



**NATIONAL
WILDLIFE
FEDERATION**

PUFFINS AND SEABIRDS GUIDE FOR EDUCATORS

INTRODUCTION

www.climateclassroom.org/kids

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.

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*®, *Ranger Rick, Jr.*®, 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.

Why Focus on Sea and Coastal Regions in Climate Change Instruction?

As sea temperatures rise scientists have recorded a decline in puffin and sea bird populations. Like the many migratory birds that have had to literally shift their way of life, the puffin is finding it more difficult to find its major food sources, fish. Fish populations are displaced as ocean temperatures warm, causing mismatches in prey-and-predator relationships and shortages in the abundance of herring, their primary food staple.

What Do Puffins and Seabirds Have to Do with Global Warming?

Puffins are excellent swimmers, sleek flyers, skilled hunters and whimsical waddlers. They have been given colorful nicknames—from “sea parrot” to “the clown of the sea,” and even “sea rooster”. Nicknames aside, these tuxedoed waddlers are causing increased concern and sounding a now all-too-familiar alarm from the natural world about the growing consequences of climate change.

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.

ACTIVITY ONE

WHERE IN THE WORLD?

Subjects: Geography: Landforms, maps, globes

LEARNING OBJECTIVES:

- Identify the sea and coastal regions of the Northern Hemisphere and the Arctic region and some of their 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 coastal regions and the Arctic.

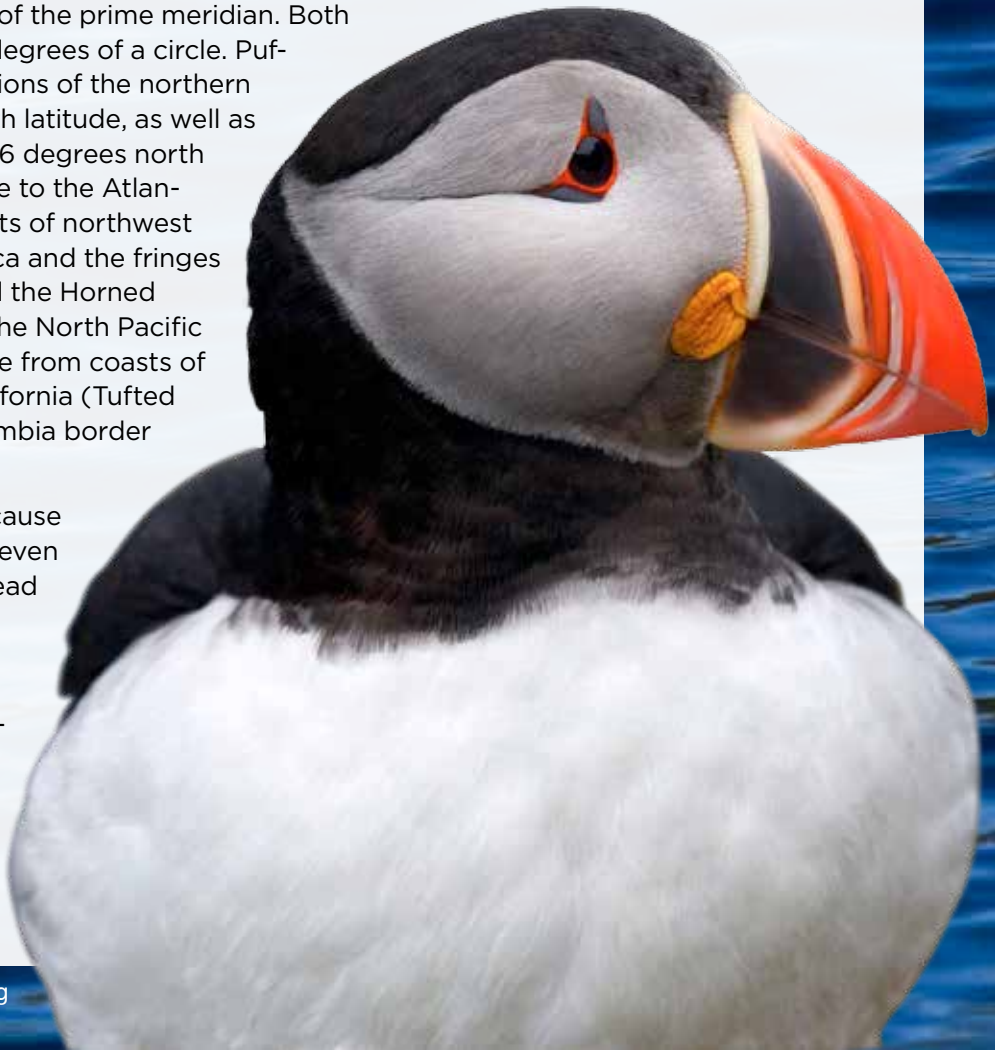
MATERIALS:

- Student Page “What I Know about Northern Coasts of the United States”
- Photos of the Tropics
- Pencils and Red Pencils
- Globe
- World Map

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. Puffins inhabit the sea and coastal regions of the northern hemisphere above 36 degrees north latitude, as well as the fringes of the Arctic Circle, at 66 degrees north latitude. The Atlantic Puffin is native to the Atlantic Ocean, breeding along the coasts of northwest Europe, northeastern North America and the fringes of the Arctic. The Tufted Puffin and the Horned Puffin are both found throughout the North Pacific Ocean. Their breeding ranges range from coasts of northwestern Alaska to central California (Tufted Puffin) and the Alaska-British Columbia border (Horned Puffin).

Climate stressors are expected to cause large contractions in the ranges of even some of the common and widespread species we enjoy today. Some bird species will be pushed closer to extinction. Migratory species, such as most birds, face the unique challenge of climate change affecting the multiple habitats they require to breed, migrate and overwinter.





Bird ranges are shifting and populations changing. The timing of migration and breeding are changing, affecting the availability of food needed to raise their young.

WHAT YOU DO:

1. Divide students into small groups and give each group a set of photos of the northern coastal regions. 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 do these places look like?
- How would you describe the climate?
- What are these places called? What characteristics do they have in common?

Invite groups to share their answers with the class. Then tell students that they are going on a mapping adventure to find the places pictured—the northern coastal regions of the U. S.

2. Using a globe, show students the northern Pacific and Atlantic oceans and coasts.
 - What are the differences between globes and maps?
 - Which tool would you use to see the best model of the entire Earth?
3. Distribute copies of the student page called “What I Know about Northern Coasts of the United States” Give students ample time to record what they know in the chart on this page.
4. Collect the completed pages. At the end of this teaching unit, return the pages to your students and have them compare their initial knowledge of the regions with their current understanding.

ADAPTATIONS:

For younger students. Have students fold a piece of paper in half and draw the two coastal areas on each side of the one sheet of paper for comparison.

USEFUL LINKS:

Photos of the puffins and seabirds can be found at www.climateclassroomkids.org/galleries

STUDENT PAGE

WHAT I KNOW ABOUT NORTHERN COASTS OF THE UNITED STATES

Directions: Record things you know about the northern coastal regions in the spaces below.

Climate _____

Animals _____

Plants _____

People _____

Other _____



ACTIVITY TWO

FILL THE BILL

Subjects: Biology, Natural Science, Art

LEARNING OBJECTIVES:

- Describe five different types of beaks and explain how each is adapted to feed on different foods.

MATERIALS:

- Photos of the Arctic
- Chart paper
- Markers
- Student Page “Bird Adaptations”

BACKGROUND:

It would be impossible for a hummingbird to gobble up a mouse. And it would be just as impossible for a hawk to slurp up some nectar from a flower. Each type of bird has a special beak and tongue adapted to eating a certain type of food. In this demonstration your group can find out which beaks are best for tearing, scooping, cracking and picking by going to different stations you’ve set up and trying to find out which tools go with which types of “food.”

First talk about some different bird beaks to get the kids thinking about how beaks help birds survive. Here are some examples of birds and beaks you can talk about:

Hummingbirds have long hollow beaks that they use to probe flowers for nectar. The beak protects the tongue which slurps up the nectar.

Curlews, godwits, kiwis, and snipes have very long beaks that they use to probe for worms, crustaceans, and other small creatures in mud and water.

Cardinals, sparrows, grosbeaks, and other finchlike birds have very short, conical beaks. These beaks are very strong and can break open tough seeds.

Spoonbills and pelicans have long, flattened or pouchlike beaks that they use to scoop up fish and other aquatic creatures.

Nighthawks, whip-poor-wills, swifts, and swallows have large, gaping mouths that act like nets to trap insects. These birds catch insects on the wing.

Warblers have small, sharp, pointed beaks for picking insects from leaves, logs, and twigs.

Toucans have very long, thick beaks for reaching out and plucking fruit from trees.

Puffins have thick, curved bills in which they hold small fish crosswise with their tongue while diving for more.

Flamingos and some ducks have bills that act like strainers to filter tiny plants and animals from the water.

Important Note: Like the many migratory birds that have had to literally shift their way of life, the puffin is finding it more difficult to find its major food sources as fish populations are displaced as ocean temperatures warm. This causes mismatches in prey-and-predator relationships and shortages in the abundance of herring, the puffin's primary food staple. Many puffin populations are filling the void by hunting and feeding their young butterfish, which are now more abundant in the area as they too react to changing conditions. But, young puffins are simply unable to swallow the larger butterfish and many have died of starvation.

WHAT TO DO:

You'll need to set up eight different stations, each with a special type of "food" that fits one of the eight different types of beaks we've described. And at each station you will need three different tools – one that fits the food and two that don't fit so well. Also have a sign at each station that tells what type of food is represented. For example, have a sign that says "nectar" at Station #1, one that says "worms in the mud" at Station #2, and so on.

The * indicates the tool that best fits the food:

- **Station #1 Water** in a tall, thin vase to represent nectar in a flower. For tools use eyedropper or straw*, envelope or small fishnet, large scoop or slotted spoon.
- **Station #2 Large saucepan** filled with dry oatmeal or cracked wheat, with grapes on the bottom to represent worms buried in the mud. You can use fake rubber worms instead of grapes. For tools use chopsticks*, nutcracker, strainer.
- **Station #3 Whole walnuts** or other nuts to represent seeds with hard coverings. For tools, use nutcracker or pliers*, tongs, chopsticks.
- **Station #4 Styrofoam** chunks floating in an aquarium or bucket filled with water to represent fish and other aquatic animals. For tools, use large scoop or slotted spoon*, eyedropper or straw, chopsticks.



- **Station #5 Popcorn** or tiny marshmallows tossed in air (which must be caught in the air) to represent flying insects. For tools, use envelope or small fishnet*, forceps or tweezers, chopsticks.
 - **Station #6 Rice spread** on a log to represent caterpillars and other insects. For tools, use forceps or tweezers*, envelope or small fishnet, nutcracker or pliers.
 - **Station #7 Swedish or “gummy” fish** to represent small fish. For tools, use tongs*, eyedropper or straw, strainer.
 - **Station #8 Puffed rice** in an aquarium or bucket of water to represent tiny aquatic plants and animals. For tools, use strainer*, forceps or tweezers, tongs.
1. Pass out a copy of the student page to each person. Divide the group into eight teams and start each team at a different station. Explain that there will be three different tools at each station, each of which represents a different type of bird beak function. Each group must decide which tool would most efficiently get the food at each station, by trying out the different tools.
 2. Once they pick the best tool, they should write the name of the tool in the appropriate square. You might want to set a time limit to keep things moving. Underneath the squares are picture sof different birds and their beaks. On the line under each picture, they should write the number of the square that represents the correct beak. For example, they should write “8” on the line under the flamingo.

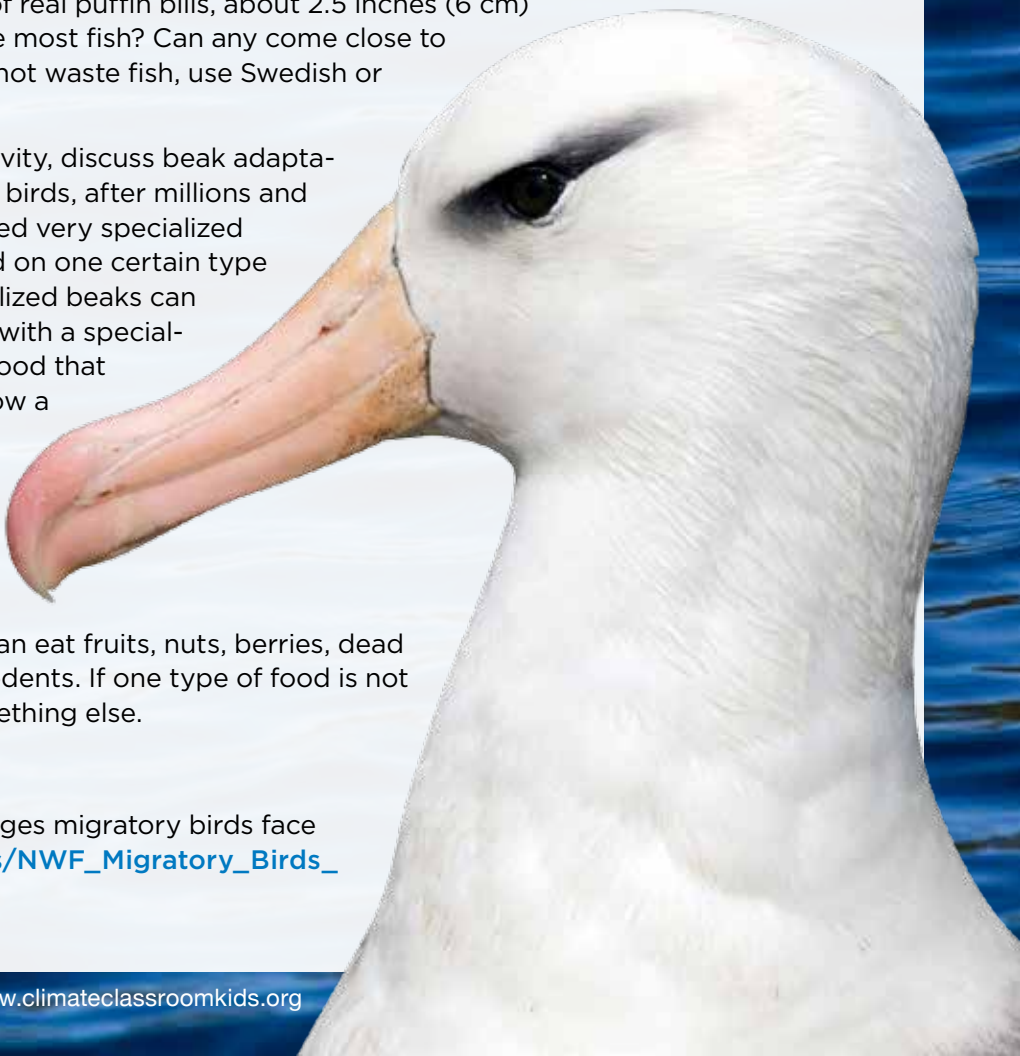
ADAPTATIONS:

For younger students. Learn about the puffin’s specializedbill with a class competition. Purchase a few tins of slippery sardines. Divide students into teams to make model puffin bills. The models should be approximately the size of real puffin bills, about 2.5 inches (6 cm) high. Which team’s bill can grip the most fish? Can any come close to the puffin record? If you prefer to not waste fish, use Swedish or “gummy” fish candy.

For older Students. After the activity, discuss beak adaptations in general. Explain that many birds, after millions and millions of generations, have evolved very specialized beaks, beaks that can only be used on one certain type of food. Ask the group how specialized beaks can help some birds stay alive. (A bird with a specialized beak can often eat a type of food that no other bird can eat.) Then ask how a specialized beak might hurt a bird. (If the bird’s habitat changes and its food is no longer available, the bird might die because it can’t eat anything else.) Explain that some birds, such as crows, have very versatile beaks. Crows can eat fruits, nuts, berries, dead animals, and even fish and small rodents. If one type of food is not available, they can always eat something else.

USEFUL LINKS:

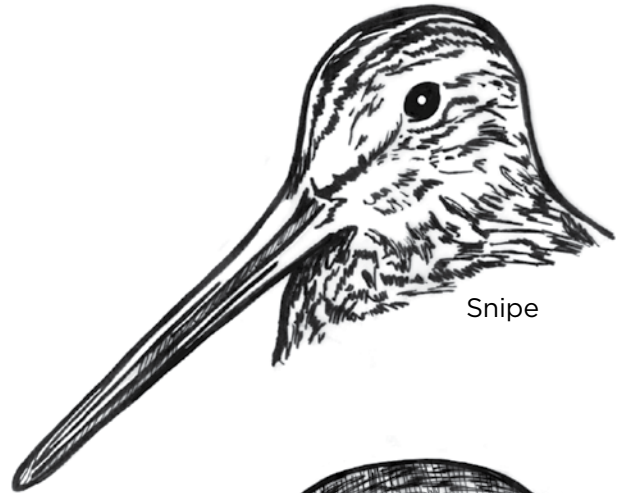
Read about unique climate challenges migratory birds face
http://www.nwf.org/pdf/Reports/NWF_Migratory_Birds_Report_web_Final.pdf



STUDENT PAGE



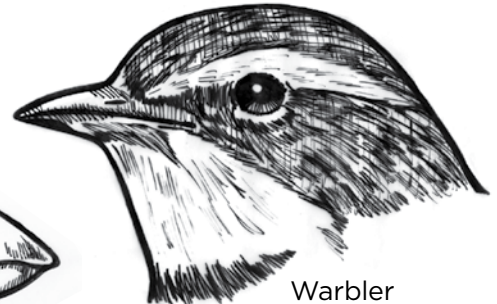
Flamingo



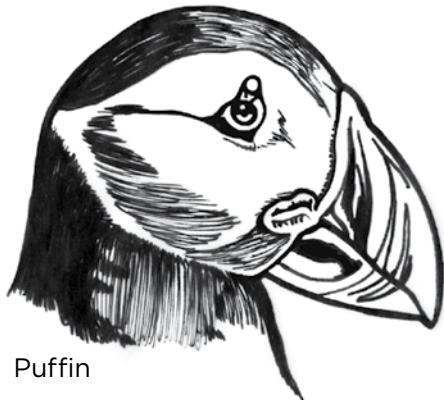
Snipe



Grosbeak



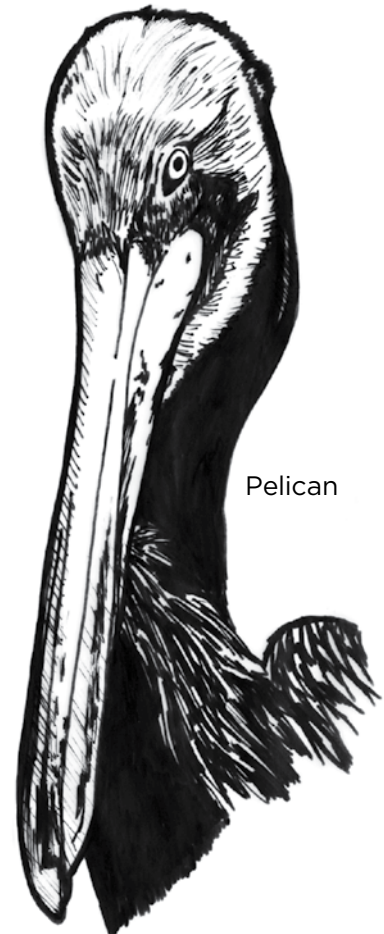
Warbler



Puffin



Whip-poor-williu



Pelican

List food:

- 1 Nectar
- 2 Worms in the mud
- 3 Seeds
- 4 Fish and other water animals
- 5 Flying insects
- 6 Caterpillars and other insects
- 7 Small fish
- 8 Tiny water plants and animals



Hummingbird



ACTIVITY THREE

HOUSE HUNTING

Subjects: Science

LEARNING OBJECTIVES:

- Describe the nests of four common species of birds and a Puffin.
- Build a specific type of bird nest.

MATERIALS:

- Copies of Student Page
- Bird research books, internet access
- Slips of paper
- Pencils
- Nesting materials

BACKGROUND:

Birds build their nests in all kinds of places. Some nest high in trees while others nest on the ground. Some plaster their nests on the sides of buildings or rocky cliffs and others build floating nests in marshy areas. Many birds also nest in tree cavities, stream banks, fields, and swamps. Birds also use a variety of nesting materials to build their nests, including sticks, mud stones, lichens, grass, spider webs, snakeskins, and thistledown.

Some birds are adaptable nest builders; they seem to build their nests wherever they can find a spot and use whatever materials they can find. But other birds are much pickier and will build their nests only in certain places and use only certain materials.

Puffins form breeding colonies, often choosing rocky cliffs to build their nests, and use the same three-foot burrow with the same mate every year. Each year they clean the two rooms of the nest - lavatory and nursery - and line the nursery with fresh feathers and grass. A lavatory helps keep the chick's feathers clean and prevents damage to its waterproofing. As the earth's temperature increases, the melting of ice causes sea levels to rise. This can potentially flood breeding islands and limit their ranges.

WHAT YOU DO:

1. Students will describe the perfect site to build a nest and then try to build one for the species they selected. First write down on slips of paper the names of four common birds that live in your area and a species of puffin. Divide the group into five teams and have each team pick one slip. Then explain that each team is a real estate agent hired by the bird on their slip of paper to find the perfect nest site.
2. Pass out copies of the Student Page. Explain that each team must research their bird to fill out the nesting information sheet. Remind them that most birds build their nests near a food source and that the nests are usually sheltered from rain, hot sun, and other types of weather. Also tell them that many birds hide their nests so predators can't spot them.
3. After everyone has filled out the information, ask each group to report their findings. If possible go outside or take the group to a nearby park or nature center that has several different types of habitats. Have the kids in each team search for the perfect spot to build a nest. Give everyone 15 minutes to find the perfect spot and then have everyone gather back together. Start with one team and have the kids in the team describe their bird and its requirements. Then visit the nest site and talk about the pros and cons of the location - this one's too exposed, this one's too far from water, this one would get run over by a lawnmower, and so on. The group with the puffin will just have to imagine their nesting site on the bluff overlooking the ocean. After visiting all the nest sites, take a vote on which team found or described the best site.
4. Afterward, have each group work together to try to build the nest of their bird, using craft materials. Each nest should be the correct size and shape. Have everyone on the team pitch in to help gather the materials and shape the nest. If collecting materials outside, please warn students not to pick flowers or pull living plants. Then line up the nests and talk about each one.

ADAPTATIONS:

For younger students. Although most primary-age children can't do the research part of this activity, they can go on a hike to look for nests and good nesting sites, and try to build their own nests.

For older Students. Encourage students to look out for nests when they take walks with their parents or friends, and sketch or photograph them. Please remind them that it's against the law to remove or damage a nest in the wild, even if it is old and abandoned.

USEFUL LINKS:

Read more about how climate change affects puffins

blog.nwf.org/2013/06/climate-change-spells-peril-for-puffins/



ACTIVITY FOUR

WRITER'S CORNER

Subjects: Language Arts, Visual Arts, Social Studies

LEARNING OBJECTIVES:

- Communicate scientific facts effectively using a variety of media.
- Formulate and express opinions in writing.

MATERIALS:

- Writing supplies or computer access
- Optional: audio or video recording equipment, art supplies
- Student Page: "Here's my Opinion"
- Puffin Fun Facts

WHAT YOU DO:

1. Encourage students to choose one of the topics below or an idea of their own to reflect upon.
 - Penguins and puffins are quite different but the birds do have some similarities, too. Compare and contrast penguins and puffins.
 - A food web has species at the bottom, in the middle, and at the top. Which species do you think are most important? Defend your answer.

- Use the Student Page: “Here’s My Opinion” to answer the questions: Are puffins and seabirds more or less vulnerable to the effects of climate change? Why?

Share the “Puffin Fun Facts” with students. Ask them to write a story about their favorite trait(s) or behaviors of puffins.

2. Ask students to share their thoughts in writing, or give them a choice from among a variety of media. For instance, they may write a song or rap, or perhaps they’d like to make an audio or video recording, a blog post, or a collage or drawing with captions.
3. Provide an opportunity for students to share and discuss their work with each other.

USEFUL LINKS:

www.epa.gov/climatechange/kids on science and impacts of global warming and climate change, and on actions that help address global warming.

Find out more about protecting wildlife from global warming at <http://www.nwf.org/rrgreenzone/>.



STUDENT PAGE

HERE'S MY OPINION

Question: Are puffins and seabirds more or less vulnerable to the effects of climate change? Why?

Directions: Use this page to create an outline that will help you write an opinion piece about the question above. Refer to the www.climateclassroomkids.org and "Fun Facts" to help you make your outline.

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: Science, Civics

LEARNING OBJECTIVES:

- Students identify individual and group actions they can take to reduce their contribution to global warming pollution.

MATERIALS:

- Writing supplies or computer access
- Student Page “Climate Change Actions”

BACKGROUND:

The average global temperature 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 sea and coastal ecosystems, climate change is already affecting animals such as puffins. You can focus their concern by steering them toward positive actions they can take to reduce their own carbon “footprints.” While a true solution to climate change must come from major changes to society on an international scale, learning more about the science and applying what your students learn to their daily

lives through personal actions is an empowering place to start.

WHAT YOU DO:

1. Use the concepts and resources presented throughout this guide and www.climateclassroomkids.org or the suggestions below to lead a brainstorming session with your students on actions they can take to reduce carbon pollution and to benefit wildlife and the environment as individuals, as a class or a school.
2. Copy and distribute the Student Page “Climate Change Actions”
After students complete this Student Page, ask them to develop a plan for taking action as individuals or as a class.
3. Either let students that they will share their plans and measure progress. For example, make a chart to document progress on class activities or post everyone’s pledges for individual actions in the classroom or in a common area of the school.

EXTENSIONS:

Have students design an information board or display to share what they have learned about puffins and other birds with others in the school.

Have students make a list of Simple Steps they can take to reduce carbon pollution and help penguins, puffins and other seabirds! Such as:

- Unplug three electronic devices (TV, computer, stereo) when not in use.
- Take reusable bags when you go shopping.
- Walk, bike, carpool and use mass transit whenever you can.
- Replace old light bulbs with energy-saving ones.
- Learn more and add to your list at www.nwf.org/energy.

Get involved! Join an organization that works to protect puffins and other wildlife, such as the National Wildlife Federation or a local group that works in your area. You can even join as a class at www.nwf.org/everystepcounts.

Organize a trash pick-up and create a campaign to dispose of garbage properly - especially plastics and chemicals! Chemicals and plastics can end up in the local water supply and a lot of waste finds its way to oceans.

Write letters! Students can let decision makers, their peers and adults know when they think a subject is important or if an action needs to be taken.

USEFUL LINKS:

Adopt a Puffin! www.shopnwf.org/Adoption-Center/Adopt-an-Atlantic-Puffin/index.cat

Want to help your school take big steps to protect wildlife and the environment? 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 Water – a good fit if you’re looking to do more to help marine animals!

Learn more about how Eco Schools USA works at www.ecoschoolsususa.org. Find the Eco Schools USA Water Pathway at www.nwf.org/globalwarming/schoolsolutions/ecoschoolsUSA/Beco-meanecoschool/Pathways/water.aspx

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.

PUFFIN FUN FACTS

(These facts are adapted from National Wildlife Federation's Ranger Rick® magazine)

KNOW YOUR PUFFINS

- Of the 300 species of seabirds, puffins are among the smallest at only 10" tall. They are also the most colorful and whimsical.
- The Atlantic puffin lives in the northern part of the Atlantic Ocean, and breeds as far south as Maine and France.
- The Horned Puffin gets its name from the small, fleshy horn-like projection that extends above the eye. Unlike other puffins, which nest in burrows, the Horned Puffin typically nests in rock crevices and cliffs in the Pacific Ocean.
- The Tufted Puffin is the largest of the breed and makes its home in the northern Pacific. It gets its name from the long, straw-colored feathers that extend from its crown during mating season.
- As global warming changes air and ocean temperatures, seabirds are especially impacted. Scientists are seeing changes in their migration patterns, their behavior, their food supply and their breeding seasons.

PUFFIN FAMILIES

- Puffins mate for life, which can be 30 years. Their relationship is a true partnership with both sexes sharing the duties of cleaning the nest, incubating the egg, hunting for food, and rearing the chick.
- After spending several months at sea, puffins return to the same colony and inhabit the same three-foot burrow with the same mate. Each year they clean the two rooms of the nest - lavatory and nursery - and line the nursery with fresh feathers and grass.
- Deep inside her cozy burrow, each female lays a single egg. For about six weeks, she and her mate take turns keeping the egg warm and safe. Gulls are their biggest worry—they will try to steal and eat puffin eggs and chicks.
- When the egg hatches, out pops a fluffy, black puffin chick, called a "puffling." For two more months, the puffling stays deep in the burrow, safe from predators. Parents bring meals of fish up to ten times a day!
- Even though puffins are territorial, they are very social birds who often "chat" with one another. They will congregate outside their nests or on the hillside above at the end of a day of fishing.

PUFFIN ADAPTATIONS

- These comical birds exhibit some amazing adaptations. Their two-tone color provides clever camouflage from predators. The black feathers on their backs make them hard to see from above when floating on top of the water; and their white belly feathers make them less visible to potential predators beneath them in the sea.
- A puffin's large beak, which increases in size as it ages, can hold several fish at one time. The average catch is around 10 fish, but some have caught 50-60 fish at once.
- Puffins may not appear graceful on land or when taking off and landing from flight, but they are very adept swimmers. They can dive up to 60 meters and use their wings and feet to propel them through the water.

- Puffins are usually on land from April to August incubating and raising their young. The rest of the time they dive, fish, and sleep out at sea - usually for months at a time. With water-proofed feathers, the ability to drink sea water and catch fish they are very well adapted to a life at sea.
- Puffins beat their wings very fast in flight — up to 400 beats per minute.
- Puffins must race across the water to get speed to take off.
- During the summer breeding season, puffins wear their colors proudly but in the winter their beaks and feet fade to a dull gray. They also shed a portion of their colorful outer beak.
- Puffins “fly” both in the air and the sea. They can dive for up to one minute, scooping up small fish one-by-one. The puffins hold the fish crosswise in their beaks with their tongue while diving for more. The biggest haul on record is 62 fish at once!
- The Great Black-backed Gull can catch and eat an adult puffin in mid-air.



NATIONAL EDUCATION STANDARDS

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

WRITER'S CORNER

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

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

Changes in environments

Grades 5-8 Standard C: Life Science

Diversity and adaptations, Populations and ecosystems

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

Populations, resources, and environments

English/Language Arts: NCTE/IRA

Standard 1: Reading for perspective

Standard 4: Communication skills

Standard 5: Communication strategies

Standard 6: Applying knowledge

Social Studies: NCSS

Theme 4: Individual development and Identity,

Theme 9: Global Connections, Theme 10:

Civic Ideals and Practices

WHAT YOU CAN DO

Social Studies: NCSS

Theme 9: Global Connections, Theme 10:

Civic Ideals and Practices

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

