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Student Pages - How Much Difference Can a Bulb Make?

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Name: _____ Date: _____ Class/Period: _____

Activity 5.1: How Much Difference Can a Bulb Make?

Background

Because energy cannot be created or destroyed, all the energy you use must be obtained and transformed from another source. Turning on the lights in your house requires energy to be transformed in an electrical power plant. Considering that many power plants still burn fossil fuels to make electricity, turning on a light bulb or an appliance in your house adds carbon dioxide to the atmosphere.

Prediction

You can buy different types of light bulbs for your house – incandescent light bulbs and compact fluorescent light (CFL) light bulbs are the two most standard bulbs that people buy. Look at the descriptions of the two below.

Incandescent Light Bulb	Compact Fluorescent Light (CFL) Bulb
Lasts 500-2000 hours	Lasts about 6000 – 10,000 hours
10% energy used for light	> 80% energy used for light
100 watts (amount of energy) = 1500 lumens (amount of light)	25 watts (amount of energy) = 1500 lumens (amount of light)

If you had the two types of light bulbs on for 10 hours a day for one year (10 hours a day for 365 days a year= 3650 hours), which one do you think would result in adding more carbon dioxide to the atmosphere? How many pounds more do you think it adds? Why?

Directions

The amount of carbon dioxide added to the atmosphere from using a light bulb depends on where your electric company obtains the energy. Typically electric companies obtain energy from a variety of sources such as natural gas, oil, nuclear, hydro, solar and coal. This means the amount of carbon dioxide emissions does vary, but one estimate for how electricity use translates into carbon dioxide added to the atmosphere is:

1 watt/hour of electricity = 0.00164 pounds of carbon dioxide

Below we used the estimate to calculate how much carbon dioxide a typical refrigerator adds to the atmosphere in one day – 28.536 lbs.

Use the table below to calculate how many pounds of CO₂ an incandescent light bulb adds if it is on for 10 hours and then 10 hours/day for an entire year (3650 hours). Then calculate how many pounds of CO₂ a CFL light bulb adds if it is on for 10 hours and then 10 hours/day for an entire year (3650 hours).

Appliance	Watts/hour X	Hours X	0.00164 lbs CO₂ =	Total lbs CO₂
<i>Example: Refrigerator</i>	<i>725 watts/hour</i>	<i>24 hours</i>	<i>0.00164 lbs CO₂</i>	<i>28.536 lbs</i>
Incandescent light bulb		10 hours		
Incandescent light bulb		3650 hours		
CFL light bulb		10 hours		
CFL light bulb		3650 hours		

Conclusions:

1. Think about all of the appliances in your house and other activities you do that release carbon dioxide (e.g. cars, trains, etc). How many pounds of carbon dioxide do you think your activities add to the atmosphere each year? Why?

Name _____ Class/Period _____ Date _____

Activity 5.2: How many pounds of carbon dioxide do you produce each year?

Purpose

In this activity, you will calculate how many pounds of carbon dioxide you produce per year using an emissions calculator developed by the Environmental Protection Agency.

You will need to know:

- If you drive a car, the number of miles a week your drive and the average gas mileage.
- If your home is heated by natural gas, electric heat or oil.
- Your home’s average monthly electric bill.
- Your home’s average monthly gas bill (might not have one).
- Your home’s average monthly fuel oil bill (might not have one)
- Note: If you are unable to estimate these numbers, you can use the averages listed on the website.

Directions

1. Go to the following website: http://www.epa.gov/climatechange/emissions/ind_calculator.html
2. Answer the questions based on your home. As you complete each section, record the pounds of carbon dioxide/year in the table below.
3. After completing the section for “Your Total Emissions”, then complete the section “What You Can Do to Reduce Emissions”. Only select options that you think you could change in your home in the next year. Record this information below.

Source of Emission	Pounds of Carbon Dioxide/year
Transportation	
Gas Bill	
Electric Bill	
Fuel Oil Bill	
Waste	
Total Emissions (Before Reductions)	
Reductions <ul style="list-style-type: none"> • Amount you could reduce your emissions if you took particular actions. 	
Total Emissions (After Reductions)	

