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Name: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Class Hour: \_\_\_\_

## Energy Bill, Part 1: The Cost of Energy

### Student Lesson & Response Guide

#### Introduction:

Although you have a lot of daily, personal experience with energy, you may never have seen an energy bill before. In this activity, you will work with two residential energy bills from a typical family in this area. One is a bill from the winter season and one is from the summer season. How a typical residential consumer is billed for their energy and its costs will be reviewed. You will also consider patterns of a family's energy use, both weekly and seasonally. In the end, you will come to realize there is much to be learned about the cost of energy from an energy bill.

#### Materials:

Two energy bills from a typical area family—one winter and one summer.

Internet accessible digital device

Calculator

#### Procedure:

Follow the numbered instructions beginning on the next page.

## ELECTRIC SERVICE—SUMMER BILL

1. Refer to the energy bill from the summer to answer these questions

1a. How many days were there in the billing period?

\* **days [delete these words; post your answer in front of unit label given.]**

1b. One kilowatt-hour (KWH) of electricity is equal to 1000 Watts of electricity used for one hour (in other words it is equal to the amount of energy needed to light ten 100 Watt light bulbs for one hour). Energy utilities express how much electricity a customer uses in KWH units. How much electricity was used in total by this family in the billing period?

\* **KWH [delete these words; post your answer in front of unit label given.]**

1c. How many KWH of electricity were used on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\* **[delete these words; show your math work here]**

\* **KWH / day [delete these words; post your answer in front of unit given.]**

1d. How much did this family pay for each KWH of electricity (Total Electric Service Charges / KWH of Electricity Used)?

*[Show math work as required. Provide answer with correct unit label.]*

\* **[delete these words; show your math work here]**

\* **\$ / KWH [delete these words; post your answer in front of unit given.]**

1e. How much did electricity cost for this family on average each day (Total Electric Service Charges / Billing Days)?

*[Show math work as required. Provide answer with correct unit label.]*

\* **delete these words; show your math work here**

\* **\$ / day [delete these words; post your answer in front of unit given.]**

## NATURAL GAS SERVICE—SUMMER BILL

2a. The number of days in the billing period remains the same.

2b. One Therm is roughly equal to 100 cubic feet of natural gas, or methane. Energy utility companies express how much natural gas a customer uses in units of Therms. How much natural gas was used in total by this family in the billing period?

\* **Therms [delete these words; post your answer in front of unit label given.]**

2c. How many Therms of natural gas were used on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\* **[delete these words; show your math work here]**

\* **Therms / day [delete these words; post your answer in front of unit given.]**

2d. How much did this family pay for each Therm of natural gas (Total Gas Service Charges / Therms of Natural Gas used)?

*[Show math work as required. Provide answer with correct unit label.]*

\* **[delete these words; show your math work here]**

\* **\$ / Therm**

2e. How much did natural gas cost for this family on average each day (Total Gas Service Charges / Billing Days)?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\* **\$ / day**

## ELECTRIC SERVICE—WINTER BILL

3. Now refer to the energy bill from the winter to answer these questions. Note that the units are no longer given to you on the answer blanks. For each question, supply the proper unit to go along with your number answer.

3a. How many days were there in the billing period?

\* **Answer**

3b. How much electricity was used in total by this family in the billing period?

\* **Answer**

3c. How many KWH of electricity were used on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

3d. How much did this family pay for each KWH of electricity?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

3e. How much did electricity cost for this family on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

## NATURAL GAS SERVICE—WINTER BILL

4a. The number of days in the billing period remains the same.

4b. How much natural gas was used in total by this family in the billing period?

\* **Answer**

4c. How many Therms of natural gas were used on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

4d. How much did this family pay for each Therm of natural gas?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

4e. How much did natural gas cost for this family on average each day?

*[Show math work as required. Provide answer with correct unit label.]*

\*

\*

## Lesson Summary Questions

**1a.** What are likely reasons why this family used more electricity in the summer than in the winter?

**\* Answer**

**1b.** What are likely reasons why this family used more natural gas in the winter than in the summer?

**\* Answer**

**2a.** Consider the days of the week and how your family uses energy at home. Which day (or days) of the week do you think your family uses the most energy? Explain the thinking behind your answer fully.

**\* Answer**

**2b.** Which day (or days) of the week do you think your family uses the least energy at home? Explain the thinking behind your answer fully.

**\* Answer**

**3.** You should know that electricity is not a primary energy resource. Electricity is produced through the use of natural resource fuels. Name at least three natural resource fuels that are commonly used to produce electricity.

**3-1. \* Answer**

**3-2. \* Answer**

**3-3. \* Answer**

**4.** Consider your answers to the last question. Name at least one waste gas that is commonly released to the air in the production of electricity.

**\* Answer**

**5.** Describe the most important idea, concept, principle, or fact you learned while completing this lesson. Explain why your idea, concept, principle, or fact is important for you (and probably other people) to know and understand.

**\* Answer**