NATIONAL WILDLIFE FEDERATION®

POLAR BEARS AND THE ARCTIC
GUIDE FOR EDUCATORS

INTRODUCTION

www.climateclassroom.org/kids

Why Focus on the Arctic in Climate Change Instruction?

Nowhere is the reality of climate change more evident than in the Arctic. The spring thaw is beginning earlier each year, the winter freeze is starting later, and glaciers are receding at an accelerated rate. Images taken by NASA satellites show that the polar ice cap, the mass of sea ice that sits atop the Arctic Ocean year-round, is shrinking each year.

What Do Polar Bears Have to Do with Global Warming?

Polar bears live only in the Arctic and as the sea ice continues to melt, the polar bears' primary habitat becomes more threatened. Polar bears are incredibly specialized hunters that have adapted to life in the Arctic environment. The sea ice is their hunting grounds, and they depend on it for survival.

About Howard Ruby, the photographer:

Wildlife images featured on Climateclassroomkids.org and throughout this guide were taken by Howard Ruby. Mr. Ruby is a nature photographer, Chairman of Oakwood Worldwide, and a supporter of the National Wildlife Federation. He has spent years traveling around the world to photograph the many amazing wild animals and wild places seen on this site. He is passionate about using his photos in creative ways to teach children and adults about the effects of climate change and he has been the driving force behind the creative development of this website and education program.

You can also visit his website, **www.howardruby.com** to see a preview of other photos that will soon be featured on our site.

ABOUT NATIONAL WILDLIFE FEDERATION

National Wildlife Federation inspires Americans to protect wildlife for our children's future. For more than 70 years, NWF has been connecting people of all ages with nature through award-winning education programs and resources, including the children's magazines *Wild Animal Baby*®, *Your Big Backyard*®, and *Ranger Rick*®.

ABOUT THIS GUIDE:

This guide's activities are designed for grades 3-5, with extensions for younger and older children. These activities meet national standards for English/Language Arts, Science, Social Studies, and Visual Arts.

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INTRODUCTION

News about climate change is everywhere—in the newspaper, on TV and the radio, even at the movies. It's hard enough for grown-ups to sort out what's true and to determine what we should do about it. For kids, it can seem even more complicated and scary. That's why age appropriateness is a vitally important ingredient of climate change education.

The most age-appropriate measure you can take as a teacher is to help your students explore nature in their own neighborhoods and communities. This fosters a strong, positive connection with the natural world and builds a foundation for caring about global environmental problems later in life.

But how do you answer the questions your students inevitably raise about climate change? And how do you begin to examine the topic in a manner that doesn't frighten or overwhelm them? The best strategy is to provide children with brief, accurate information at a level you know they can understand and relate to—and in hopeful ways. This guide is one tool you can use to do just that.

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TALKING TO KIDS ABOUT CLIMATE CHANGE

1. **Be age appropriate.** Climate change is the largest environmental problem humans have ever faced. Solving it is a vast responsibility to place on the next generation. Our responsibility is to prepare our children for it—and to hand it over only when they're ready. **Preschool/Early Elementary:** This is a time for children to explore the immediate environment (backyard, neighborhood, nearby parks) in a way that is hands-on and full of joy. It's not a time for them to worry about environmental tragedies. There's no need to bring up climate change at this

age if children don't ask about it. If they have questions, by all means address them—but keep your answers brief and basic. Assure children that grown-ups are working hard on solutions. The very best thing you can do for the youngest children is to foster a strong, positive connection with the natural world. This builds a foundation for caring about global environmental problems later in life. (For ideas and resources to connect young children with nature, visit www.beoutthere.org) Upper **Elementary:** As their ability to think abstractly increases, older children will be able to discuss climate change in more depth. This is the time to talk about your students' questions and ideas, model your own interest in learning more about the issue, and seek out concrete actions you can take to be part of the solution. At the same time, continue exploring and enjoying the local environment. Outdoor exploration and learning are vitally important ways to foster care for the planet.

2. **Let students guide the conversation.** Listen carefully to their questions and concerns. It may be hard to hold back, especially if you know a lot or are passionate about this subject, but it's important not to overload students with information they aren't ready for.
3. **Answer questions.** To effectively answer students' questions, it's important to be informed yourself. Visit www.climateclassroomkids.org for additional child-friendly information about climate change.
4. **Diffuse fear.** There's no doubt that climate change and many of its projected impacts are scary. If students are anxious or upset by what they have heard, acknowledge these fears. Then try to diffuse them by steering the conversation toward solutions.
5. **Don't burden them.** Children didn't create this problem, and it's not fair to tell them that they'll be solely responsible for solving it. Let them know that many, many grown-ups are working hard to resolve it.
6. **Think positively.** Children are naturally optimistic. We'll need every drop of that optimism to tackle climate change successfully—so be sure they keep it! Emphasize that it's not too late. People have caused this problem, and people, working together around the world, should be able to solve it.
7. **Invite participation.** Explain that solving the problem will require some big changes—in society and also in our own daily lives. We'll need to rethink many things, from the way we get energy to the way we build our houses and get around. Simply turning off the lights won't solve the problem. But everyone can play a part in turning the tide.
8. **Empower action.** Provide opportunities for students to take action at home and in the classroom. Seek out positive steps you can take together. Whenever possible, keep it local and tangible, with visible results. For instance, you may not be able to directly help the polar bears in the Arctic, but you could participate in a habitat restoration project that will benefit wildlife in your own neighborhood.

USEFUL LINKS:

"A Parent's Guide to Talking to Kids About Global Warming" at http://www.climateclassroomkids.org/download/TalkingToKidsCCK.ppt - also

ACTIVITY ONE

WHERE IN THE WORLD IS THE ARCTIC?

Subjects: Geography: Landforms, maps, globes

LEARNING OBJECTIVES:

- Identify the Arctic region and some of its key geographic features on a globe and a world map.
- Compare ways information is presented on globes and maps.
- Record and discuss prior knowledge and perceptions of the Arctic.

MATERIALS:

- Photos of the Arctic
- Globe
- "Arctic Map" student page
- Red Pencils
- "What I Know About the Arctic" Student Page
- Pencils

BACKGROUND:

Longitude and latitude are imaginary lines on a map or globe that help us describe the location of any place on Earth. Latitude lines measure the distance north or south of the Equator. Longitude lines measure the distance east or west of the prime meridian. Both are measured in terms of the 360 degrees of a circle. The Arctic is a circumpolar ecosystem (an ecosystem that spans the globe around the pole). It generally falls above 66° N (north) latitude.

It includes northern parts of Asia, North America, and eight countries within Europe. The North Pole is located in the Arctic, at 90° N latitude.

The Arctic consists of ice-covered ocean that is nearly surrounded by land masses. Animals that live here include polar bears, reindeer, caribou, lemmings, and snowy owls. Antarctica is at the opposite end of the Earth. It consists mostly of ice-covered land surrounded by ocean. Few animals live in Antarctica. Those that do include penguins, squid, and krill. Note: Polar bears live only in the Arctic; penguins live only in the southern hemisphere.

WHAT YOU DO:

1. Divide students into small groups and give each group a set of photos of the Arctic. Tell students that today they are going to learn about a special place. Have each group look through its photos and jot down answers to these questions:

- What does this place look like?
- How would you describe its climate?
- What is this place called?

Invite groups to share their answers with the class. Then tell students that they are going on a mapping adventure to find the place pictured—the Arctic.

2. Using a globe, show students the Arctic region. Point out the areas that are ice-covered and those that are land masses. Ask the class: If you divide the Earth in half along the Equator, in which hemisphere is the Arctic?
3. Distribute copies of the student page called "Arctic Map." Have students spend a few minutes studying the map. Explain to them that the Arctic Circle is at 66° north latitude and that everything above that imaginary line is considered the Arctic region. Have students draw in the Arctic Circle with a red pencil or marker. Then ask them to complete the "Arctic Map" student page independently or in small groups. After everyone has completed the page, discuss the answers to the questions on the "Arctic Map" page. Then ask students:

- What are the differences between globes and maps?
- Which tool would you use to see the best model of the entire Earth?

4. Distribute copies of the student page called "What I Know About the Arctic." Give students ample time to record what they know about the Arctic in the chart on this page.
5. Collect the completed pages. At the end of this teaching unit, return the pages to your students and have them compare their initial Arctic knowledge with their current knowledge.

ADAPTATIONS:

For younger students. Adaptation.

For older students. Adaptation.

USEFUL LINKS:

Photos of the Arctic can be found at www.climateclassroomkids.org/galleries

STUDENT PAGE

ARCTIC MAP

Directions: Use these maps to answer the following questions.

1. If you divide the Earth in half along the Equator, in which hemisphere is the Arctic region?
2. What continents have land in the Arctic region?
3. What is the name of the ocean found there?
4. Find the North Pole on the map below. Put a red "X" over it.
5. What is the latitude of the North Pole?

STUDENT PAGE

WHAT I KNOW ABOUT THE ARCTIC

Directions: Record things you know about the Arctic region in the spaces below.

Climate

Animals

Plants

People

Other

ACTIVITY TWO

READING ABOUT POLAR BEARS

Subjects: Language arts, life science

LEARNING OBJECTIVES:

- Read for information.
- Identify and explain some basic information about polar bears—their life cycle, habitat, and eating habits as well as some physical adaptations that help them survive in the Arctic.
- Explain some potential effects of changes in a polar bear's Arctic habitat.

MATERIALS:

- Photos of the Arctic
- Markers
- Chart paper
- Polar Bears: At Home in the Arctic" student page

BACKGROUND:

Polar bears live on Arctic sea ice and the northernmost coasts of Europe, Asia, and North America. They eat seals, walruses, small mammals, birds, fish, shellfish, and some plants. Polar bears often catch rides on ice floes and snatch seals by surprise when they pop up out of the ocean. A thick layer of blubber and two layers of thick fur keep polar bears warm in their cold Arctic climate. Mothers give birth to one, two, or three cubs at a time (usually to two), and care for them for about two and a half years.

WHAT YOU DO:

1. Divide students Into small groups and give each group a set of photographs of polar bears and the Arctic. Take a few minutes as a class to brainstorm what students already know about polar bears as well as what the photos suggest about the bears. List the students' responses on chart paper.
2. Ask students to help you put their responses into categories. On another sheet of chart paper, organize the categories and their related responses into a web or map (see sample below). Ask a student to summarize the results.
3. Distribute a copy of "Polar Bears: At Home in the Arctic" to each student and have students read the article silently.
4. After students have finished the story, discuss the following questions as a class:

- How is a polar bear "built" to live in the Arctic?
- How does a cub change during its first two years of life?
- How are the first two years of a cub's life like the first two years of a child's?
- How are they different?
- What does a cub need to know to survive in the Arctic?
- What is climate change?
- How is climate change affecting polar bears?

ADAPTATIONS:

For younger students. Adaptations.

For older Students. Adaptations

USEFUL LINKS:

Visit www.climateclassroomkids.org/galleries to find photos of polar bears, plus panoramas of the Arctic.

STUDENT PAGE

POLAR BEARS: AT HOME IN THE ARCTIC

Polar bear cubs sure are cute, roly-poly fur balls! Look at some photos of polar bear moms and cubs, and you'll see that these bears love to flop around in the Arctic snow.

You'd think that rolling around in the snow would be—to put it mildly—chilling. But it's not to a polar bear. That's because this bear is "built" just right for life in the frigid Arctic. Its coat has two layers of fur and a layer of thick fat (called blubber) underneath. These keep a bear's body heat in and the cold out—even better than a heavy winter jacket could.

ON THE PROWL

A polar bear spends months wandering across the frozen surface of the Arctic seas, looking for food. Often it catches a ride on an ice floe and snatches seals when they pop out of the water. Polar bears eat walruses, small mammals, birds, and fish, too. But their favorite food is seals because of their rich blubber. Polar bears will actually wait for hours by a seal's breathing hole to catch one.

A polar bear also spends lots of time in the water, searching for food there or swimming from place to place to find something to eat. A polar bear can swim for hours at a time. It uses its big front paws to paddle through the water and its back feet to steer.

DEN MOTHERS

In the fall, female polar bears that will soon be mothers make a den. Usually the female finds a hillside near the sea. There, she claws out a cozy home in the snow or cool earth. She crawls in and sleeps through much of the winter. During this time, the mom gives birth, usually to two cubs. Mom and her cubs stay in the den, safe from the brutal winter weather.

Newborn cubs are tiny, toothless, and totally helpless. Each one weighs just over a pound—as much as an adult squirrel. The cubs' eyes are closed, and they have thin hair and no fat. To keep warm, they snuggle up against Mom. Mom nurses her cubs often. By the first month or so, the cubs have opened their eyes. Soon they have teeth and a coat of thick fur.

GROWING UP IN THE ARCTIC

By early spring, the cubs are ready to leave the den. They weigh about 30 pounds each—around the same as a cocker spaniel. They follow Mom out into the big snowy world, where she keeps a close watch on them.

The little cubs soon discover how to have fun. They chase each other and slide down slopes on their backs. After a while, the cubs stop playing, and Mom lets them nurse. Then it's naptime.

Most cubs stay with their mom for two and a half years. She shows them how to handle thin ice, blizzards, rough seas, and other dangers. She teaches them where and how to hunt. With luck, all that their mom has taught them will help them survive.

LESS ICE TIME

These days, polar bears face a problem that their mothers have not prepared them for—global climate change. Climate change is something that is happening to the climate of the Earth. It's causing the average temperature to rise around the world. Rising temperatures are causing Arctic ice to melt earlier in the spring and to form later in the fall. Because polar bears depend on ice to find seals and other food, less ice time means they may not get enough to eat. Many scientists are working hard to learn all they can about climate change. They hope to use what they learn to help the bears.

ACTIVITY THREE

ARCTIC ADAPTATIONS

Subjects: Biology, Natural Science

LEARNING OBJECTIVES:

- Identify and explain the adaptations that help polar bears survive in the Arctic.
- Compare and contrast these adaptations with those of other Arctic animals.
- Explain some potential effects of changes in the Arctic habitat.

MATERIALS:

- Photographs of polar bears
- Items for your Dress-Up Box

  Wet suit - Blubber for insulation from the cold

  Black shirt - Black skin, believed to absorb heat from the sun

  Warm coat - Thick fur to retain body heat. A soft underlayer provides insulation, while longer guard hairs add further protection.

  White sheet - Camouflage to avoid being seen by prey

  Extra large mittens, snowshoes, or flippers - Big paws used as snowshoes for walking and paddles for swimming

  Bubble wrap - Bumpy surface of feet for gripping ice

  Petroleum jelly - Oily fur that forms a waterproof barrier when wet

  Binoculars - Keen eyesight

  Swim goggles - Ability to see clearly underwater

  Nose clip - Ability to close nostrils underwater

  Fish net - Big paws for catching food

  Butter knives - Sharp claws and teeth for hunting and eating seals

BACKGROUND:

The Arctic ecosystem is one of the planet's most extreme. Temperatures range from -50° F (-45° C) in the winter to 77° F (25° C) in the summer. Winter brings darkness, miles of sea ice, and snow-covered ground, while summer is characterized by constant light and wide stretches of open water. To survive in these conditions, polar bears and other Arctic animals have physical characteristics and behaviors that are adapted to their habitat. These adaptations have developed over thousands of years of natural selection. Because polar bears are so well adapted to Arctic life, changes in their habitat due to climate change put the bears at risk.

WHAT YOU DO:

1. Gather all the dress-up items from the list on the next page that you can, and place them nearby in a box or bag.
2. Have students look at some photos of polar bears in the Arctic. Ask them to describe the environment where the polar bear lives and to identify some of the bear's physical features.
3. Explain the term adaptation. Adaptations are body parts or behaviors that help a species survive in its habitat.
4. Tell students you are going to adapt one of them for life as a polar bear. Invite a volunteer to come to the front of the group. Ask:
   - Would the volunteer be able to survive in the Arctic equipped as he or she is now? (Students should conclude that the answer is no!)
5. Ask students to name some challenges that polar bears face. If they need a little help with this question ask:
   - How do polar bears find food?
   - How do they get protection from the cold?

   Then have students call out adaptations that would help the volunteer meet these challenges.
6. As students name body parts that would help the volunteer survive as a polar bear, pull items out of the dress-up box and begin dressing the volunteer. For instance, if a student suggests, "Thick fur to stay warm in the cold," put the warm jacket on the volunteer. Give students a chance to explain the importance of each feature and provide additional information as needed (see the chart for details).

7. Prompt students with questions, if needed, to help them name all the adaptations in the dress-up box. For example:
   - How does a polar bear catch its food?
   - How does it eat it?
8. When the volunteer is all dressed, explain that a real polar bear has all of these adaptations built into its body.

   Suggest that the volunteer try walking around in the gear. Would he or she get hot with all those clothes on? Note that polar bears are well suited for the cold but can overheat when summer temperatures climb. In fact, instead of hibernating during the cold season as some animals do, polar bears enter a state of "walking hibernation" in the summer when food is scarce and they need to conserve energy.
9. Now divide the class into small groups and some photographs of polar bears to each group. As students look at the photos, have them point out the adaptations you have discussed. Suggest that they also note features of the bears' environment for which these adaptations equip them, such as white snow and icy seawater.
10. Ask students to name some other Arctic animals. Follow up with questions such as:
    - What adaptations help these animals survive in their habitat? (For example, other sea-going mammals such as seals and walruses have blubber. Foxes, wolves, hares, and lemmings all have thick fur. Some animals, such as the Arctic fox, ptarmigan, and Arctic hare, change their coats from brown to white for the winter.)
11. Finally, ask students to consider what happens when an animal's habitat changes.
    - Would a polar bear's adaptations be an advantage in a different type of habitat or a disadvantage?
    - How might climate change affect the bears?
12. Explain that not only are polar bears physically adapted to a cold climate, they also depend on the floating sea ice to hunt for seals. As the climate warms, this ice is present for less of the year. The decreased ice cover means their hunting season is getting shorter, so they can store less fat for the summer season when food is scarce. That's why many scientists are concerned about polar bears and working hard to find ways to help them. And it's just one of the reasons why people around the world are trying to find ways to help slow down climate change.

ADAPTATIONS:

For younger students. Adaptations.

For older Students. Adaptations

USEFUL LINKS:

Helpful Web sources about polar bears include: polarbearsinternational.org; seaworld.org/animal-info/info-books/polar-bear/index.htm.

ACTIVITY FOUR

WRITER'S CORNER!

Subjects: Language arts

LEARNING OBJECTIVES:

- Use a writing frame to plan and write a persuasive piece.
- Describe the basic habitat and behavior of several bear species.
- Compare the potential effects of climate change on polar bears to its potential effects on other bear species.

MATERIALS:

- Access to a library or the internet
- Paper
- Copies of the "Here's My Opinion" student page
- Index cards
- Pens, pencils, crayons, markers

BACKGROUND:

Besides the polar bear, bear species include the grizzly bear, Alaskan brown bear, American black bear, Asiatic black bear, European brown bear, panda, and spectacled bear. Bears live in parts of North and South America, Europe, and Asia. Their various habitats include mountains, forest, swamps, and grassy plains.

WHAT YOU DO:

1. Divide students into small groups and give each group an index card and some crayons or markers.
2. Assign each group a different bear species (other than the polar bear) to investigate. Have each group find out: a) what the bear looks like, b) where it lives, c) what its habitat is like, d) what the bear eats.
3. Tell each group to use the bear research to make a Bear Card. On one side of the card, students should draw a picture of their bear and print its name. On the other side, they should list the four main pieces of information they gleaned about the bear.
4. Once the cards are finished, ask a member of each group to show the class the final Bear Card and to summarize the information on the back. Then ask students:
   - How are these bears alike?
   - How are they different?
5. Ask students to summarize what they learned in an earlier lesson about climate change and its effects on polar bears. (See last paragraph of the story "Polar Bears: At Home in the Arctic" in Activity Two, page 11.)
6. Then ask the class what the word "vulnerable" means (to be in danger, in a weak position). Then write the following on the board:
   - Are polar bears more or less vulnerable than other kinds of bears to the results of climate change? Why?

   Ask a student to summarize what this question Is asking. Then ask everyone to think about how they would answer the question.
7. Distribute copies of the "Here's My Opinion" student page. Have students complete this page and use it to write an opinion piece that answers the question on the board. Encourage students to use information they learned about bears as they made their Bear Cards.
8. Invite students to share their finished pieces with the class. Then ask students:
   - Were any of you tempted to change your opinion after hearing some of these pieces? Why or why not?
   - What do you think makes a well-written opinion piece?

ADAPTATIONS:

For younger students. Adaptations.

For older Students. Adaptations

USEFUL LINKS:

Helpful Web sources include:
www.greatbear.org/bearspecies.htm, www.americanbear.org/otherbears.htm

STUDENT PAGE

HERE'S MY OPINION

Question: Are polar bears more or less vulnerable than other kinds of bears to changes that climate change can cause? Why?

Directions: Use this page to create an outline that will help you write an opinion piece about the question above.

Opening paragraph

What is your main opinion on the question above?

Arguments

1. What is the most important point you want to make?

1b. What evidence or facts support this?

2. What is your next point?

2b. What evidence or facts support this?

3. What other points do you want to make?

Closing paragraph

Restate your main opinion about the question above in another way.

ACTIVITY FIVE

WHAT YOU CAN DO

Subjects: Environmental Education: Examining climate change and ways to reduce its effects

LEARNING OBJECTIVES:

- Define climate change
- Explain why climate change is a threat to Arctic wildlife.
- List several actions students can take to reduce their own contribution to global warming pollution.

MATERIALS:

- Access to the internet
- "Climate Change Action" student page
- Climate Change Family Action Checklist" student page

BACKGROUND:

The average temperature around the world is rising. This is due to increasing levels of carbon dioxide and other greenhouse gases in the atmosphere. These gases, which trap the sun's heat, are released whenever we burn fossil fuels (oil, gas, and coal) for energy. Climate change is a vast problem that can seem insurmountable and scary. Particularly with children, it is important to approach this topic in a way that is empowering rather than disheartening. As students will have learned from studying the Arctic ecosystem, climate change is already affecting animals such as polar bears. You can focus their concern by steering them toward positive actions they can take to reduce their own carbon dioxide "footprints." While a true solution to climate change must come from major changes to society on an international scale, personal actions are a good place to start.

WHAT YOU DO:

1. Ask students to summarize what they have learned about polar bears and other Arctic animals, and how this relates to the results of climate change.
   - How are these animals adapted to survive in the Arctic?
   - How will changes in their habitat affect them?
2. Discuss more about climate change with students. What have they heard or read about climate change or global warming? What questions do they have about it?
3. Hand out copies of the "Climate Change Action" student page. In small groups, have students explore www.climateclassroomkids.org to find answers to the questions in Part One of the student page. Invite groups to discuss their answers.
4. Explain that climate change is a big problem that requires many big solutions. Leaders and lawmakers can make changes in the ways that whole countries do things. Scientists and engineers can help by designing new kinds of technology that use much less energy (e.g., hybrid cars), or renewable forms of energy (e.g., wind and solar power). As individuals, we can also do our own small part. By making smart choices about lots of things— such as what we buy, how we travel, and how we stay warm or cool—we can all be part of the solution.
5. Then ask students to look at the "Family Action Plan for Global Warming" on the Climate Classroom website to find steps for reducing personal contributions to global warming pollution. Or give each student a copy of the "Climate Change Family Action Checklist" student page. Then have students complete Part Two of the student page by listing several actions they could take. As a class, discuss the actions students have listed.
6. Wrap up your study of the Arctic ecosystem and climate change by returning students' "What I Know About the Arctic" pages from Activity One. Give them a chance to add to their list or make changes based on what they know now. Then, as a group, ask them to reflect on what they have learned throughout this unit. How has their understanding changed? How will they use this new knowledge?

USEFUL LINKS:

http://www.climateclassroomkids.org/popup_familactionplan.html

STUDENT PAGE

CLIMATE CHANGE ACTION

Directions: Use www.climateclassroomkids.org to help you answer the following questions.

PART ONE:

What is climate change?

What is causing it?

How do scientists measure it?

Why is it a problem?

What are some things people are doing to solve it?

PART TWO:

List five things you could do in your own life that would help save energy and reduce climate change pollution.

1.
2.
3.
4.
5.

STUDENT PAGE

CLIMATE CHANGE FAMILY ACTION CHECKLIST

Simple Steps

Turn off the lights, computer, and TV when you're not using them.

Unplug electronics and chargers between uses.

Do laundry when you have a full load.

Set your washer on the cold water setting.

Take shorter showers and don't fill the tub full when you take a bath.

Run your dishwasher when you have a full load. Use the energy-saving setting.

Set your water heater no higher than 120 degrees.

Set the temperature on your air conditioner a few degrees higher.

Set the thermostat on your furnace a few degrees lower.

Walk or ride a bike instead of riding in the car for short trips.

Combine errands to reduce car trips.

Recycle your paper, plastic, glass, and cans.

Take reusable bags with you to the supermarket.

Bigger Steps

Switch to compact fluorescent light bulbs.

Hang your wash up to dry instead of using the dryer.

Insulate your hot water heater.

Weatherize your windows and doors.

Check the tire pressure on your car regularly.

Keep your car's engine tuned up.

Plant a tree or two.

Super Steps

Buy fresh, locally grown fruits and veggies.

Buy less stuff.

Choose recycled paper and other recycled products.

Add more insulation to your home.

Choose a well-insulated home that isn't bigger than you need.

Choose a car that gets high gas mileage.

Choose appliances with the Energy Star® label.

Tell others how they can join the fight against climate change.

Encourage elected officials to support laws to reduce climate change.

JOIN ECO-SCHOOLS USA!

National Wildlife Federation's Eco-Schools USA is part of an international program that helps you form an Eco-Action team and make a plan to green your school building, grounds, and curriculum. You choose to focus on one or more of the eight "pathways," which include Energy, Transportation, or Climate Change—a good fit if you're looking to do more to help polar bears!

Learn more about how Eco-Schools USA works at www.eco-schoolsusa.org

Find the Eco-Schools USA Water Pathway at www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA/Become-an-Eco-School/Pathways/Water.aspx[CH2]

POLAR BEAR FUN FACTS

POLAR BEAR FAMILIES

- Polar bear cubs stay with their mother till they are 2 years old.
- Polar bear mothers usually have two cubs, although sometimes they have one or three.
- Polar bear cubs leave the den when they are three months old.
- After they leave the den, cubs live out on the ice with their mother. During severe storms, the mother may make a temporary den in the snow.
- Polar bear milk is high in fat content. It is the only food the cubs will have for a long time. They grow quickly and add a layer of protective fat to help them survive the cold.
- Polar bear milk is some of the richest in the world, with 30-40% fat content. Human milk is only about 4% fat.
- Once cubs are strong enough, they will follow their mother to hunting grounds from 30 to 100 miles away.
- Once they are 4-5 years old, a female breeds once every 3 years.
- Polar bears greet each other by clasping muzzles.
- Polar bears are carnivores, which means they eat meat. Their favorite food is seals because the seals supply a lot of blubber. The bears need to eat blubber to build up their own layer of fat to survive in the Arctic.
- Cubs can travel up to 12 miles per day.
- Since there are three adult males to every breeding female, competition between males is fierce.

POLAR BEAR FAMILIES

- Polar bears spend as much time as possible on the sea ice looking for food. They spend months wandering across the frozen surface of the Arctic seas.
- On the snow and ice, polar bears' large paws work like snowshoes. Even though they can weigh as much as a small car, they can walk on ice that is too thin for humans to cross.
- Aside from mothers and cubs, polar bears are solitary animals that usually live and hunt alone.
- Polar bears' long heads and muzzles, or noses, give them a very strong sense of smell. They can smell seals and other prey over three miles away.
- Polar bears have massive legs that are useful for hunting but take a lot of energy to move. Their slow, lumbering walk helps conserve energy.

POLAR BEAR FAMILIES

- Polar bear cubs love to play, often tumbling over their mother, but never getting too far from her.
- Polar bears are the largest land predator in the world. Adult males can be 10 feet long and stand 13 feet high when on their hind legs. They can weigh as much as 1750 lbs.
- While polar bears can appear to be pale yellow or snowy white, their hair is actually hollow tubes. The skin beneath is black.

NATIONAL EDUCATION STANDARDS

ACTIVITY ONE

WHERE IN THE WORLD IS THE ARCTIC?

Science: NSES

Grades K-4 Standard C: Life Science

Organisms and environments

Grades 5-8 Standard C: Life Science

Regulation and behavior, Diversity and adaptations

Grades K-4 Standard D: Earth & Space Science

Changes in earth and sky

Grades 5-8 Standard D: Earth & Space Science

Structure of the Earth system, Earth in the solar system

ACTIVITY TWO

READING ABOUT POLAR BEARS

Science: NSES

Grades K-8 Standard: Science as Inquiry

Understandings about scientific inquiry

Grades K-4 Standard C: Life Science

Characteristics of organisms, Life cycles of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Regulation and behavior, Diversity and adaptations of organisms

Grades K-4 Standard F: Science in Personal and Social Perspectives

Characteristics and changes in populations, types of resources, changes in environments

Grades K-8 Standard G: History and Nature of Science

Science as a human endeavor

Grades 5-8 Standard G: History and Nature of Science

Nature of science

English/Language Arts: NCTE/IRA

Standard 1: Reading for perspective

Standard 3: Evaluation strategies

Standard 4: Communication skills

Standard 5: Communication strategies

Standard 6: Applying knowledge

Standard 10: Developing English competency

Standard 11: Participating in literary communities

ACTIVITY THREE

ARCTIC ADAPTATIONS

Science: NSES

Grades K-8 Standard: Science as Inquiry

Understandings about scientific inquiry

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Regulation and behavior, Diversity and adaptations

Grades K-4 Standard D: Science & Technology

Abilities to distinguish between natural and human objects

Grades 5-8 Standard D: Science & Technology

Understanding about science and technology

Grades K-4 Standard F: Science in Personal and Social Perspectives

Types of resources, Changes in environments

Grades 5-8 Standard F: Science in Personal and Social Perspectives

Science and technology in society

English/Language Arts: NCTE/IRA

Standard 4: Communication skills

Standard 5: Communication strategies

Standard 10: Developing English competency

Standard 11: Participating in literary communities

ACTIVITY FOUR

Writer's Corner!

Science: NSES

Grades K-8 Standard: Science as Inquiry

Understandings about scientific inquiry

Grades K-4 Standard C: Life Science

Characteristics of organisms, Life cycles of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Regulation and behavior, Populations and ecosystems, Diversity and adaptations of organisms

Grades K-4 Standard F: Science in Personal and Social Perspectives

Characteristics and changes in populations, changes in environments

NATIONAL EDUCATION STANDARDS

Grades 5-8 Standard F: Science in Personal and Social Perspectives

Science and technology in society

Grades K-8 Standard G History and Nature of Science

Science as a human endeavor

English/Language Arts: NCTE/IRA

Standard 1: Reading for perspective
Standard 3: Evaluation strategies
Standard 4: Communication skills
Standard 5: Communications strategies
Standard 6: Applying knowledge
Standard 7: Evaluating data
Standard 8: Developing research skills
Standard 10: Developing English competency
Standard 11: Participating in literary communities

ACTIVITY FIVE

CLIMATE CHANGE ACTION

Grades K-4 Standard C: Life Science

Organisms and environments

Grades 5-8 Standard C: Life Science

Diversity and adaptations of organisms

Grades K-4 Standard D: Earth & Space Science

Objects in the sky, Changes in earth and sky

Grades 5-8 Standard D: Earth & Space Science

Earth in the solar system

Grades K-4 Standard D: Science & Technology

Abilities to distinguish between natural and human objects

Grades 5-8 Standard D: Science & Technology

Understanding about science and technology

Grades K-4 Standard F: Science in Personal and Social Perspectives

Personal health, Characteristics and changes in populations, Types of resources, Changes in environments, Science and technology in local challenges

Grades 5-8 Standard F: Science in Personal and Social Perspectives

Populations, resources and environments, Risks and benefits, Science and technology in society

Grades K-8 Standard G: History and Nature of Science

Science as a human endeavor

Grades 5-8 Standard G: History and Nature of Science

Nature of science

English/Language Arts: NCTE/IRA

Standard 1: Reading for perspective
Standard 2: Understanding the human experience
Standard 3: Evaluation strategies
Standard 4: Communication skills
Standard 5: Communications strategies
Standard 10: Developing English competency
Standard 11: Participating in literary communities

Social Studies: NCSS

Theme 3: People, Places, and Environments

POLAR BEAR FUN FACTS

SCIENCE: NSES

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Regulation and behavior, Diversity and adaptations, Populations and ecosystems

English/Language Arts: NCTE/IRA

Standard 1: Reading for perspective