

4. How Much Energy Do You Use?

Subjects:

Science, Math, Social Studies, Home Economics

Process Skills:

Counting, multiplication, use of calculators, comparing, data gathering

Grades:

3—6

Cognitive Task Level:

Average to difficult

Time for Activity:

15 minutes preparation, one day's homework, 20 minutes classwork

Intended Learning Outcomes:

Completing this activity will allow students to:

- Observe the items that use energy in their own homes
- Calculate the energy cost for their own homes
- Compare this cost with others in their class and with the national average.

Background

U.S. residents use more energy now than we ever have in the past. There are many reasons for this. As more people populate the country, energy needs rise. Technology advances, such as industrial processes, sophisticated machinery and computers also require increased energy. Our everyday lives are filled with electrical appliances that our grandparents never used.

Why is our energy bill so high? This activity gives your students a chance to work on some real-life math problems. This activity bases its numbers on cost figures from one utility. Energy figures in your area may be different. Your local energy utility can give you figures that show the average expenditure per household in your community.

Materials

Calculators

Handout

- *Energy Home Survey* worksheet

Procedure

1. Start by asking your students if they ever heard their parents complain about the cost of energy. Explain that the monthly utility bill is directly related to the amount of energy the household uses, and that this activity will help them find the “energy-eaters” in the house.
2. Distribute the Energy Home Survey worksheet and assign the homework.
3. When students have completed the homework assignment, assist them in answering the questions and completing the math.
4. Ask them if they found appliances in their homes they think they could live without, such as an electric can opener or an electric plate warmer.

Extensions/Modifications

A good introduction to this activity is to encourage students to ask a grandparent, or older relative or neighbor about what life was like when they were children. Many grandparents grew up before television, commuter flights and digital clocks. The student could interview the senior and write a report comparing an aspect of energy use “then” vs. “now.”

Energy Home Survey

Do this survey twice: once in the morning before school, and once just before dinner. It will help you determine how much energy you use.

Appliance Electrical Appliances	Multiply by	Subtotal	Total per day
Incandescent Lights: Number of lights on =	1 cent per hour		
Fluorescent lights: Number of lights on =	1 cent per every 4 hours		
Television: Number of sets on =	4 cents per hour		
Radio: Number of sets on =	1 cent per hour		
Stereo: Number of sets on =	2 cents per hour		
Microwave oven: Number of ovens on	15 cents per hour		
Computer: Number of computers on =	1 cent per hour		
Vacuum cleaner: Number on	9 cent per hour		
Portable heater: Number on =	15 cents per hour		
Air conditioner: Number on =	55 cents per hour		
Total for all subtotal usage			
Total usage in one day			

Add up all the numbers in the Subtotal column. This subtotal is the total cost for these appliances in one hour.

Some of these appliances will be on for more than one hour, some less. Based on what you know about your household, write the total number of hours and the total cost in one day for these appliances in the Total per day columns above.

(Example 1: If two stereos are on for eight hours a day, you multiply 2 (stereos) x 2 cents per hour x 8 hours =32 cents per day. Example 2: If you vacuum for 1/2 hour, multiply by 9 cents per hour x .5 hours =4.5 cents per day.

Periodic Appliances

Some items are not used all the time. They create a cost only when they are used.

Periodic Appliances Appliance and loads per month	Multiply by	Total per month
Dishwasher:		
Loads =	10¢ per load	
Washing machine:		
Loads =	5¢ per load	
Electric clothes dryer:		
Loads =	67¢ per load	
Gas clothes dryer:		
Loads =	16¢ per load	
Total usage for one month		

These answers give you the total cost per month, based on how much your family uses these appliances.

Periodic Appliances: Appliance and average use per month	Total per month
Gas water heater:	\$13.00
Electric water heater:	\$45.00
Refrigerator:	\$16.00
Extra freezer:	\$18.00
Electric heating system:	
Small home:	\$85.00
Large home:	\$250.00
Gas heating system:	
Small home:	\$28.00
Large home:	\$120.00
Total for 1 month	

With your teacher's help, try to figure out your home energy costs for one month. Compare it to the bill that your parents receive each month. How do they compare?

My estimate: _____

My parent's bill: _____

Did your estimate come close to the actual cost? If not, why do you think they differ?

Credit: The National Wildlife Federation's Animal Tracks Activity Guide for Educators.
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