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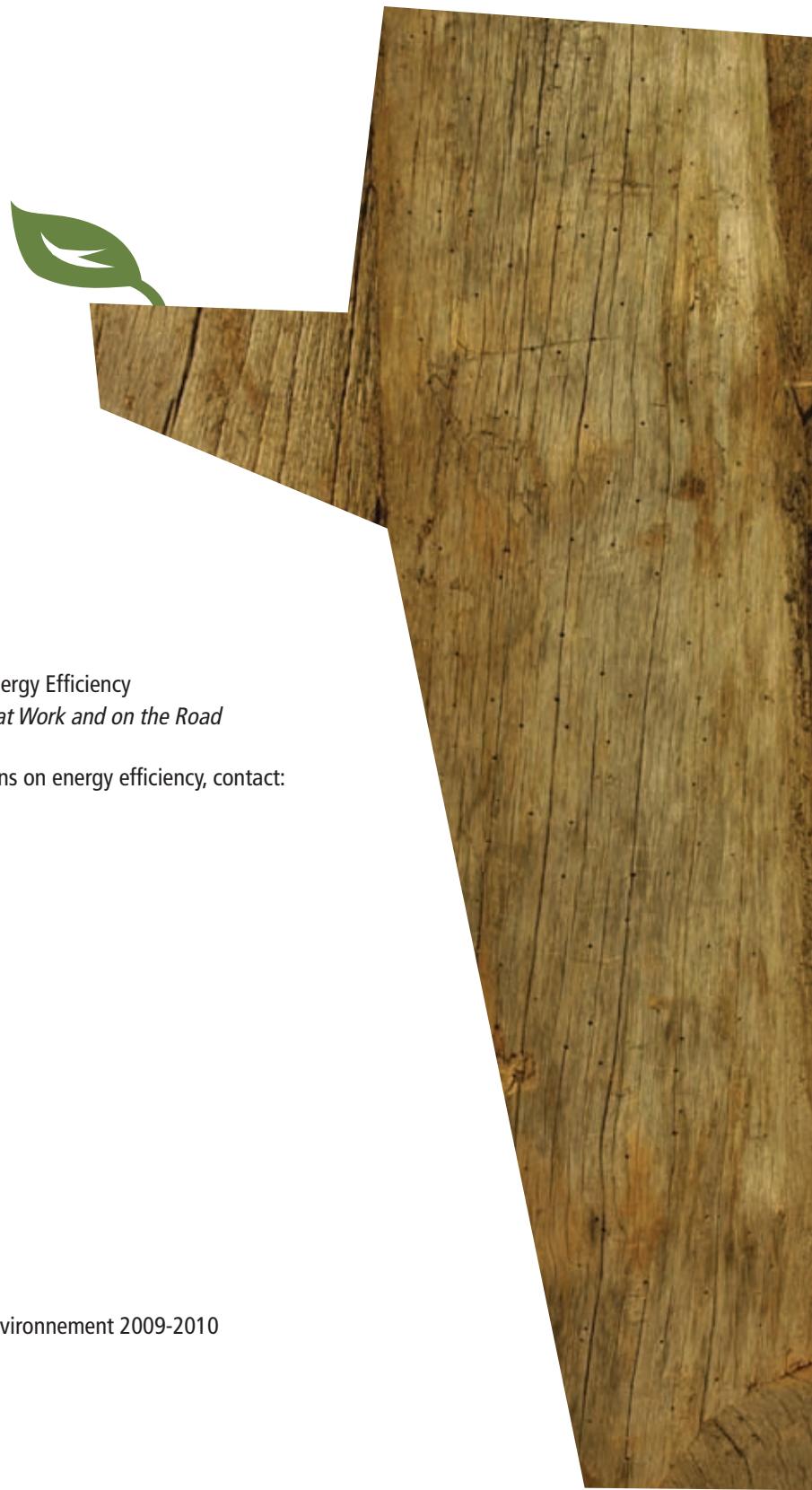
ENERGY and the ENVIRONMENT

2009-2010

Learning
Activities



Canada



Natural Resources Canada's Office of Energy Efficiency
Leading Canadians to Energy Efficiency at Home, at Work and on the Road

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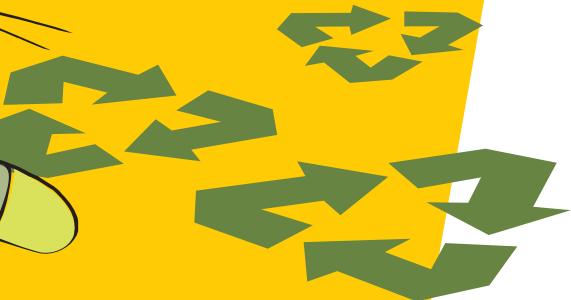
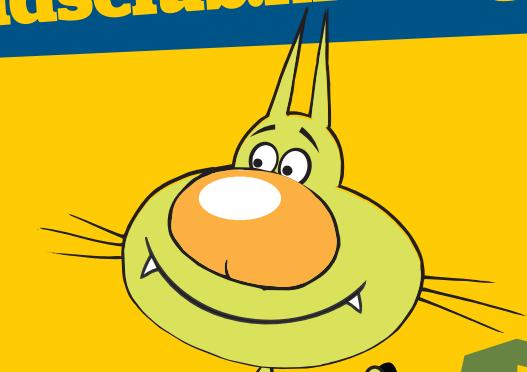
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The greenhouse effect

Have you heard about how our world is getting warmer?

Read this explanation and see if you can answer the questions.

Greenhouse effect

Have you ever been inside a greenhouse? It's very warm all year-round, even in winter! This is how plants grow so well inside it. But did someone crank up the heat in there? No! Greenhouses are made of glass, which allows the sun to shine in and keeps the heat in. The same thing happens with our planet, like it's inside a greenhouse. Earth is surrounded by the atmosphere, and like the glass of a greenhouse, the atmosphere absorbs enough heat from the sun to keep us comfortably warm. This is natural and a good thing too, because without it, we would be freezing!

Are we getting hot?

The atmosphere is made up of water drops and **greenhouse gases (GHGs)**, and these gases absorb the heat to keep us cozy. But we're busy creatures. We love to drive cars, fly planes and burn oil and coal to make electricity. Together this puts a lot more greenhouse gases into the atmosphere where they absorb a lot more heat from the sun. This creates an increased greenhouse effect, and the earth is becoming warmer than usual. This is known as **global warming**, and it can affect our lives.



Did you know?

With all our activities, like driving our cars and heating our homes, Canadians produce on average 5 tonnes of GHGs per year. Picture it: One tonne of GHGs would fill a two-storey, three-bedroom house!

1

Explain why a greenhouse is warm all year-round, even in winter.

2

Why is the earth compared to a greenhouse, or what keeps the earth warm enough so that there can be animal and plant life?

3

Is the "greenhouse effect" a natural thing? What would happen without it?

4

Why is the earth getting warmer? Explain what's happening.

5

Global warming is not a good thing for all living creatures on the earth. What can you do to help slow down global warming?

Climate change

Understanding climate change is as easy as A-B-C!

Learning Activity

2

The earth is warming more quickly than in the past. This warming creates climate change, which is the change in weather over time and over a region. It includes changes in temperatures, wind patterns and precipitations.

Read the following sentences about climate change. Circle the word that is misspelled in each sentence and write it correctly in the space provided.

Did you know?

The Arctic ice at the North Pole has shrunk by about 10% in the past few decades, and the thickness of the ice above water has decreased by about 40%.



ERRROS

1 When we produce energy from fossil fuels, we release greenhouse gases (GHGs) into the atmossfere.

2 All over the world, GHGs are warming the planet and changing the climeat: Rainfalls are heavier, hurricanes are stronger, and we experience more heat waves.

3 Canada is so big that climate changes are different dependant on where we live.

4 The northern see ice where polar bears live and hunt is shrinking because of climate change.

5 When stuff – food, clothes and toys – travvels a long way to get to us, a lot of GHGs are created because of the fuel and emissions from transportation.

6 When we use our own energy – like riding our bikes to school – we help the enviromnent.

7 We can use less energy in summer, too – for example, we can close the curtains instead of using the air condichener.

8 We can all be climate change champeons – by using only the energy we need.



Energy conservation

Test your energy conservation knowledge.

Learning Activity **3**

Did you know?

There are three ways to use less energy:

- * Conservation – such as turning off the air conditioner or riding a bike instead of taking the car
- * Energy-efficient technologies – such as hybrid cars and compact fluorescent light bulbs
- * Renewable and alternative fuels – such as solar and wind power

Energy doesn't go away. When we use energy – of any sort – we simply convert it from one form to another. Consider your favourite fruit – maybe a juicy peach. It draws energy from the sun to grow and ripen, and when you eat it, you get energy in the form of calories. This is good energy.

When we burn fossil fuels – oil and natural gas to heat our homes, gas in our cars, coal to create electricity – we get the energy we're after. But we also release carbon dioxide into the atmosphere, and this affects the climate in a bad way.

How do we avoid this? By using as little fossil fuels as possible. Taking steps to use less energy – at home, at school and on the road – is one way to do this and make a difference. And if we convince our families and friends to use less too, we'll make an even bigger difference!

True or false?

Test your energy conservation knowledge!
Circle the correct answer.

1 Snow tires help save on gas when roads are snow-covered.

True or False

2 In the winter, furnaces have to work extra hard at night.

True or False

3 Running cold water instead of hot saves energy.

True or False

4 The dishwasher uses less energy when it's only half full.

True or False

5 Walking to school is good for the environment.

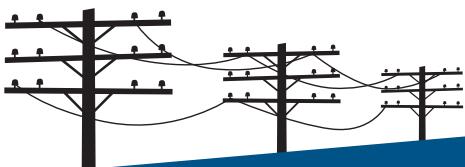
True or False

6 The microwave uses less energy than the oven.

True or False

7 The television uses more energy when you switch it on and off.

True or False



The power of “off”

We use electricity every minute of the day in our homes.

Sometimes we need to keep appliances running all the time – like the refrigerator that keeps our food safe to eat and the alarm clock that wakes us up in time for school. Other energy-users that we can turn off with the flick of a switch: a light bulb, the dishwasher.

But electronic equipment – like televisions, computers and video games – is different. You may think you’re turning off your electronic equipment but it’s actually just “napping” – waiting to snap back into action. That’s pretty convenient. But the equipment is still using energy called **standby energy**. To stop electronics from using energy, you need to either (1) unplug them or (2) plug them into a power bar that you can switch off. This can save up to 10% of the energy used in your entire home!

Be a ghost buster!

Take stock of all the equipment and appliances you have, and fill in the boxes below.

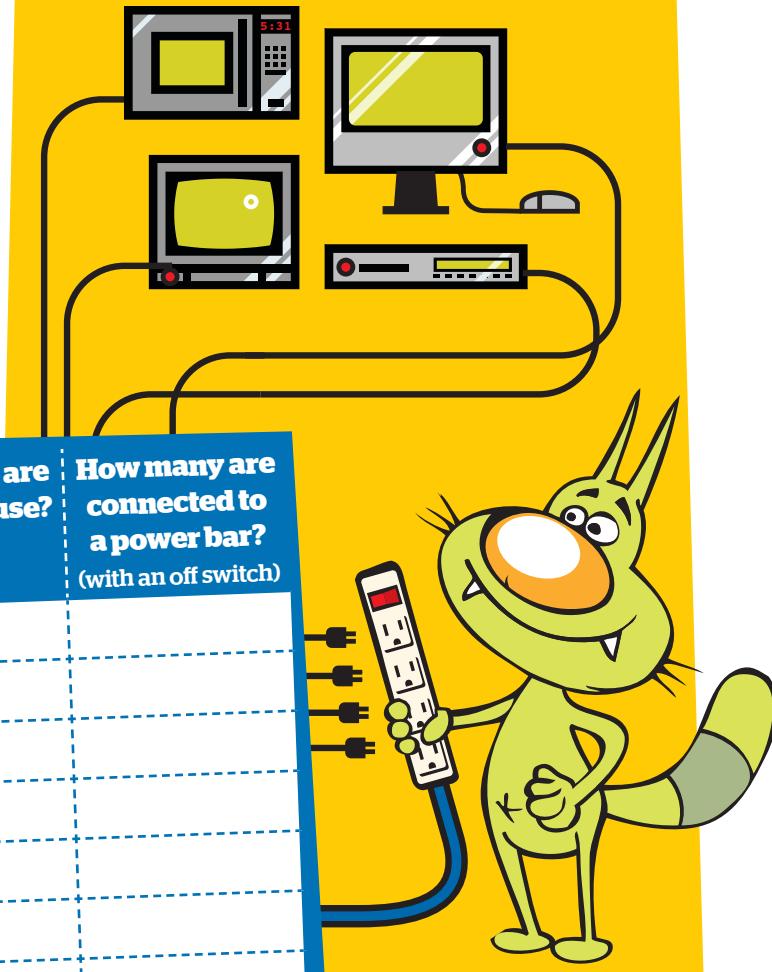
Equipment/Appliance	How many are in your house?	How many are connected to a power bar? (with an off switch)
Microwave		
Toaster oven		
Television		
Audio system		
Cell phone charger		
Computer		
Others (please list):		

How scary is the phantom load at your house?

Learning Activity 4

Did you know?

Electronic devices draw power even when you think they are “off.” This standby energy is also called “phantom load” because it’s invisible.



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Water and energy

The less water we use,
the less energy we waste.

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Earth is sometimes called the “blue planet,” because from outer space, the oceans that cover most (70%) of our world appear blue. All this water is salt water, and while it may be good for some fish, that’s not so for us! We need fresh water, from lakes and rivers. But there isn’t a lot of that, so we need to conserve what we have. Also, saving water means saving energy. Water has to travel to us, and after we use it, it has to be treated and returned to its source. All of this activity takes energy, so the less water we use, the less energy we waste.

Did you know?

If all the earth’s water could be stored in a five-litre container, the proportion of that water good enough to drink would not even fill a teaspoon.



Learning Activity **5**

Read the text below and circle the answer that you think is best.

1 Using less water in the kitchen is easy. A good way to save water is to

- a** Fill the dishwasher before running it
- b** Chill drinking water in the refrigerator
- c** Wash vegetables in a bowl
- d** Do all of the above

2 If you leave the water running when you brush your teeth, how much water will you use?

- a** 2 litres
- b** 3 to 5 litres
- c** 7 litres
- d** 10 litres

3 How much of the water that people use on their lawns and gardens is wasted because it evaporates or runs off?

- a** Less than 10%
- b** About 25%
- c** Almost 30%
- d** More than 50%

4 How much of the water that we use at home every day is for baths and showers?

- a** 10%
- b** 15%
- c** 25%
- d** 35%

5 How often should a lawn be watered in the summer?

- a** Only when necessary
- b** Three days per week
- c** Four days per week
- d** Every day

6 It takes energy to heat water. How much of an average home’s energy bill is for heating water?

- a** 3%
- b** 5%
- c** 10%
- d** 15%

Reduce, reuse, recycle

Learning Activity **6**

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Did you know?

- * It takes 17 trees to produce one tonne of paper.
- * With the same amount of energy it takes to produce only one new aluminum drink can, you can make as many as 20 cans from recycled material.
- * Recycling paper takes 70% less energy than making it from scratch.



The 3Rs.

Draw a line to the correct "R" concept from the actions list. Some actions can link to more than one R!

Action

Use the microwave instead of the oven.

Use a bottle that can be refilled again and again.

At home and at school, use different bins to discard paper, plastic and cans.

Always walk, bike or take the bus to school.

Choose toys that don't need batteries.

When you grow out of your favourite clothes, give them to a charity.

Your family saves food scraps and composts them in a bin.

Decorate a glass jar for pens and other stuff as a birthday gift.

Borrow a book from the library instead of buying one.

Do you know the 3Rs? That's right! **Reduce**, **Reuse** and **Recycle**. These steps are some of the easiest things you can do for our environment, and you'll help save money, energy and our planet!

Reduce ...

Only buy things you really need and you'll create less waste.

Reuse ...

Use things again and again. Can't find a use for something? Offer it to someone who can.

Recycle ...

Take an item that's already been used and make a new use of it.

You're conscious of your environment, and chances are, you already recycle, and that's a good thing. But **recycling** all those individual wrappings from lunch is only part of the equation! Choosing to use items with less packaging – **reducing** – and then using a bottle and container that can be used over and over again – **reusing** – are important first steps for success. Now you can watch the pile of recycling shrinking away!

"R" concept



Greening your classroom

Let's play a game of "I spy!"

Learning Activity

7

Look around your classroom and school. Can you spy some ways to save energy and protect the environment? For example

- * Do the lights need to be on right now?
- * Is there a lot of paper in the garbage?
- * How was your lunch wrapped today?

Before and after

Here's your mission: Do a green audit of your classroom. That means taking stock of the way you use energy, water and materials. **Write down all the activities you do now. Give yourself one point in the "Before" column for each activity that you complete. Give yourself another point for each time you repeat an activity.** Your class will then talk about ways to be greener. **After you've added these ideas to your chart, you can do another audit in the "After" column.** See how much greener you can be!

Did you know?

There are about 11 000 elementary schools across Canada. And who knows how many classrooms? So greening up our classrooms can really add up!

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Here are some green ideas to get you going. You can fill in the blank lines with your own ideas.

Item or activity	Before	After
Use less electricity		
1. Turn off lights when it's sunny		
2. Turn computers off when they're not in use		
3.		
4.		
Use less paper		
1. Set up a paper recycling bin		
2. Make sure you use both sides of the paper		
3.		
4.		
Use less water		
1. Turn the water off while soaping your hands		
2. Report leaking faucets		
3.		
4.		
Green up your lunch		
1. Try for a litterless lunch – there's no paper or plastic to throw away		
2. Bring your drink in a re-usable container		
3.		
4.		
Total points		

Renewable energy

Use your energy to find the answers

Find as many renewable energy words as you can in the puzzle below.

DOWN

- 1 So yummy with butter but can also be used to produce biomass (4)
- 2 Describes our effort to use less. Think opposite of waste (12)
- 5 Form of energy that uses water as its main source (2 words: 5 + 11)
- 6 We use them to make electricity from the sun. They can heat a pool! (6)
- 7 Type of energy created by using the power of the sun (5)
- 9 It's our own, we need to protect it! (5)
- 10 Type of energy that comes from the earth (10)
- 13 Natural water course that flows toward the ocean (5)

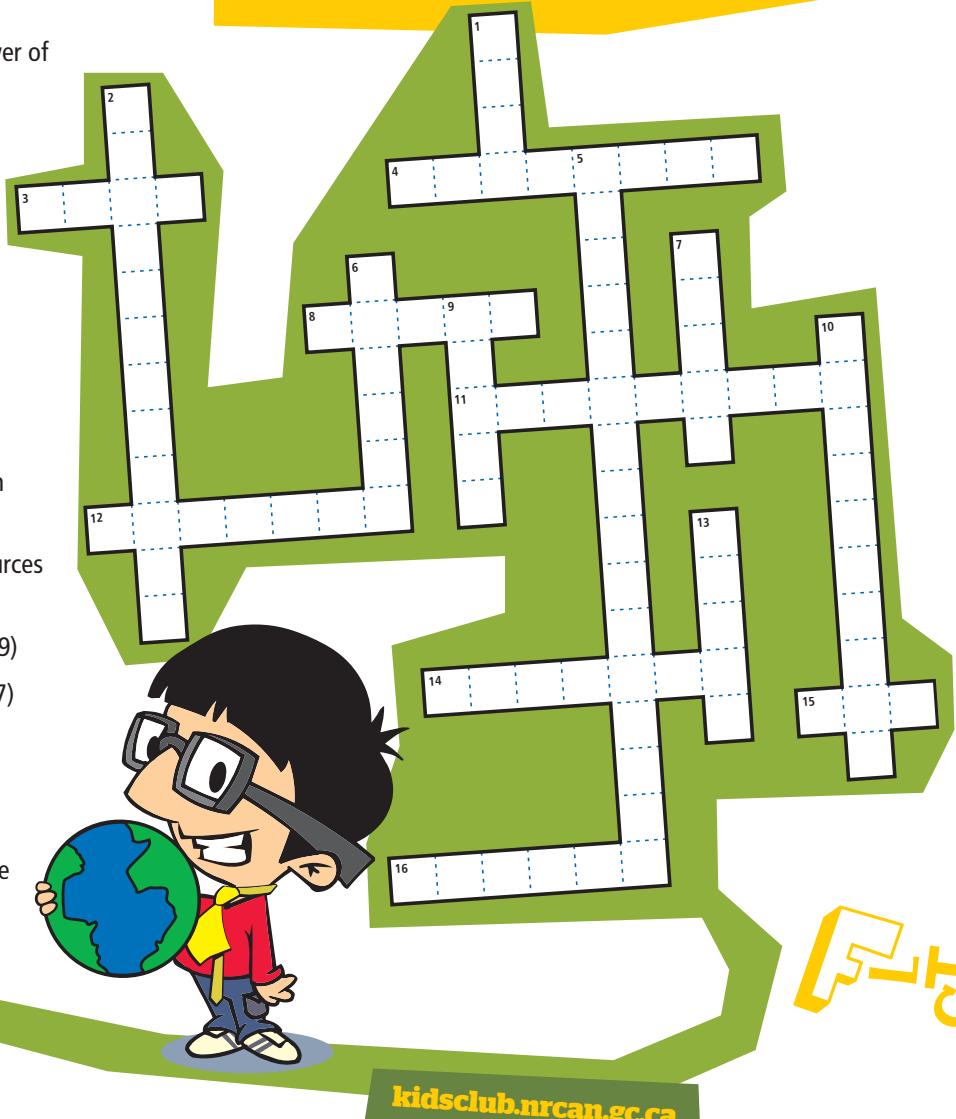
ACROSS

- 3 Type of energy that's on the move (4)
- 4 Natural source of heat and light that can warm your room in winter (8)
- 8 One of our most important natural resources in Canada. We can't live without it (5)
- 11 Type of energy that can be replenished (9)
- 12 Type of energy that comes from plants (7)
- 14 Form of solar energy that requires no equipment – just open your curtains! (7)
- 15 Barrier used to retain water (3)
- 16 It comes in many forms, but we often use too much of it (6)

Did you know?

Renewable energy is energy that doesn't run out and can renew itself:

- * Even though we use solar energy, the sun keeps shining and continues to produce solar energy.
- * Wind is air in motion, and as long as it's blowing, we can use it to produce other forms of energy.
- * We build a dam in a river to create hydro-electricity, and the water still flows.
- * We harvest crops for biomass energy, and we can plant more.
- * We draw heat from the earth to create geothermal energy, and more heat is made every day in the earth's core.



New Technologies

Test your energy efficiency knowledge
to unscramble the words in the sentences below.

Learning Activity

9

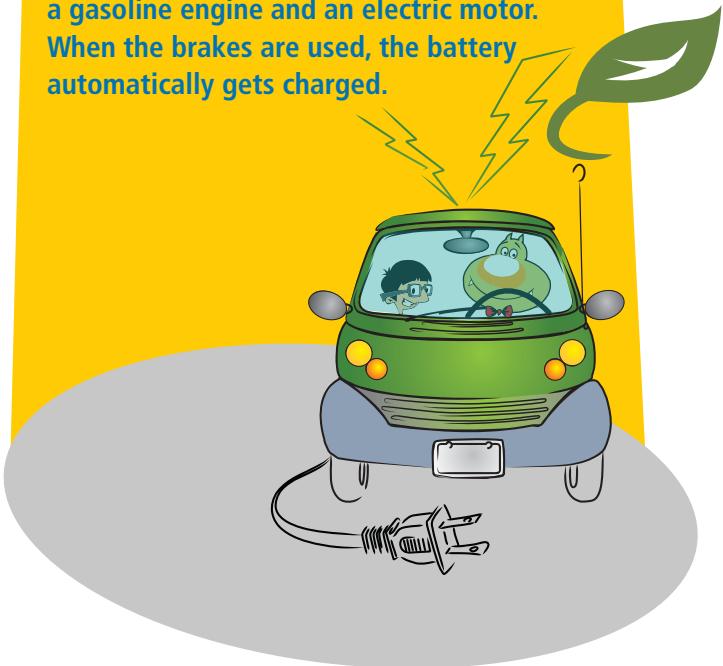
All around the world, people depend on energy drawn from the earth. Because there are so many of us using so much energy, the earth is under stress. It needs our help.

Energy-efficient technologies – like light bulbs and appliances that use less electricity and hybrid vehicles – are already helping today. They allow us to do things we need to do – make dinner, read at night and visit grandma – while using less energy.

- 1** It will soon be possible to charge cars using electricity from **R ALSO NE YEGR**.
- 2** Compact **FORUETNSCEL** light bulbs (CFLs) are more efficient because they use 75% less energy.
- 3** **RDYHBI** vehicles get their power not only from conventional gas but also from electricity, and that's good for the environment.
- 4** Newer, energy-efficient refrigerators use less than half the **TYTELCEIRIC** of models 10 years older.
- 5** Use the **PLESE** mode on your computer to save energy.

Did you know?

Hybrid vehicles get their power from both a gasoline engine and an electric motor. When the brakes are used, the battery automatically gets charged.



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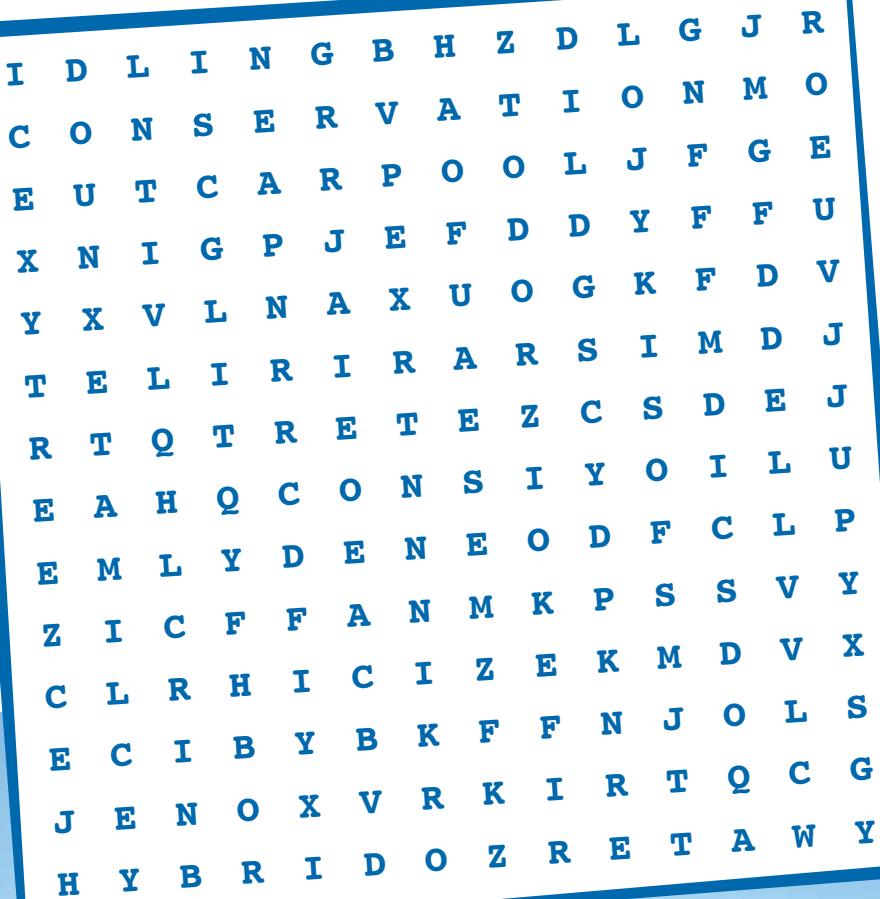
Energy-smart choices

Test your search skills

Word puzzle

All the circled words in these fun facts are hidden in the puzzle.

Can you find them?



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Did you know?

Composting is a way to recycle, and it's good for planet Earth.

You can do something good for the environment and lessen the negative effects of climate change by planting a tree or conserving water.



Energy efficiency and cars:

- * Ask your parents if they carpool.
- * No idling please, it uses more fossil fuel.
- * Hybrid cars help with energy conservation.

Notes



IDLING



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