

As the WORLD Warms



A HOT TOPICS NEWSPAPER SUPPLEMENT FROM



Welcome to a Warming World

What are the top stories in the world — the most important things happening — right now? Think for a moment.

The choosing of new world leaders, wars, the economy, strife in several countries, natural disasters — all these have been top stories in newspaper headlines and on the TV news.

But another story grows in importance every day. Barely a week goes by that we don't get new information about the state of the global environment. Almost daily, a new headline appears about changing weather patterns worldwide, and the story is usually about the weather warming. Related stories mention endangered polar bears, droughts, flooding, and so on, all caused by warming weather patterns worldwide.

Global warming — sometimes called global climate change — is quickly becoming one of the top ongoing stories. In just the next couple of years, more information will become known, more studies will be announced, more solutions will be proposed, and more new “green products” (that is, environmentally friendly) will be created and sold. It is a very important story.

That's why it's important for you to better understand the science of our warming world, what global warming means, and what you and your class can do about it. This special newspaper section will help you learn those things.

We've included lots of activities for you, whether you do them alone, in small groups, or with the entire class. Many of the activities ask you to use the newspaper. Since global warming is an issue that changes almost every day, the newspaper, along with the Internet, is one of the greatest resources to help you to understand this important story.

Global Warming Resources

There's an avalanche of books, DVDs, websites, even board games available to help you dive more deeply into global warming. Here are a few additional resources:

1. Global Warming, or Not: Watch Al Gore's movie, “An Inconvenient Truth,” the movie that won him the Nobel Peace Prize and riveted world attention on the issue. Discuss the movie afterwards. Then, for the opposing view, try the website globalwarming.org, organized by global warming skeptics.

2. Warming on the Web: Some of the best information is presented by the government.
www.epa.gov/climatechange/kids/version2.html
www.ncdc.noaa.gov/oa/climate/globalwarming.html

3. Now for Something Completely Different: Use an online search engine, and type in “Blue Man Group, Earth.” Check out this creative video with a global warming message. Enjoy!



As the planet's temperatures have warmed in recent years, Arctic Ocean ice has begun breaking up faster and sooner than expected. Scientists have begun worrying about the fate of the polar bear, a hunter that needs sea ice to catch its prey, seals. Without ice, polar bears face an uncertain future.

CREDITS:

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TODAY'S HEADLINES

How does a newspaper tell you what the most important story of the day is? What is today's largest and most noticeable front-page headline? Now look at all the stories on the front page. Do you agree that the one with the largest and most noticeable headline is the most important story? Skim through the world news in today's newspaper. If you're using an e-edition or online newspaper, there's probably a search tool you could use to find world news. Is there a global warming or environmental story? What is the story about? Summarize the story in one sentence.

Learning standards: using common textual features, identifying basic facts and main ideas

As the World Warms

A Poll About Global Warming

A pollster is a person who asks questions to find out what people are thinking. Here's your chance to be a pollster and find out what folks are thinking about global warming.

This is a 10-question poll. Since global warming has been in the news so much, everyone has opinions about it. Let's learn some of these opinions.

First, take the poll yourself. Read each question, and check your choice or fill in the blank. (In polls, you are allowed to write in "I don't know" if that most accurately reflects your opinion.)

Then, talk as a class about how you would tabulate your results as a group to make it a class poll. Group your answers, and report them as percentages. If, say, 12 students of a class of 24 thought the Earth's weather was changing, that would mean that 50% responded yes (and what percent no?) to that question.

What question does most of the class agree on? What question do most of you disagree on? What question divides the class most evenly? Does anything surprise you?

TODAY'S NEWS POLL

What story in today's newspaper would lend itself to an opinion poll? Choose one and write a five-question poll about it.

Learning standards: identifying and summarizing main ideas, generating questions

1. Do you believe the Earth's weather has changed in the last few years?
 Yes No
2. If yes, is it caused by the actions of people, or is it caused by nature?
 People Nature
3. What's the biggest cause of the change in our weather?

4. Should global warming be an issue in elections?
 Yes No
5. Is global warming the most important election issue?
 Yes No
6. Which group is the most responsible for fixing a possible global warming problem?
a. Government b. Business and industry c. People
7. Should we make and sell cars that are more fuel-efficient, that burn less gas?
 Yes No
8. Should we make cars that do not burn fossil fuels at all?
 Yes No
9. Should you personally do something to reduce global warming?
 Yes No
10. What's the most important thing you can do?

Let's go polling!

Break your class into four groups of pollsters, groups A through D. Each group is going to give this poll to a different group, and the results of those polls will be compared to the class's results. Group A will poll another class in your school's grade. (Is there a difference between the opinions of the two classes?) Group B will poll the school's teachers. Group C will poll a sample of about 20 adults who do not work at the school — parents and friends of classmates. And Group D will poll a sample of about 20 high school students.

Have each polling group report to the class. Make a table to compare the four groups' answers by percentage. What did you learn?

Global Warming: The Science



To understand global warming, one has to first know how the greenhouse effect works. In a greenhouse, sunlight travels through glass and heats the air inside. While light passes easily through glass, heat does not — and so heat builds up inside, much like how the interior of a car gets warm when the car is parked in the sun.

To see how greenhouse gases might work, try this experiment. Your teacher will help you procure materials, and you'll work in small groups.

Test A

Find a large, lidded glass jar like one used for cookies, pretzels, or pickles. Place the jar on a sheet of white paper in the sunlight in your classroom (or outdoors). Remove the lid, and place a small thermometer inside the jar where you can read the mercury. Make sure the jar receives sunlight the entire time. With the lid off, take a reading of the thermometer every five minutes for 30 minutes. Record and chart your results on graph paper.

Test B

For test B, put the lid on the jar, and do the experiment the exact same way.

Test C

For test C, place a small glass (like a jelly jar) of water inside the large jar. Put the lid back on the large jar, and conduct the experiment.

Test D

For test D, pour out the water and fill the small jar with dark potting soil. Place the small jar inside the big one, seal the big jar, and conduct the experiment.

Since you've recorded the results, you can now place four different lines (label each one) on one sheet of graph paper, one line for each of your tests.

Discussion:

1. Greenhouse gases are special gases like water vapor that trap heat and make the atmosphere artificially warm. Test A is a sky with no greenhouse gases; test B is the same atmosphere, but with greenhouse gases. What's the difference?
2. On which planet would you like to live – one with or without greenhouse gases? The Earth's temperature would be 0 degrees without a greenhouse sky. What would have happened to the oceans if that was our average temperature?
2. Test C shows how water vapor is also a greenhouse gas and how water itself warms up to trap heat. How was that test different?
3. Test D shows what happens when the Earth itself warms up from sunlight. As the earth warms, it radiates heat, which is trapped by greenhouse gases. What were the differences here?
4. Do an online search for "greenhouse gases, Venus," and see what you can discover about life on that greenhouse world. Which of your tests is most like Venus?

Materials needed:



As The Weather Warms

To understand warming weather patterns, one needs to understand the composition of the atmosphere — how much of which gases make up the air we breathe. Check out the table on this page. Use the Internet or an encyclopedia in your school library to fill in the blanks in both columns.

Atmospheric gas	Percent of atmosphere
Oxygen	%
?	78%
Argon	%
Carbon Dioxide	%
Other Gases	

Any surprises on the chart? Overwhelmingly, so much of the air we breathe is only two gases.

Classroom meteorologists

What happens to outside air temperatures during the season we're now in?

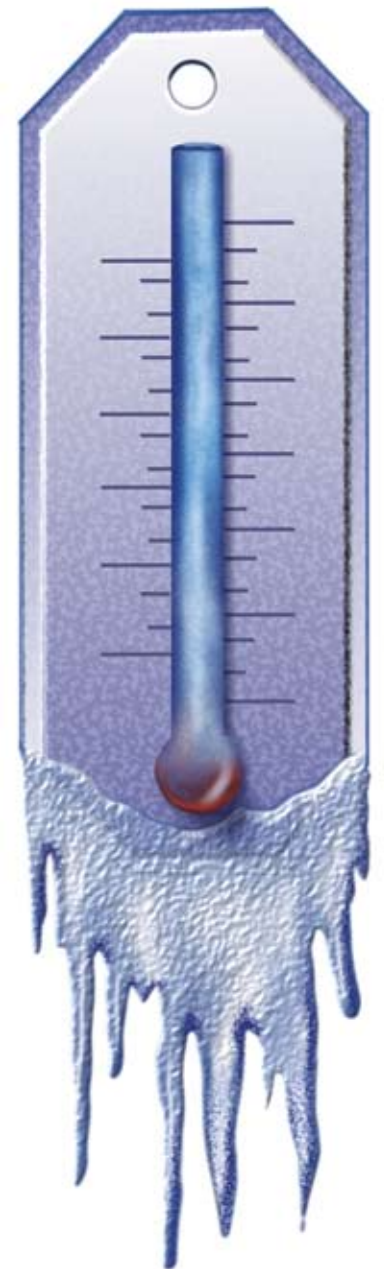
Your class is now going to become a group of meteorologists. You are going to measure outside air temperatures (even on rainy or snowy days) for four weeks.

First, make a group prediction about what will happen to outside air temperatures over the four weeks. Next, devise a strategy for making sure the temperature is measured every day. How should your class accomplish this?

Then, carry out your plan, measuring the outside temperature at the beginning of science class every day. At the end of the four weeks, create a graph of your measurements, with temperatures on one axis and dates on the other. What's your expected weather trend over four weeks?

Does weather always cooperate and follow patterns? Why or why not?

Consider writing to a TV meteorologist in your town or city and sharing your results. Do you get a response?



ANSWERS:
 Oxygen—20.95%
 Nitrogen—78.08%
 Argon—.93%
 Carbon dioxide—.038%
 Other gases—trace amounts

WEATHER

IN THE NEWS

Check today's newspaper, either in print or online. If you're using an online newspaper, go to the weather summary. There probably will be an almanac section that shows today's weather, the five-day forecast, and weather around the country and world. Turn to that page. (It's a useful part of the newspaper to know — if you're not sure how to dress for school in the morning, this page can really help you!)

1. Look at this week's weather. What's the prediction for this week? Watch the week's weather; at the end of the week, decide if the forecast was correct or not.

2. Look at the almanac's map of the United States. Where would you expect it to be the hottest in the country at this time of year? Look at the previous day's temperatures in key cities. Are you correct? What is the hottest city in the country today? What's the hottest city in the world?

3. Use the data you find on the weather page to write three word problems about the weather for a partner to solve. Exchange papers and solve each other's problems. Show the equations you used to find the answer.

Learning standards: drawing conclusions based on evidence, explaining data, locating diverse places, understanding computation

How Global Warming Happens

On page four, we learned some basic global warming science. Here, let's dive a little deeper. As you read this text, you'll notice there are lots of blanks. Look along the bottom of this page for a list of words. Choose a word to fill in each of the blanks. Each word is used only once.

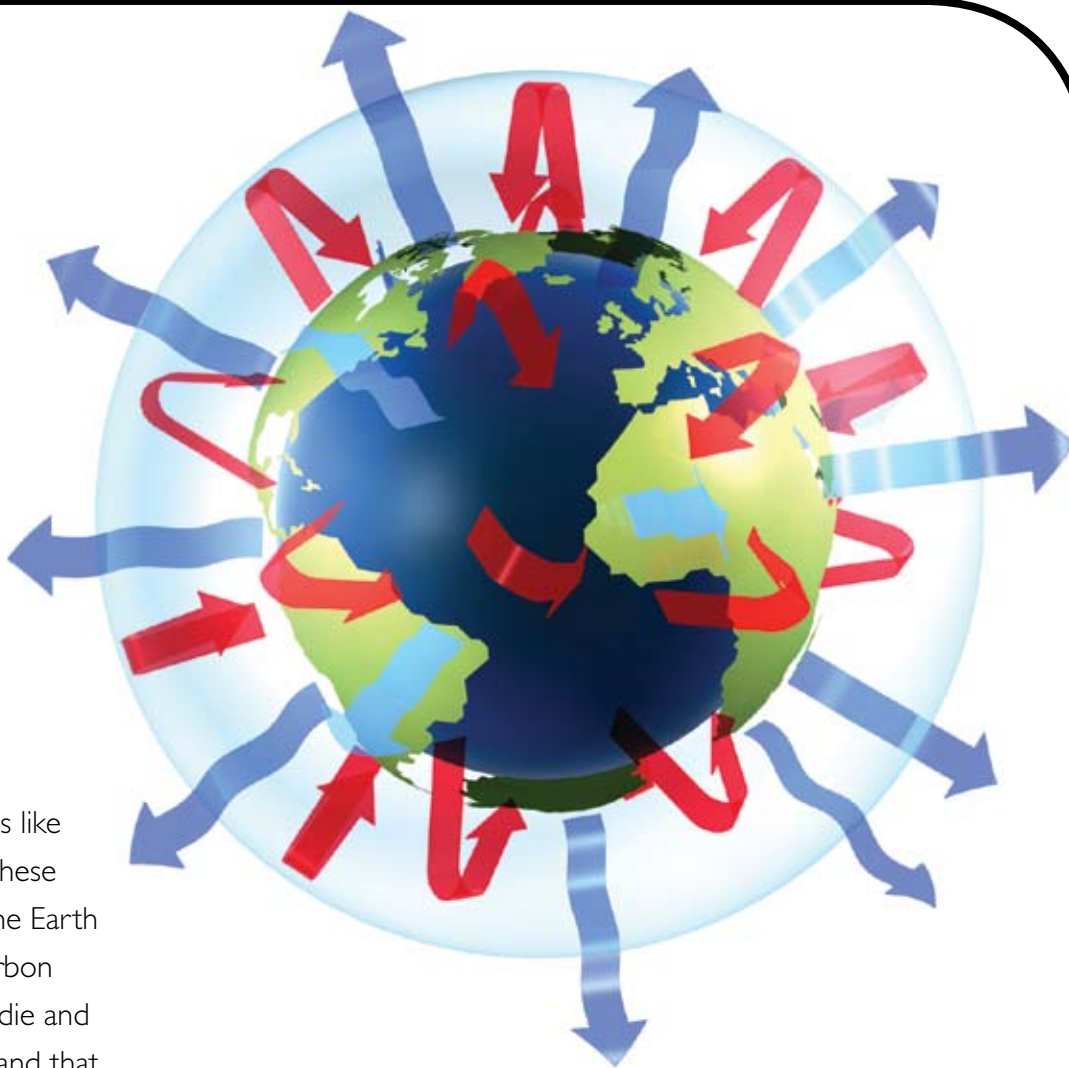
So here's the deal: the Earth's atmosphere is filled with gases like oxygen, nitrogen, carbon _____, and more. Some of these gases are greenhouse gases, ones that trap heat and keep the Earth artificially warm. Water vapor is a greenhouse gas, as are carbon dioxide and methane, the gas given off in swamps as plants die and rot. Even CFCs, the chemical that harmed the ozone layer (and that was once used in refrigerators), is a greenhouse gas.

By itself, the greenhouse _____ is a good thing. Without it, there would be no life on Earth at all, and our oceans would be solid chunks of _____.

Global warming, however, is an artificial increase in the temperature of the Earth caused by the large amounts of greenhouse gases released into the sky. When people burn fossil fuels like coal, oil, _____, and natural gas in power plants and cars, large amounts of gases like water and carbon dioxide are emitted.

Cars and _____ give off greenhouse gases. When you turn on a light switch, a power plant that makes _____ gives off greenhouse gases.

All over the world, a lot of cars – and a lot of people – are using electricity. Because of our worldwide energy use, the amount of carbon dioxide in our air has increased more than 20 percent in the last 50 years, _____ from 320 parts per million to some 380 parts per million. Scientists are concerned that concentrations may continue climbing until they reach 500 or even 600 parts per million, a double dose of carbon dioxide.



That's global warming – an enhanced greenhouse effect. Over the last few years, many signs point to a warming world with changing weather patterns. Average temperatures are increasing. Summers are hotter in many places, _____ milder. The Arctic _____ is thinner in many places. Glaciers in Greenland and on _____ are receding. Because ice has melted, sea levels have risen just a little.

Many people are talking about global warming these days, including scientists, elected _____, entertainers, talk show hosts, and kids like you.

It's one of the important issues of our day, and one on which _____ can have a very strong impact.

- | | | | |
|---------------------|------------------|----------------|--------------------|
| mountaintops | officials | dioxide | winters |
| climbing | ice | effect | you |
| gasoline | Ocean | buses | electricity |

Global Warming:



The Game Show!

Let's look at the impact of global warming on people like you. People around the world have already been hurt by global warming. For example: Residents of the low-lying island of Tuvalu decided recently to leave their island home because of rising ocean levels; as many as 400,000 Indonesians fled their homes in 2007 because of floods caused by torrential downpours; and Holland is building bigger dams to survive larger expected floods.

Here's a global warming game show: **Name That Place!** Your teacher will read aloud each of the statements below. Your goal is to be the first student to raise his or her hand and correctly **Name That Place!**

The prize? Knowledge!

Name That Place!

1. It's the coldest state in the United States, so cold that many buildings are built atop permafrost, permanently frozen soil. But in recent years, thawing of the permafrost has damaged houses, roads, airports, pipelines, and military installations as the ground sinks underneath these structures. Buildings already have been abandoned, including homes, a radio transmitter site near Fairbanks, and a hospital at Kotzebue, to name a few. **Name that state!**

2. The world's most populated country has plans to build more than 500 new coal-fired power plants. Because the country already burns so much coal, the air in large cities is dark during the day, and everyone is covered in soot. This country, host of the 2008 Summer Olympics, will soon replace the United States as the world's largest producer of greenhouse gases. **Name that country!**

3. In fall 2007, a series of wildfires burned across this state, destroying more than 500 homes and 500,000 acres of land. Nine people died and 85 were injured, including 61 firefighters. Many, including the state's governor, Arnold Schwarzenegger, blamed the fire on drought and hot weather caused by global warming. **Name that state!**

4. This city was rocked in 2005 by one of the largest and deadliest hurricanes in history. Many scientists expect more and more intense hurricanes from globally warmed waters, and many have pointed to this hurricane as proof of global warming. Home of Mardi Gras, jazz, and the football Saints, this city is still shocked. **Name that city — and the hurricane that caused the damage.**

5. It's the largest rainforest and the "lungs of the world," because so much of our oxygen is made there. Yet that rainforest burns every day, and 20% of it has disappeared since 1970. One satellite photo showed 70,000 fires burning there in just one day as the giant rainforest dries out. Worse, people are setting fires to claim the land and grow crops and raise cattle. This area raises a huge question: How do we feed the world and preserve nature?

Name that rainforest!

6. It's one of the largest islands in the world — and its own continent — and it has been suffering under a years-long drought that is the worst in its history. Blamed on a warming trend, the drought has devastated agriculture. It's the home of unique animals like the platypus and kangaroo. **Name that country!**



Find one of the places named on this page in today's newspaper. Why is it in the news? Is the story related to global warming?

Learning standard: understanding how global patterns influence weather

Answers:
1. Alaska
2. China
3. California
4. New Orleans, Katrina
5. The Amazon
6. Australia

Global Warming and Nature



Scientists are very worried about global warming harming a large number of plants and animals. They are carefully studying many species to determine if they are being affected by warm weather.

For example, many scientists have already asked the U.S. government to list the polar bear as an endangered species. Polar bears need sea ice to hunt for seals, and as their ice has thinned and disappeared, bears seem to be losing weight, and, for the first time ever, drowned bears are being found in the Arctic Ocean. They are good swimmers, but they now have to swim farther to find ice floes to stand upon.

Each of the pictures on these two pages features an organism in the news that is being harmed by global warming. Can you rearrange the letters of each creature, and write its name in the space provided? Then, use each numbered letter to decipher the Word of the Day, a very important word in biology and the global warming debate.



1. R A W S U L : _ _ _ _ **8** **9**

Another Arctic animal, this creature needs ice to live upon. It dives from the ice into shallow seas to find and eat shellfish from the ocean bottom. Recently, researchers have found large numbers of stray pups; their mothers may have had to abandon them to swim north to follow retreating ice shelves.



2. C R A L O : _ _ **3**

This small ocean animal has a hard skeleton and builds massive reefs in tropical and warm ocean waters. The vast majority of ocean animals such as starfish, lobsters, angelfish, eels, and so many more live in these reefs. Since 1980, one-fifth of the world's reefs have disappeared, dying and bleaching white as water temperatures have increased. If we lose the reefs, we will lose an abundance of ocean life.



3. E D A C K I C H E : _ _ **2** _ _ _ _ **4**

Even this common forest bird, which is the state bird of Massachusetts, may be affected by climate change. It times the rearing of its young to coincide with trees leafing out and insects having their young. As the weather warms, trees may bud sooner, insects may hatch eggs earlier, and even common forest birds will have life cycles out of whack with the seasons.



Answers:
 1. WALRUS
 2. CORAL
 3. CHICKADEE
 4. BUTTERFLY
 5. PENGUIN
 6. QUIVER
 WORD IS "BIODIVERSITY"

Hot Air Over Global Warming

Opinions about global warming vary, but, as these quotes show, many politicians and scientists — and even religious leaders — think we should address global warming. Read these quotes. Choose one, and react to it in writing.

“We simply must do everything we can in our power to slow down global warming before it is too late. The science is clear. The global warming debate is over.”

– California Gov. Arnold Schwarzenegger

“With all of the hysteria, all of the fear, all of the phony science, could it be that man-made global warming is the greatest hoax ever perpetrated on the American people? It sure sounds like it.”

– U.S. Sen. James M. Inhofe, Oklahoma

“For the first time in history, my community has had to use air conditioners. Imagine that, air conditioners in the Arctic.”

– Inuit Eskimo leader Sheila Watt-Cloutier

“Global warming is a threat, one that will affect generations to come. The atmosphere surrounding us that supports life is a God-given gift. It must be protected. Those of us living in the United States should be leaders in efforts to curb global warming, not resistant followers.”

– Archbishop Harry Flynn, St. Paul, Minnesota

“We can empower individuals with new tools and technology to lead the green revolution one home, one car and one business at a time.”

– U.S. Sen. Hillary Clinton, New York

“I don’t believe that climate change is just an issue that’s convenient to bring up during a campaign. I believe it’s one of the greatest moral challenges of our generation.”

– U.S. Sen. Barack Obama, Illinois

“Our nation has both an obligation and self-interest in facing head-on the serious environmental, economic, and national security threat posed by global warming.”

– U.S. Sen. John McCain, Arizona



Greenhouse cartooning

Newspapers also present opinion through political cartoons, usually one-panel cartoons that lampoon politicians and political points of view. Find today’s cartoon on the editorial page. What’s it about?

Draw a political cartoon about global warming on one of these themes.

Global warming and...

- endangered species
- drinking water
- alternative energy
- farming
- disease
- rising sea level

OPINIONS



IN THE NEWS

The editorial is where the newspaper tells its readers what it thinks about an issue. Read one of the editorials aloud in class. Does your class agree, disagree, or have no opinion?

The newspaper also includes other writers’ opinions in essays often called Op-Ed pieces because they run

opposite the editorial page. What issues are discussed today?

Check out the letters to the editor, sent in by readers like you. What are the topics? Do the letter writers agree or disagree with the newspaper?

Divide your class into three teams. One team will write an editorial taking a stand on global warming; a second team will write an Op-Ed piece; the third will compose (and send in via email) a letter to editor.

Learning standard: describing the effects on the environment using both renewable and nonrenewable sources of energy



The Great Log-Cabin Debate

Global warming is caused by an increase in greenhouse gases given off by the burning of fossil fuels. Those fossil fuels run most of the power plants that make electricity. It's the electricity flowing through your house and this classroom that powers your life.

But your use of that electricity is contributing to global warming.

Power of 10

On the lines below, write the names of 10 appliances or gadgets that you use in the course of a day or week that consume electricity. Remember, anything that plugs into a socket uses electricity!

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Look at your list.

Which would you guess use the most electricity? The least? Do you have a favorite use of electricity, one you couldn't live without? Circle that use. Is there one you could easily give up, live without? Strike a line through that one.

Here's the deal.

Your teacher will divide you into groups of three or four students. Because you are concerned about global warming, you and your friends are going to live in a log cabin with a small generator that supports only three uses of electricity. Your group will have 15 to 20 minutes to decide which three items you will bring as a group. (Don't forget to think about how you will heat and light your cabin, how you will store and cook your food, and how you heat your water.)

Appoint a spokesperson from your group to present to the class what you decided. Which item is every group bringing? How did everyone meet their basic needs?

At the end of this exercise, you should understand that conservation involves consuming natural resources like electricity wisely. Your class should brainstorm 10 to 20 ideas for conserving energy to combat global warming. Write the list on the board.

Which of these might you personally consider doing as your pledge to the planet?

Write your pledge on these lines.



It Heats a Village

Most of the electricity made in America comes from fossil fuels like coal, oil, and natural gas. There are at least two problems with these: They release large amounts of greenhouse gases, and they are nonrenewable. Once you burn coal or oil, it is gone forever — it doesn't renew itself.

Renewable sources of energy, sometimes called alternative or sustainable sources, have been getting a lot of attention. Much research is going on, with new companies exploring new sources of electricity that release little or no greenhouse gas. At the same time, they don't run out — the wind never stops blowing, the Sun never stops shining. They are renewable, and they sustain themselves.

Check out the columns below. You'll see eight different sources of energy to make electricity on the left, most of which are renewable and all of which reduce greenhouse gas emissions. Many people are advocating for these energy uses to help us combat global warming.



The renewable challenge

Divide your class into eight groups. Each group will choose one of the energy sources listed here. Create a display — either a poster or a three-dimensional model — that teaches how your source works. Are there other environmental problems with your source that we should know about? Is it usable today, or is it for the future?

Imagine that your class is a town deciding on its energy future. Hold an election to decide which of these sources of power you will adopt. Can a majority of students agree on one of these sources of energy? If not, what should you do?

On the right are definitions for each energy source. Match the definition on the right with the type of energy on the left. Write the correct matching letter for the definition on the line to the left of each energy source. Share your answers.

Energy

- _____ 1. Solar power
- _____ 2. Geothermal power
- _____ 3. Wind power
- _____ 4. Tidal power
- _____ 5. Nuclear power
- _____ 6. Hydroelectric power
- _____ 7. Hydrogen fuel cells
- _____ 8. Wave power

To make electricity, this source

- a. Uses air movements
- b. Uses movement on the ocean surface
- c. Splits atoms
- d. Uses chemical reactions
- e. Converts sunlight
- f. Utilizes waterfall power
- g. Uses the Earth's warmth
- h. Uses the rising and falling of oceans



Follow-up projects

You've learned a lot about global warming and the state of the global environment. For your final summary activity, work in groups and create one of the following projects to share:

1. Global warming art: Create a 3-D sculpture that makes a statement about global warming.
2. Music: Write a rap about the environment and perform for your class.
3. Write a TV ad for a new energy-saving product that cuts greenhouse emissions.
4. Write a TV ad for a new car that runs on something besides gasoline.
5. Write a TV ad for a politician running for president on a global warming platform.

ANSWERS:
1.e-2.g-3.a-4.h
5.c-6.f-7.d-8.b