Contents

NAME: _____

Before You Read

Cars, Buses, Bicycles, and Feet

1. Complete each sentence with a word from the list.

efficient **car** **carbon** **safer** **lanes** **idling**

a) The least energy efficient way to get to school is if you travel as the only student in a _____.

b) Walking to school adds almost nothing to your _____ footprint.

c) Travel by bus and by train are about equally _____.

d) Walking is _____ than biking.

e) Biking is safer when there are bike _____.

f) Cars and buses waste energy when they are _____.

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

a) Which of these ways of getting to school adds the least to your carbon footprint?

- ◯ **A** bus
- ◯ **B** car
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b) Which of these ways of getting to school adds much more to your carbon footprint than any of the other three?

- ◯ **A** bike
- ◯ **B** bus
- ◯ **C** run
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c) An idling car is one that is

- ◯ **A** speeding up.
- ◯ **B** coasting downhill.
- ◯ **C** overloaded with passengers.
- ◯ **D** parked with its engine running.

NAME: _____

Reading Passage

Footprints in Your Lunch

A Reusable Lunch Bag & Reusable containers

The food we eat adds to our carbon footprint. Most of the CO_2 emissions related to food are indirect, but still fairly large. For example, a farmer's tractor burned a lot of fossil fuel as it traveled back and forth over a field to plant and harvest the wheat to make the bread in your PB & J sandwich.

Calculating the footprint caused by your school lunch is a little tricky because some students bring their lunch from home and some eat in a school cafeteria. If you bring your lunch, you could argue that this is part of your personal footprint, rather than the school's. In any case, no matter how you get your lunch, there are ways to reduce its footprint that work for everyone.

A school in Massachusetts started a green lunch program based on the idea that "recycle is good, but reduce and reuse are better." At the beginning of the school year, all the students got "green" lunch bags containing napkins, silverware, and cups that are washable and reusable. This eliminates a lot of waste, and any waste leads to CO_2 emissions when it is disposed of.

STOP

Describe two ways the food we eat causes fossil fuels to be burned.

_____

_____

The lunch footprint can be reduced further by buying food that is grown locally and organically. Any food waste can be put on a compost pile rather than trucking it to a landfill. The compost pile can eventually be used to fertilize a school garden.

After You Read

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Reduce What You Can and Offset the Rest

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

a) Donating money to an organization that works to reduce global warming is a way to buy a

- ◯ **A** carbon copy.
- ◯ **B** carbon offset.
- ◯ **C** carbon footprint.
- ◯ **D** carbon compound.

b) The greenhouse gas humans are most responsible for has the chemical formula

- ◯ **A** CH_4.
- ◯ **B** CO_2.
- ◯ **C** H_2O.
- ◯ **D** O_2.

c) A one-ton carbon offset costs as little as

- ◯ **A** $1.
- ◯ **B** $10.
- ◯ **C** $100.
- ◯ **D** $1,000.

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

a) Wood is a fossil fuel.
TRUE **FALSE**

b) Greenhouse gases trap light.
TRUE **FALSE**

c) Photovoltaic cells produce electricity.
TRUE **FALSE**

d) Carpooling reduces students' carbon footprints.
TRUE **FALSE**

e) Everything sent to a landfill gets recycled.
TRUE **FALSE**

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We Recycle Cans, Trees Recycle Carbon

3. Answer the questions in complete sentences.

a) Describe two ways your school can reduce the amount of carbon dioxide emitted into the atmosphere.

_____

_____

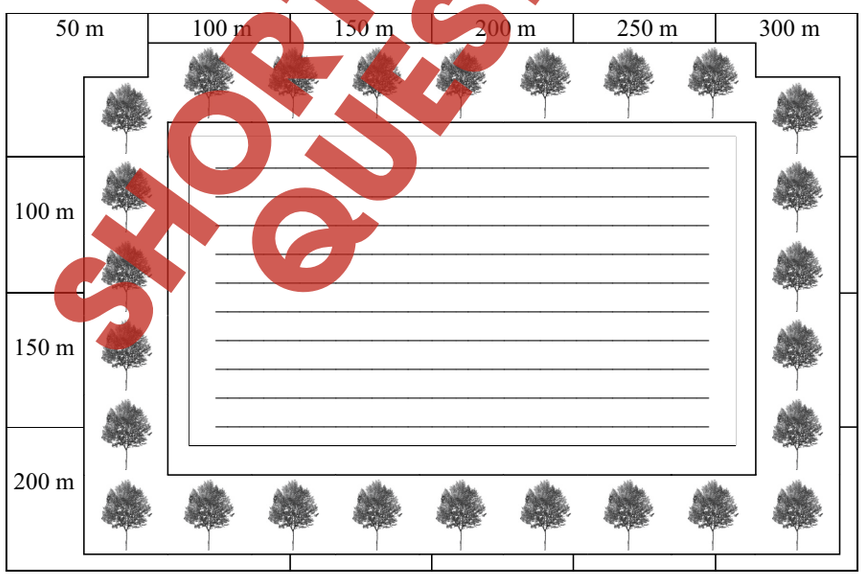
b) Describe one way your school can remove carbon dioxide from the atmosphere.

_____

_____

Extensions & Applications

A school occupies a rectangular plot of land that is 300 meters by 200 meters. The students started a project to plant trees all the way around the edge of the property. If they plant a tree every 10 meters, how many pounds of CO_2 will the trees remove from the atmosphere when they are mature? Show your work and explain your calculations in the space below.



Hands-On Activity # 1

Carbon Footprint Calculator

On this and the following page you can calculate your school's carbon footprint. The different parts of your footprint are arranged in the same order as in the chapters of this book. The calculations will be done in pounds per year (lbs./yr.) of CO_2 and then converted to tons/yr. One ton = 2000 lbs. If you don't understand how to do the math, be sure to ask for help.

For each of the four parts of your school footprint, you will have to collect some information. Some of the numbers you will need may take some time to collect and record. This is why it is a good idea to work in groups and share the leg work. Suggestions for how to find information are given under the heading of each part of the footprint.

Energy

Your school probably uses electricity and one type of fuel. You will need to find the amount of each kind of energy used by the school for the entire school year. These numbers appear on the school's energy bills. Ask your teacher or principal where you can see these records. They might also be found in the school's annual budget. The numbers you are looking for are **kilowatt-hours** (kWh) of electricity, **therms** or 100 cubic feet (100 ft^3) of gas, gallons of oil, and tons of coal. Multiplying each of these times the number in the equation will change energy units/yr. to lbs. of CO_2/yr. If all you can find are monthly bills, you will have to multiply the amount for an average month by the number of months in the school year (probably 9).

Electricity: (_____ kWh/yr.) × (1.75) = _____ $\frac{\text{lbs. } CO_2}{\text{yr.}}$

Gas: (_____ therms, gal. or 100 ft^3/yr.) × (11) = _____ $\frac{\text{lbs. } CO_2}{\text{yr.}}$

Oil: (_____ gal. /yr.) × (24) = _____ $\frac{\text{lbs. } CO_2}{\text{yr.}}$

Coal: (_____ tons/yr.) × (5,000) = _____ $\frac{\text{lbs. } CO_2}{\text{yr.}}$

Total emissions due to school energy use: _____ **pounds/year**

$\frac{\text{\_\_\_\_\_ lbs./yr.}}{2000}$ = _____ tons/yr.

Transportation

First find the number of days in the school year and the average daily attendance (how many show up—not how many are supposed to show up). Next do a survey of about 50 students chosen so they are scattered evenly throughout the school. For example, you could leave a survey form at every tenth locker, but don't choose the first 50 students getting off buses. The questions will be: how do you get to school? How many total miles do you travel each day on your way to and from school? If you carpool, how many students are in your carpool? Record your results in a table with these headings:

After You Read

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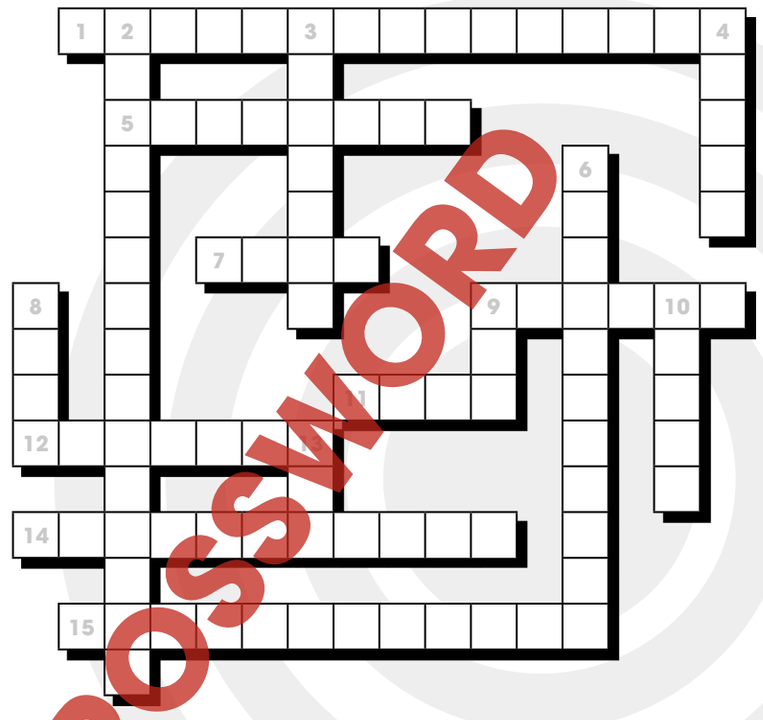
Crossword Puzzle!



Across

1. The tons of carbon dioxide emissions caused by your activities.
5. What CO_2 is to the photosynthesis process.
7. EPA Energy _____ Rating.
9. All over the Earth.
11. Compounds that enter the atmosphere when paint is sprayed. (abbreviation)
12. Rising temperature is one example of global _____ change.
14. Circulating air in a building.
15. Energy inefficient light bulbs with a tungsten filament.

Down

2. It cools the inside of a building on a hot day.
3. Coal, oil, and _____ gas.
4. The unit for measuring the amount of natural gas used.
6. The energy efficient kind of light bulbs.
8. The system that heats, cools, and circulates air in a building. (abbreviation)
9. Coal, oil, and natural _____.
10. If Earth's climate changes slowly enough, we will be able to _____ to it.
13. The government agency that worries about the environment. (abbreviation)

Word List

carbon footprint	fluorescent	climate
air conditioning	star	EPA
natural	HVAC	ventilation
therm	global	incandescent
reactant	adapt	
gas	VOCs	

After You Read

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Comprehension Quiz

25

Part A

7

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

1. Oil is a fossil fuel.
   TRUE **FALSE**
2. Oxygen is a greenhouse gas.
   TRUE **FALSE**
3. Your share of the CO_2 emitted into the atmosphere is called your carbon offset.
   TRUE **FALSE**
4. Energy Star is a brand of light bulbs.
   TRUE **FALSE**
5. Photovoltaic cells heat water.
   TRUE **FALSE**
6. It is possible for a school bus to emit CO_2 even when it is not moving.
   TRUE **FALSE**
7. A bicycle has a much smaller carbon footprint than that of a school bus.
   TRUE **FALSE**

Part B

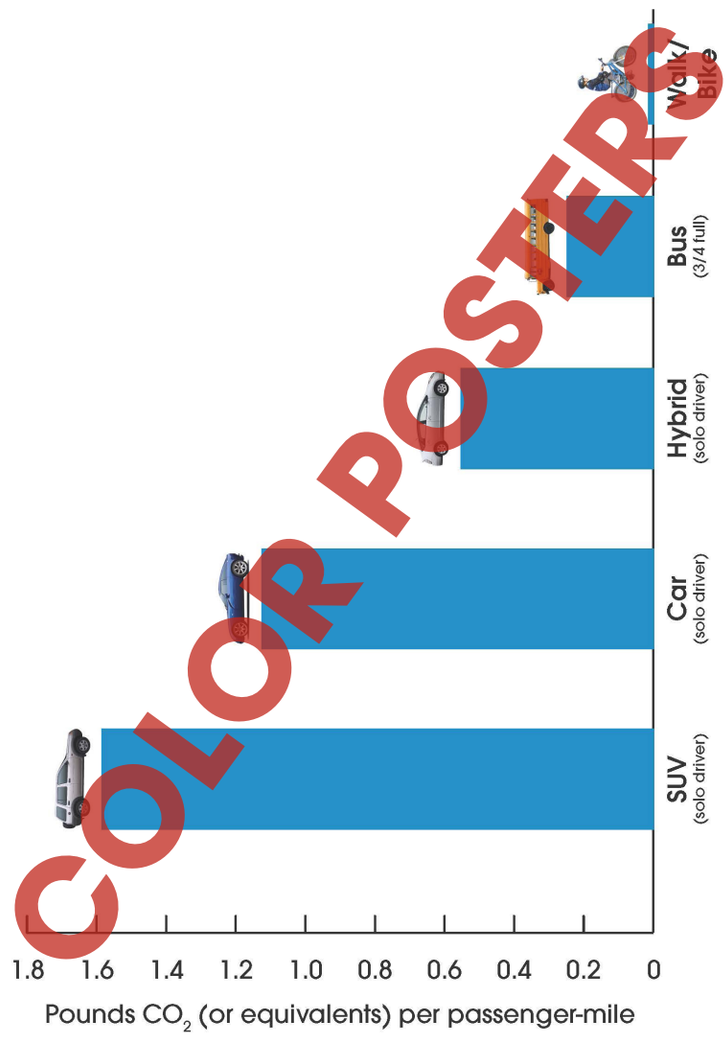
3

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

1. **Carbon footprints are usually expressed in units of**
   - ◯ **A** tons per year.
   - ◯ **B** miles per hour.
   - ◯ **C** therms per week.
   - ◯ **D** kilowatt-hours per month.
2. **The government agency concerned with climate change issues is the**
   - ◯ **A** AARP.
   - ◯ **B** EPA.
   - ◯ **C** HVAC.
   - ◯ **D** VOC.
3. **Which of these is the term for an efficient type of light bulb?**
   - ◯ **A** fluorescent
   - ◯ **B** incandescent
   - ◯ **C** photosynthetic
   - ◯ **D** photovoltaic

SUBTOTAL: /10

Your Transportation Carbon Footprint



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- ◯ **C** overloaded with passengers.
- ◯ **D** parked with its engine running.

1.

a) car

b) carbon

c) efficient

d) safer

e) lanes

f) idling

2.

a) ☑ **C**

b) ☑ **B**

c) ☑ **D**

Efficiency is measured in emissions per passenger mile, and buses have more passengers so the result is lower.

1.

a) ☑ **D**

b) ☑ **B**

c) ☑ **A**

2.

a) TRUE

b) FALSE

c) TRUE

d) FALSE

e) FALSE

3.

a) (Answers will vary.) Get a map of bike lanes and find a route that has all bike lanes.

b) (Answers will vary.) Vehicles must turn off their engines in an idle free zone. When engines idle they emit CO_2 even though they aren't moving.

Extensions & Applications

Answers will vary widely from school to school. There are no correct answers for this application.

1.

a) FALSE

b) TRUE

c) TRUE

d) TRUE

e) FALSE

2.

a) ☑ **A**

b) ☑ **C**

c) ☑ **C**