

Math MANIA

Objective:

Students will work together to solve challenging math problems based on real-life situations. At the same time, they will learn the value of energy efficiency.

Directions:

Start by asking a class member to write the questions on the chalkboard as mathematical formulas. Ask your class to brainstorm ways to

work out the answers to these questions.

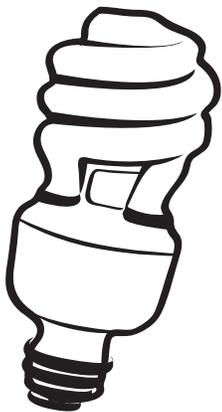
- Should you add, subtract, multiply, or divide?
- How much money can you save over the course of a year by changing lightbulbs or buying different appliances?
- What could you buy with that much money?

Have students create bar graphs to visually demonstrate their answers.

Curriculum Connections

Math
NCTM Standards:
Problem Solving
Number and Operations
Connections

Problem #1: A Lighting Solution



Problem:

Jane's parents just installed one 25-watt CFL in their kitchen. It gives off as much light as a 100-watt incandescent bulb. They use the light for five hours every evening.

Sam lives with his grandmother. She has one 100-watt incandescent lightbulb in her kitchen, too, and she uses it from 5 P.M. until 10 P.M. She hasn't switched over to CFLs yet, though she's planning to.

Note: Electric companies measure electricity use in *kilowatt hours (kWh)*.

Part 1: Kilowatt Hours

Step 1: Calculate how many kilowatt hours the 25-watt CFL uses in five hours.

First, divide the wattage of the lightbulb by 1,000 to find out how many kilowatts the bulb uses. [Number of watts ÷ 1,000 = number of kilowatts]

Next, multiply the number of kilowatts by the number of hours the lightbulb will be turned on. [Number of kilowatts x number of hours used = number of kilowatt hours]

Step 2: Use the same two formulas to calculate how many kilowatt hours the 100-watt incandescent lightbulb uses in five hours.

Step 3: Answer the questions below.

1. How many kilowatt hours does the 25-watt CFL use during the time Jane's family uses it?
2. How many kilowatt hours does the 100-watt incandescent lightbulb use during the time Sam's grandmother uses it?
3. Which bulb uses more energy?

Part 2: Savings

To learn how much it costs to use each bulb, multiply the number of kilowatt hours by the cost of each kilowatt hour (the average cost of a kilowatt hour is 12 cents, or \$0.12).

[Number of kilowatt hours x cost of a kilowatt hour = cost of using the bulb]

4. How much does it cost to use the CFL for five hours?
5. How much does it cost to use the incandescent lightbulb for five hours?
6. Which family uses more electricity? How much more?
7. Which family spends more money? How much more?
8. How much does the family save in a year?

Part 3: Graph It

Now use your graphing skills to show which family spends more. Create a bar graph representing the cost of using the CFL as compared with the cost of using the incandescent lightbulb.

Can you think of other ways that Jane's parents could conserve energy and save money?



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Problem #2: Smart Choice

Use the formulas you just learned to compare the amount of energy used by standard appliances to the amount of energy used by ENERGY STAR®-labeled appliances.

1. A standard clothes washer uses 2 kWh per load of laundry. An ENERGY STAR-labeled clothes washer uses 1 kWh per load of laundry. A typical family washes 390 loads of laundry a year. If 1 kWh costs 12 cents, how much money would a family save in one year if it uses an ENERGY STAR-labeled clothes washer rather than a standard one?
2. A standard television set uses 75 watts per hour when it's turned on and 6 watts per hour when it's turned off. An ENERGY STAR-labeled television set uses 70 watts per hour when it's turned on and 2 watts of power when it's turned off. A typical family watches 6 hours of television per day. How much money would a family save in one year if it were to use an ENERGY STAR-labeled television rather than a standard one?

