

LESSON 2:

CALCULATING YOUR POWER BILL

NEXT GENERATION SCIENCE STANDARDS

4-PS3-1 Use evidence (e.g., measurements, observations, patterns) to construct an explanation.

4-PS3-4 Apply scientific ideas to solve design problems.

Time: 1 50-60 minute class period

This lesson gives the students the opportunity to calculate the cost of several appliances used in their home for one month.

Example 1:

Let's begin with a common appliance — the TV. A typical TV set requires about 200 W of power. Put students in groups and have them determine how many hours a TV set is turned on in one month in a typical house and have them then calculate the cost of electricity for that TV set for one month. Have students share their results with each other.

POSSIBLE ANSWER: $(0.200 \text{ kW})(60 \text{ hours})(\$0.13/\text{kW}\cdot\text{hr}) = \1.56

Have students give their thoughts on the result. Too high? Too low?

Example 2:

You can usually find at least one light bulb turned on at any one time in a house. A typical old fashioned incandescent light bulb consumes about 60 W of power. Put students in groups and have them determine the overall cost of all lighting in a house for one month. Have students share their results with each other.

POSSIBLE ANSWER: $(0.06 \text{ kW})(2000 \text{ hours})(\$0.13 \text{ kW}\cdot\text{hr}) = \15.60

The LED light bulb only consumes about 8 Watts of power. Determine the cost for electricity use if you replaced all of the incandescent bulbs with LED's.

POSSIBLE ANSWER: $(0.008 \text{ kW})(2000 \text{ hours})(\$0.13 \text{ kW}\cdot\text{hr}) = \2.08

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Student Worksheet

COST OF ELECTRICITY PROJECT

Your goal is to find the overall cost of electricity for each of the following appliances for one month in your home. You can research the power requirement for each appliance and then estimate how many hours it's turned on each month in your home. Take your time and really consider how long each appliance is used in the month you choose. You can also research the cost for electricity in your area or use the same rate we have used thus far: \$0.13/KW·hr.

<i>Appliance</i>	<i>Power (KW)</i>	<i>Hours used in one month</i>	<i>Cost in one month</i>
Air Conditioning			
Heater			
Water Heater			
Refrigerator			
Dishwasher			
Oven			
Lighting			
Television			
Computers			
Dryer/Washing Machine			

Answer the following questions:

1) Which appliance cost surprised you the most? Why?

2) What could you personally do to reduce the amount of electricity your household uses?

3) Research on-peak and off-peak energy consumption. Give a brief description.

4) What is the off-peak time in your area? Explain how this applies to you and your family.