



## TEACHER GUIDE

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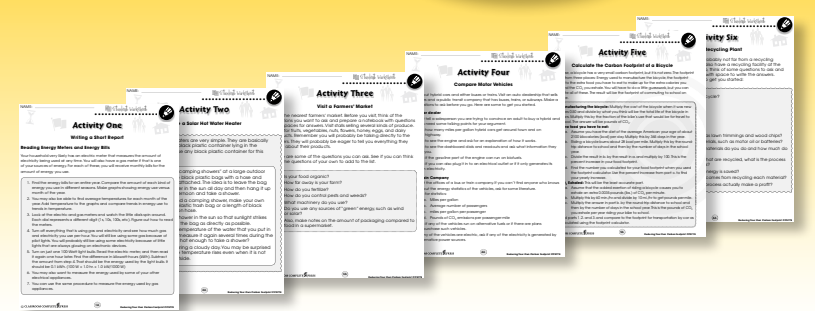
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- Enter item CC5778
- Enter pass code CC5778D for Activity





## Your Footprint At Home

1. Circle the word **TRUE** if the statement is TRUE or Circle the word **FALSE** if it is FALSE.

- a) Electrical appliances have a carbon footprint.  
**TRUE      FALSE**
- b) A heating oil bill shows how much oil you used.  
**TRUE      FALSE**
- c) An electric dryer is more energy efficient than a clothesline.  
**TRUE      FALSE**
- d) Modern appliances are usually less efficient than old ones.  
**TRUE      FALSE**
- e) Most factories have a carbon footprint.  
**TRUE      FALSE**

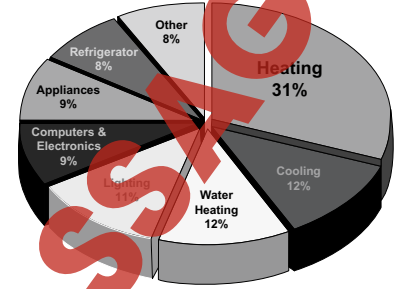
2. Put a check mark (✓) next to the answer that is most correct.

- a) An electricity bill shows how much energy you used in units of
  - A volts
  - B amps
  - C electrons
  - D kilowatt-hours
- b) What is the source of energy for most of the electricity generated in the United States?
  - A solar cells
  - B fossil fuels
  - C hydroelectric dams
  - D nuclear power plants
- c) All of these release CO<sub>2</sub> into the atmosphere, except
  - A a gas stove
  - B a solar cell
  - C a diesel truck
  - D a wood-burning fireplace



## Your Footprint At Home

**T**hink of all the things you have at home that use some kind of energy. All or most of that energy comes from the combustion of fossil fuels. So everything in your home that uses energy puts carbon dioxide into the atmosphere.



If you are thinking you will have to figure the carbon footprint of every appliance and electronic device, you can relax. It is much simpler than that. You probably use only two or three kinds of energy. Each kind of energy is sold to your household by an energy company. They keep careful records so they know how much to charge you. The amounts of each kind of energy are shown on the bill.

You will have to find copies of your energy bill to calculate the carbon footprint for your home. Electricity is measured in **kilowatt-hours (kWh)**, natural gas and other kinds of gas are measured in **therms** or hundreds of cubic feet, heating oil is measured in gallons, and coal and wood are measured in tons.

**STOP** Identify two forms of energy sold to home owners by power companies.

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We have already seen that the combustion of coal, oil, and gas releases CO<sub>2</sub>, but why is electricity part of the footprint? Most electricity is generated with energy produced by the combustion of fossil fuels, especially coal. But what if you live next to a power plant that doesn't use fossil fuels, like a



## Your Footprint At Home

1. Write the name of each appliance beside the way to reduce its carbon footprint.

air conditioner   light bulb   clothes dryer   hot water heater   dishwasher   cooking stove

- a) \_\_\_\_\_ keep lids on pots
- b) \_\_\_\_\_ use a clothesline
- c) \_\_\_\_\_ use only for full loads
- d) \_\_\_\_\_ use solar collector
- e) \_\_\_\_\_ set at a higher temperature
- f) \_\_\_\_\_ switch to fluorescent

2. Circle the word **TRUE** if the statement is TRUE or Circle the word **FALSE** if it is FALSE.

- a) Most of the electricity used to operate appliances was generated using fossil fuels.  
**TRUE      FALSE**
- b) Photovoltaic cells convert wind power to electricity.  
**TRUE      FALSE**
- c) A shower uses less hot water than a bath.  
**TRUE      FALSE**
- d) Electricity is measured in kilograms.  
**TRUE      FALSE**
- e) The energy an appliance uses does not account for all of its footprint.  
**TRUE      FALSE**

## Your Footprint At Home

3. Answer the questions in complete sentences.

- a) What information is needed to begin calculating the part of your home footprint caused by the energy your appliances use?  
\_\_\_\_\_
- b) Describe the steps in the calculation after you have gathered the information in part a).  
\_\_\_\_\_

### Extensions & Applications

A typical modern kitchen is shown below.



This kitchen uses energy in at least eleven different ways, each of which adds to the carbon footprint. Try to identify seven ways the kitchen uses energy, write their names and draw arrows to the appliance or other feature that uses energy.





# Carbon Footprint Calculator

(continued)

**Transportation:**

**Car Travel**

Estimate how many miles you travel in a car each year and estimate the average number of people in the car when you are a passenger. Find out the miles per gallon (mpg) rating of the car that you ride in. The mpg for any car can be found at <http://www.fueleconomy.gov/Feg/findacar.htm> Multiply times the conversion factor.

$$\frac{\text{(miles ridden per year)} \times (22)}{\text{(miles per gallon)} \times \text{(average number of people in car)}} = \frac{\text{lbs.}}{\text{yr.}}$$

**Air Travel**

Multiply the number of hours you spent flying over the last year by the conversion factor.

$$\text{(hours spent flying)} \times (380) = \frac{\text{lbs.}}{\text{yr.}}$$

**Public Transport**

Multiply the approximate number of miles you rode on a bus or train by the conversion factor.

$$\text{(miles on bus or train)} \times (0.24) = \frac{\text{lbs.}}{\text{yr.}}$$

**Total emissions due to transportation** \_\_\_\_\_ **pounds/year**

**Everything Else:**

**Waste**

Start with 1220 pounds and subtract 240 lbs. if you compost kitchen scraps and lawn trimmings. For recycling, subtract 140 for cans, 40 for glass, 220 for paper, and 40 for plastic.

Write the total here: \_\_\_\_\_ pounds/year

**Goods and Services**

Find out how much your household spends each month on everything else. Include clothing, furniture, appliances, entertainment, telephone, and healthcare. Don't include taxes or anything already accounted for. Use the formula below to find your share of this part of the footprint

$$\frac{\text{(monthly household spending)} \times (6.0)}{\text{(number of people in household)}} = \frac{\text{lbs.}}{\text{yr.}}$$

Emissions on Your Behalf: 3520 pounds

**Total emissions due to everything else:** \_\_\_\_\_ **pounds/year**

**Trees**

Divide the number of trees on the property where you live by the number of people in your household, multiply the result by 20 and subtract it from all the other emissions.

$$- \frac{\text{lbs.}}{\text{yr.}}$$

**GRAND TOTAL** \_\_\_\_\_ **pounds/year**

Divide the grand total by 2000 and write the answer here: \_\_\_\_\_ **tons/year**

NAME: \_\_\_\_\_



# Word Search

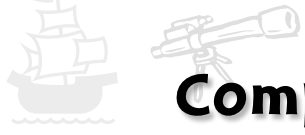


Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

combustion	climate	pesticide	organic	photovoltaic
vegetarian	compound	hybrid	fertilizer	oxygen
carbon	natural gas	carbon footprint	telecommuting	methane
greenhouse effect	global	molecule	therm	atom

G	A	B	C	D	E	F	C	O	M	B	U	S	T	I	O	N
L	N	V	E	G	E	T	A	R	I	A	N	H	Q	X	R	R
O	G	I	H	I	J	K	R	L	M	N	E	C	Y	O	P	E
B	S	T	T	C	A	R	B	O	N	R	I	G	U	V	N	Z
A	W	H	X	U	Y	Z	O	A	M	A	E	B	C	A	D	I
L	E	Y	F	G	M	H	N	E	T	N	I	J	H	K	L	L
E	M	B	N	O	P	M	F	L	W	R	S	T	T	U	V	I
D	G	R	E	E	N	H	O	U	S	E	E	F	F	E	C	T
I	W	I	X	Y	Z	V	O	C	A	M	B	C	D	E	I	R
C	F	D	G	H	O	I	T	E	E	J	K	M	L	M	N	E
I	N	O	P	T	Q	R	P	L	S	L	O	T	U	V	A	F
T	W	X	O	Y	Z	A	R	O	B	T	E	C	D	E	G	F
S	G	H	H	I	C	L	I	M	A	T	E	T	J	K	R	L
E	P	M	N	O	P	D	N	U	O	P	M	O	C	Q	O	R
P	S	T	U	V	N	A	T	U	R	A	L	G	A	S	W	X

NAME: \_\_\_\_\_



# Comprehension Quiz



**Part B**

3. Which of these parts of your personal footprint is most difficult to reduce?

- A the part caused by traveling
- B the part caused by the food you eat
- C the part caused by government activities
- D the part caused by heating and cooling your home

**Part C**

Answer each question in complete sentences.

1. Explain how human activities are changing Earth's climate. 3  
\_\_\_\_\_
2. Define carbon footprint. 3  
\_\_\_\_\_
3. Explain why using electric appliances increases your carbon footprint. 3  
\_\_\_\_\_
4. Tell four ways you can reduce the carbon footprint of the food you eat. 3  
\_\_\_\_\_
5. Explain why bus passengers have lower travel footprints than car passengers, even though buses emit more CO<sub>2</sub> than cars. 3  
\_\_\_\_\_

**SUBTOTAL: /15**

# Household Electrical & Gas Consumption



Household Gas Meter



Household Electrical Meter

**Electrical Service**

Detailed Billing Information

Meter #	Season	Service Category	Peak	KWh Usage	Unit Charge	Amount
13313	WINTER	Power Factor Rate				

KWH	ON PK	1970	0.0594	\$117.02
OFF PK	103	0.0396	\$4.08	
Total KWh Consumption		2073		
Total Electric Charges				\$120.10

**Gas Service**

Detailed Billing Information

Meter #	Season	Therms Used	Unit Charge	Amount
2345	WINTER			

Current Gas Charges		130	0.928	\$120.64
Total Gas Charges				\$120.64

Household Gas and Electric Bill

NAME: \_\_\_\_\_

After You Read 



# Your Footprint At Home

### 3. Answer the questions in complete sentences.

a) What information is needed to begin calculating the part of your home footprint caused by the energy your appliances use?

\_\_\_\_\_

b) Describe the steps in the calculation after you have gathered the information in part a).

\_\_\_\_\_

### Extensions & Applications

A typical modern kitchen is shown below.



This kitchen uses energy in at least eleven different ways, each of which adds to the carbon footprint. Try to identify seven ways the kitchen uses energy, write their names and draw arrows to the appliance or other feature that uses energy.



### 3.

- a) You will need to find the amount of energy used on the energy bills.
- b) To find your home footprint, multiply the amount of energy times a conversion factor and divide by the number of people in your household.

### Across

- 1. molecule
- 5. carbon
- 6. carbon footprint
- 10. telecommuting
- 12. pesticides

### Down

- 2. carbon dioxide
- 3. herbicide
- 4. vegetarians
- 5. carbon cycle
- 6. climate
- 7. fossil
- 8. photovoltaic
- 9. atom
- 10. therm
- 11. gas

### Extensions & Applications



# EASY MARKING ANSWER KEY