



Theme: Sustainable Practices (Grades 9 to 12)

Alternative Energy

Post-Visit Activity #1

Energy Use Inventory

Overview:

Now that you have visited the Springs Preserve, you understand the importance of being a well-informed global citizen. Knowing how much energy you consume in your home will assist you in reducing your carbon footprint on the earth. In this activity, you are going to examine the amount of electricity and fuel that your home uses on a monthly basis. Additionally, you will have the opportunity to calculate the amount of energy your body uses. This activity will give you an opportunity to brush up on your mathematics conversions!

Activity:

Bring a copy of your gas bill and a copy of your electric bill to class. Be certain they are both for the same month.

The bill will give both the amount of energy used and the cost.

What month and year are the bills for?

Electricity

The amount of electrical energy used is given in units of kilowatt-hours (kWh).

A Watt is a unit of measurement used to quantify *power*, or the rate at which energy is used; a kilowatt is one thousand Watts. If you multiply the power in kilowatts at which an appliance operates and the time in hours that the appliance is used, the product represents the total amount of electrical energy that was used in kilowatt-hours. The electric company charges customers for the quantity of energy used in kilowatt-hours.

For example, suppose you have a 5,000-Watt (5 kilowatt) oven and you use it for 2.5 hours:

The amount of electrical energy used = (5 kilowatts)(2.5 hours) = 12.5 kWh

On your electricity bill, find the amount of energy used in kilowatt-hours for the month:
_____ kWh

Calculate your average cost of electricity by dividing the total cost by the amount of energy used. Show calculations:

Average cost of electricity = _____

Electricity rates vary widely around the country, but usually fall in a range of 0.05-0.17 \$/kWh.

Does your electric company have a lower "baseline" rate for electricity?* _____

*This information will be on the bill, usually near the bottom

Natural Gas (methane)

The amount of energy used from natural gas is measured in units called Therms.

A Therm is equal to 100,000 British Thermal Units (BTUs).

$$1 \text{ Therm} = 100,000 \text{ BTU}$$

On your gas bill find the amount of energy used for the month: _____ Therms

Calculate your average cost of natural gas. Show calculations:

Average cost of natural gas = _____

The average cost of natural gas usually falls in a range of \$0.60-\$0.80 /Therm.

Converting Energy Units

Kilowatt-hours, Therms, BTUs, and Calories are a few of many different units for measuring energy, and it is possible to convert from one to the other.

Convert the amount of energy supplied by natural gas for the month in Therms to kilowatt-hours. Show calculations:

$$1 \text{ Therm} = 29.3 \text{ kWh}$$

Amount of energy supplied by natural gas = _____ kWh

Amount of energy supplied by electricity (use number from bill) = _____ kWh

Add the amount of energy supplied by natural gas in kWhs to the amount of energy supplied by electricity in kWhs to get your total monthly energy use in kWhs:

Total Monthly Home Energy = _____ kWh

Now calculate your total energy use in therms. Show calculations:

Amount of energy supplied by electricity = _____ Therms

Amount of energy supplied by natural gas (use number from bill) = _____ Therms

Total Monthly Home Energy = _____ Therms

Energy Use of Appliances

Select two appliances in your home that you think might use a lot of energy, or that get a lot of use (like the TV or radio). Find their power ratings (wattage), which can usually be found on a plate or sticker on the back of the appliance. Estimate the time in hours the appliance is used in an average month. Calculate the amount of energy it consumes in kilowatt-hours and the cost of operating the appliance for one month and one year. Show calculations:

Appliance 1: _____ Watts: _____ hours used: _____

Appliance 2: _____ Watts: _____ hours used: _____

Energy Use by Your Body

Most human bodies operate at approximately 80 Watts.

Calculate the amount of energy your body uses in one day and one month. Show calculations:

The Calorie is another unit of energy that is commonly used to measure energy use by the human body.

Calculate the number of Calories your body uses in a day and a month. Show calculations:

1 kWh = 860 Calories

Discussion Questions:

1. From what you learned at the Springs Preserve, discuss one possible way that you could decrease the amount of electricity used at your home?
2. With the cost of gas increasing, explain one way that you could cut your gas consumption by at least 15% per month?
3. On the internet, search Google for Energy Star appliances. Pick one appliance and discuss how it saves energy in the home.
4. With global warming increasing, why is it important to use alternative energy sources such as solar power?