy.
- Evidence of energy is change.
- Electrical circuits demonstrate a transfer of energy.

Lesson Outcome:

The student will calculate the energy costs of common household appliances and examine ways to promote energy efficiency.

Resources / Materials:

- A small electrical appliance such as a microwave, toaster or hair dryer (if desired)
- "Home Energy Use Practice Sheet" worksheet
- Copies of "My Home's Energy Use" handout

Classroom Demonstration

- Prepare to use an electrical appliance to complete a task. Examples include microwaving a bag of popcorn, toasting a piece of bread or using a hair dryer to blow-dry a wet spot on a cotton shirt.
- Describe what appliance you will be using to the class. Ask the students to generate a list of all of the materials needed to complete the task; make sure that “energy” is included in the list.
- Have students predict how much energy that it will take to complete the task will cost.

Procedure:

Ask the students what information would be needed in order to determine the cost of energy used. (Answer: the amount of time the appliance is used, wattage of appliance and the cost per kilowatt-hour used) Explain that electrical consumption is stated in kilowatt-hours. Most electrical devices list power consumption in watts.

Definitions:

Kilowatt (kW) - One thousand watts, where a watt is a unit of electrical power calculated as the rate of energy transfer equivalent to one ampere flowing under a pressure of one volt.

Kilowatt-hour (kWh) - The standard measure of electricity usage measured as one kilowatt of power supplied to, or taken from, an electric circuit steadily for one hour.

Ampere – The basic unit of electric current adapted under the International System of Units (SI)

Volt – The unit of electromotive force, the volt measures how much pressure there is in an electric current. The higher the voltage, the more electrical current will flow in the circuit.

Have a student examine the appliance and locate its power consumption information in watts. As a class, use the “Home Energy Use Practice Sheet” to determine the costs of some common household appliances. Check results with the students and discuss the comparisons among the energy costs for each activity.

Home Family Activity:

Follow the attached directions on the worksheet to complete the Summative Activity.

References:

MDE Science Companion Document

http://www.michigan.gov/documents/mde/K4_Science_GLCE_Companion_Document_v.1.09_2_264479_7.pdf

Consumers Energy: Lesson Plans

<http://www.consumersenergy.com/uploadedFiles/Kids/The%20Cost%20of%20Electricity.pdf>

