



**NATIONAL
WILDLIFE
FEDERATION**

PENGUINS & ANTARCTICA GUIDE FOR EDUCATORS

WWW.CLIMATECLASSROOMKIDS.ORG

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.

Answers to Crossword Puzzle on page: 18

Across:

1. elephant
2. petrel
3. rockhopper
6. krill
8. south
9. Antarctica

Down:

1. emperor
4. colonies
5. penguin
7. chinstrap

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*®.

NWF is proud to partner with Howard Ruby in the Climate Classroom Kids website and activity guides.

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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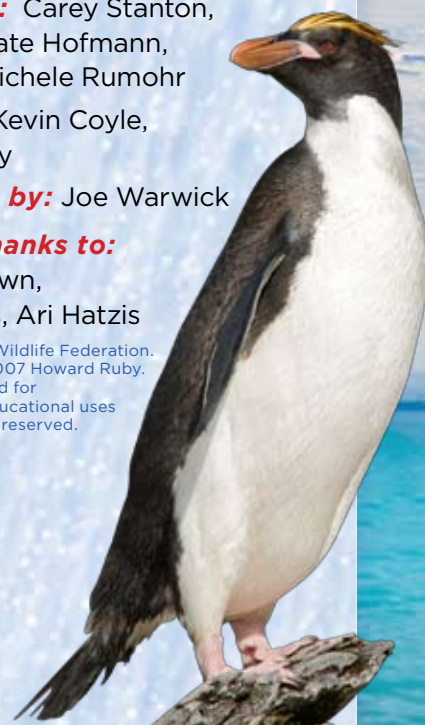
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ACTIVITY ONE

WHAT I KNOW ABOUT ANTARCTICA

Subjects: Biology, Natural Science

LEARNING OBJECTIVES:

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

MATERIALS:

- Blank paper
- “What I Know About Antarctica” student page
- Globe and maps showing Antarctica
- Books and online access to research Antarctica

BACKGROUND:

Most people know very little about Antarctica’s amazing landscape.

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. At 66.5 degrees south latitude is the Antarctic Circle. South of this latitude line, there are 24 hours of daylight at the summer solstice and 24 hours of darkness at the winter solstice (due to the tilt of the Earth’s axis).

Antarctica is a circumpolar ecosystem (an ecosystem that spans the globe around the pole). Antarctica consists mostly of ice-covered land surrounded by ocean. Animals that live there include penguins, squid, and krill. The Arctic is at the opposite pole of the Earth, north of the

Arctic Circle at 66.5 degrees north latitude. The Arctic consists of ice-covered ocean that is nearly surrounded by land masses. Animals that live there include polar bears, reindeer, caribou, lemmings, and snowy owls.

Note: Polar bears live only in the Arctic region. Penguins live only in the southern hemisphere.

WHAT YOU DO:

1. Tell students that today they are going to learn about a special place, Antarctica. Ask students either in groups or individually to write answers to the following questions to find out what they already know about Antarctica.
 - Where is Antarctica?
 - What does this place look like?
 - How would you describe its climate?
 - What animals live there?
2. Invite groups or individuals to share their answers with the class. Then collect their initial thoughts and tell students that they are going on a mapping adventure to learn more about Antarctica.
3. Using a globe, show students the region of Antarctica. 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 Antarctica?
4. Distribute copies of the Student Page that follows, called "What I Know About Antarctica." Give students ample research time in class or at home and then have them record what they know about Antarctica.
5. Return the pages with students' initial thoughts and have them compare their prior knowledge with their current knowledge about Antarctica.
6. Lead a discussion to determine what they have learned about this unique ecosystem.

USEFUL LINKS:

You will find a good description of latitude, longitude, and the Antarctic Circle at www.lat34north.com/cities/CitiesLatitude.cfm.



STUDENT PAGE

WHAT I KNOW ABOUT ANTARCTICA

Directions: Record things you have learned about Antarctica in the spaces below.

Climate _____

Animals _____

Plants _____

People _____

Other _____

1. If you divide the earth in half along the equator, in which hemisphere is Antarctica?

2. What is the name of the ocean found there? _____
3. What is the latitude of the South Pole? _____



ACTIVITY TWO

WHAT MAKES A PENGUIN A BIRD?

Subjects: Biology, Natural Science, Environmental Science

LEARNING OBJECTIVES:

- Describe the characteristics that distinguish birds from other animals.
- Explain the special adaptations of penguins.

MATERIALS:

- Index cards or small pieces of paper
- Markers

BACKGROUND:

Penguins are birds - birds that dive and swim in the ocean.

What makes a bird? All birds—from wrens to ostriches to owls to penguins—have certain characteristics in common.

- Birds are vertebrates.
- Birds have lungs to breathe air.
- Birds are warm-blooded, meaning they keep their body at a constant temperature.
- Birds lay eggs, from which their young hatch.
- Birds have feathers.

Some of these characteristics are shared with other kinds of animals. For instance, fish, reptiles,

mammals and amphibians are also vertebrates. Birds, like most fish and reptiles, hatch their young from eggs. But only birds have feathers.

How are penguins unique? Penguins have adaptations for life in the ocean. They have streamlined bodies and use their wings as flippers for swimming. They do not fly.

WHAT YOU DO:

1. Refer to the background information above, and ask students to help you make a list of the characteristics of birds. Ask them to name as many different kinds of birds as they can.
2. Then explain that penguins are birds that dive and swim in the ocean. Work together in class or ask students to do some research on penguins in order to create a list of their characteristics and where they live. Refer to the Penguin Fun Facts on page 19 in this guide.
3. On index cards, write the names of the birds that students suggest or simply create a list of different species in advance. You might also want to include the names of some non-bird species. Shuffle the cards and hand out one to each student. Place the cards face down so that students cannot read the animals' names.
4. Have students hold their cards up to their foreheads so that others can read them but they still don't know which animal they represent. Then play a round of "20 Questions," with students asking questions to help them guess their animals' identities. For instance, if the card reads "Emperor Penguin," they might start by asking "Am I a bird?" Yes. "Do I build a nest in a tree?" No. "Do I fly?" No. And so forth.
5. Depending on the size of your group, you might have students go one at a time, with the rest of the group answering their questions, or have all students mingle at once and ask questions of one another.
6. Conclude the activity by reviewing the characteristics of birds in general and penguins in particular.

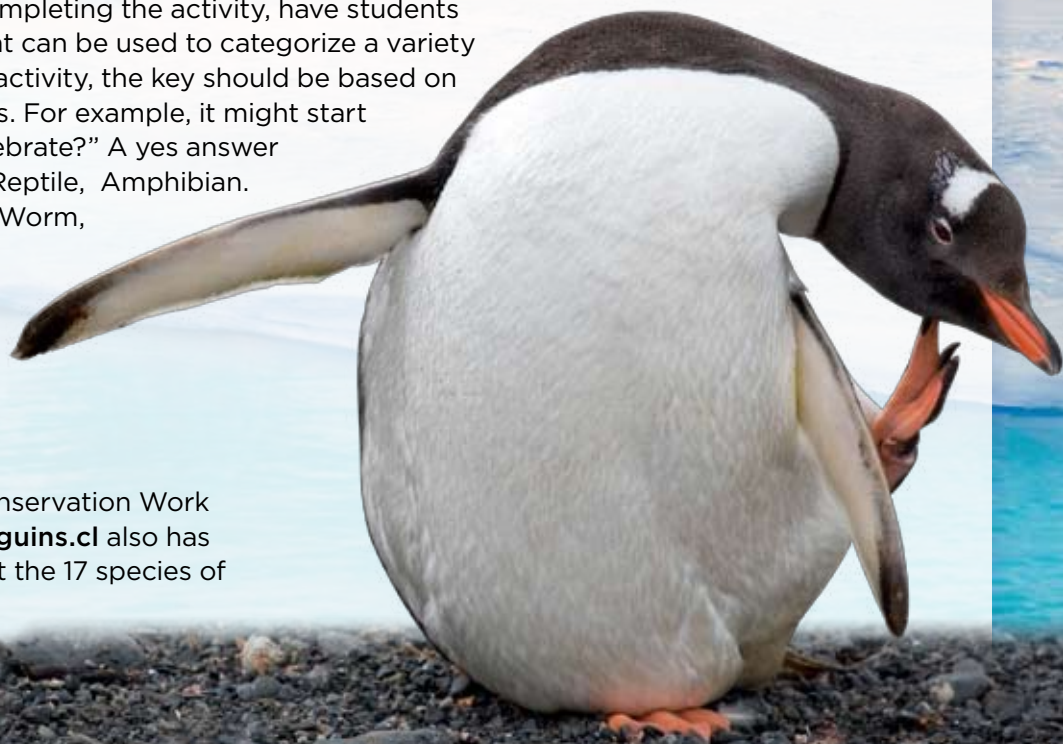
ADAPTATIONS:

For younger students. If students are not yet proficient readers, paste drawings or photos of the animals on the cards in addition to writing their names.

For older students. After completing the activity, have students devise a dichotomous key that can be used to categorize a variety of different animals. Like the activity, the key should be based on a series of yes or no questions. For example, it might start with the question "Is it a vertebrate?" A yes answer leads to Fish, Mammal, Bird, Reptile, Amphibian. A no answer leads to Insect, Worm, Mollusk, Crustacean, and Echinoderm. Subsequent questions further narrow down the choices until a single species is reached.

USEFUL LINKS:

The International Penguin Conservation Work Group's website at www.penguins.cl also has photos and information about the 17 species of penguin in the world.



ACTIVITY THREE

SORTING PENGUINS

Subjects: Biology, Natural Science

LEARNING OBJECTIVES:

- Describe and differentiate various species of penguins.

MATERIALS:

- Library/Internet access to research penguin species
- Paper/Pencils

WHAT YOU DO:

Four species of penguins live in Antarctica. Have students devise ways to compare, contrast, sort, or categorize various penguin species. Here are some techniques to try:

- Fold a sheet of paper in fourths. On each section, describe one of the 17 penguin species. Include physical characteristics, habitat, nesting strategies, and a drawing of the penguin.
- Use the student page that follows to make copies and distribute to students individually or in groups to create flash cards comparing the 4 different species of penguins residing in Antarctica. Students could produce a class field guide to penguins, with each student contributing a page on a different species.
- Find out the sizes of different species and rank them in a size chart.
- Categorize the different species by where they live.
- Group them based on similarities in color and pattern.
 - Chinstrap Penguin • Macaroni Penguin • Adélie Penguin • Emperor Penguin
 - Magellanic Penguin • Gentoo Penguin • King Penguin • Rockhopper

ADAPTATIONS:

For younger students. Paste pictures of 4 or more different penguin species onto index cards, with two cards for each species. Have students play a memory game by spreading out all the cards face down and taking turns flipping over two cards at a time, attempting to turn over matching pairs. Ask them to describe the similarities and differences in the appearances of the different species.

USEFUL LINKS:

Visit www.climateclassroomkids.org/galleries to find photos of penguins and other species, plus panoramas of Antarctica. You'll find lots of ideas for the classroom on this NWF site.



STUDENT PAGE

Create flash cards comparing the 4 different species of penguins residing in Antarctica.



ACTIVITY FOUR

PENGUIN YEAR

Subjects: Biology, Natural Science

LEARNING OBJECTIVES:

- Understand the impacts of the seasons on penguin food and behavior.

MATERIALS:

- Poster board or drawing paper
- Art Supplies

BACKGROUND:

All penguins have very specific behaviors and activities in the year's seasons.

Summer – Hunting for fish, krill, and squid in the Antarctic Ocean.

Fall – Marching inland from the edge of the sea ice to the site of their winter colony.

Winter – Males and females pair up and mate. Females lay eggs and return to the sea for food. Males incubate eggs. Chicks hatch after two months. Females return and males go to sea.

Spring – Parents take turns tending the chicks and feeding. Chicks molt, then take their first swim as summer begins again.

WHAT YOU DO:

1. Have students research and record what the penguins do in each season.
2. With these notes, they can then create a poster or picture book about the penguins' year. Encourage them to use both words and drawings to explain what happens in each season and show how the cycle begins anew every year.
3. Point out that the penguins' winter takes place during our summer. You could also demonstrate why by using a globe and a light source to represent the sun.

USEFUL LINKS:

You can keep track of nesting Adelie penguins and their chicks from mid-November to mid-January at www.penguinscience.com.



ACTIVITY FIVE

FEET ARE NEAT

Subjects: Biology, Natural Science

Adapted from Ranger Rick's® Nature Scope® Series.

LEARNING OBJECTIVES:

- Understand how penguins and other birds are adapted to live in their habitats by looking at their feet.

MATERIALS:

- Clay or modeling dough
- Pipecleaners
- Pens, pencils, crayons, markers
- Construction paper
- Tape

BACKGROUND:

Different kinds of birds use their feet in different ways. For instance, some birds use their feet for perching in trees, some for running across the ground, and some for paddling in the water. The size, shape, and other characteristics of birds' feet are adaptations that help them survive in the habitat where they live. Penguins' feet are wide and webbed for use as flippers.

WHAT YOU DO:

1. Ask students to think of some of the ways birds use their feet, such as perching, walking, swimming, running, climbing, and grabbing.
2. Then talk about some of the different kinds of feet different birds have. Refer to the Student Page that follows to help with your discussion.
3. Pass out lumps of clay or modeling dough and have each student choose a bird and make a model of its feet. Pass out copies of the Student Page or other photos they can work from. When students are finished, have each one draw a picture of his or her bird on a piece of white cardboard or stiff paper, color it, and tape pipe cleaner legs to the cardboard. (To make each leg, have them twist two pipe cleaners together.)
4. Ask students to describe the feet they made and explain how the bird uses them. Why does this bird have these particular feet, and how do they help the bird survive in its habitat?

USEFUL LINKS:

Visit [www.coolantarctica.com/Antarctica fact file/science/cold_penguins.htm](http://www.coolantarctica.com/Antarctica_fact_file/science/cold_penguins.htm) to learn more about how penguins' feet (and other body parts) help them withstand cold temperatures.



STUDENT PAGE

Different types of birds use their feet in different ways.

Climbers – Woodpeckers have two toes in front and two toes in back for climbing up and down tree trunks.

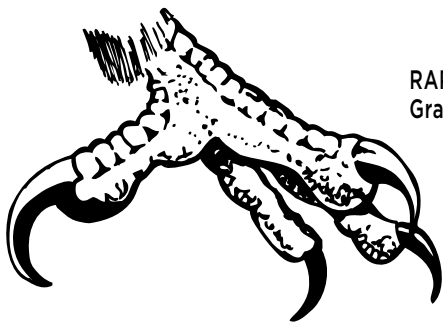
Graspers – Hawks, owls and other birds of prey have large curved claws, called talons, that dig into their prey and help them hold onto it in flight.

Perchers – Robins, mourning doves, and many other birds have three toes that face forward and one long hind toe that helps them grip their perches tightly.

Runners – Ostriches and killdeer have two and three toes, respectively, instead of four, and all their toes point forward for fast running.

Scratchers – Pheasants and chickens have rake-like toes for scratching in the soil.

Swimmers – Ducks, coots and other swimmers use their feet as paddles. Penguins use their special feet much like people use swim fins.



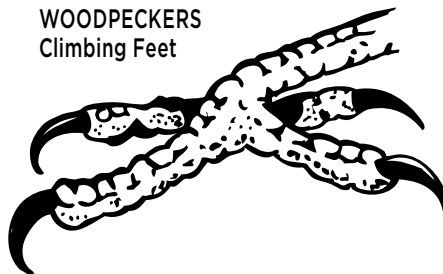
RAPTORS
Grasping Feet



PHEASANTS
AND CHICKENS
Hopping and
clinging Feet



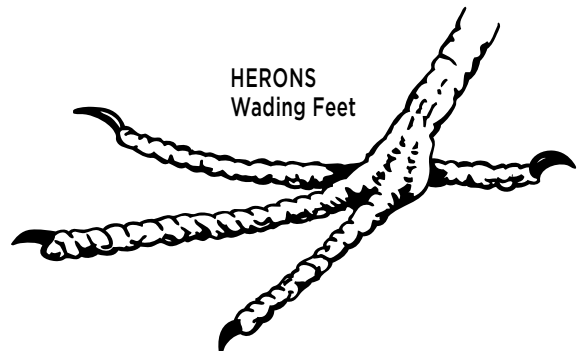
SONG BIRDS or
PERCHING BIRDS
Gripping Feet



WOODPECKERS
Climbing Feet



PENGUIN
Webbed Feet for
Swimming



HERONS
Wading Feet



ACTIVITY SIX

FOOD WEB ON THE WALL

Subjects: Science, Art

Adapted from Ranger Rick's® Nature Scope® Series.

LEARNING OBJECTIVES:

- Define and understand the terms “food chain” and “food web.”
- Explain the importance of phytoplankton and zooplankton in marine food webs.

MATERIALS:

- | | | |
|-----------------------------|---------------------|----------------------|
| • Bulletin board | • Scissors | • Markers or crayons |
| • Pictures of plankton | • Tape | • Reference books |
| • Chalkboard or easel paper | • Glue | • Paper |
| • Construction paper | • Staplers or tacks | • Yarn |

WHAT YOU DO:

1. Start the activity by discussing the concept of food chains. Ask students to raise their hands if they had some kind of meat for dinner last night. Draw a basic food web with “people” at the top, then “cattle” and “plants,” and explain that this simple food chain shows the transfer of energy, in the form of food, from one organism to another.
2. Explain that plants form the base of almost every food chain on earth. Plants use energy from the sun to make their own food through photosynthesis. In turn, some animals eat plants, and other animals eat the plant-eating animals.

3. Tell students that, like animals on land, most animals that live in the ocean depend on plants for food, and the most important marine plants are phytoplankton. Explain that millions of these tiny plants drift near the ocean's surface. Tiny animals called zooplankton eat the phytoplankton, and so do clams, corals and small fish. Show the students pictures of phytoplankton and zooplankton, and ask them if they can guess what kinds of animals eat zooplankton (some fish, jellyfish, penguins, and even some whales). Then explain that many larger fish and other animals eat the animals that feed on zooplankton.
4. Divide the group into 12 teams and have each team pick a slip of paper with the name of an organism found in the Antarctic Ocean. See the Student Page that follows to select species. Have students make a list of all the species that form the food web, from tiny krill to the elephant seal. Each team will be doing research to answer these questions about their organism:
 - What does it look like?
 - About what size is it?
 - Where does it live in the ocean – near the surface, on the bottom, in the mid-waters?
 - What does it eat and where does it get its food?
5. When everyone has finished the research, tell students they'll be making a bulletin board together that shows all their organisms and what they eat. Explain that each team will make a figure of their animal or plant. They can make the whole body of some animals, such as the scallop or octopus, and just the head and mouth of the others.
6. Pass out construction paper, glue, scissors, and markers or crayons, and let the students start making their figures. As they finish, have them staple or tack their animals or plants to the bulletin board. Then, starting with the phytoplankton, have each team explain what their creature needs to survive. For example, phytoplankton need sunlight and nutrients; zooplankton need phytoplankton. Ask the teams to check the other creatures on the board to see if their animal eats any of them, and then have them draw a line or tack yarn between their animal and the plants or animals it eats.
7. When the bulletin board is finished, ask students the following questions:

How is the finished board different from the simple food chain you drew on the board earlier? (It includes many food chains and is more complex.)

Which animals would probably have trouble surviving if there were no more phytoplankton or zooplankton? (If there were no more zooplankton, most of the organisms would have trouble, and if the phytoplankton disappeared, all of the animals would have trouble surviving.)
8. Explain that the bulletin board shows a food web – a series of interconnecting food chains. A food web is a more realistic way of explaining the transfer of energy between animals and plants than a food chain because most animals tend to eat more than one kind of food. Be sure to point out that plants (in this case, phytoplankton) almost always form the base of a food web. You can show that even a top predator such as the killer whale depends on these small plants by tracing the connecting lines from the killer whale to the phytoplankton.

USEFUL LINKS:

Play a Ranger Rick game about the ocean food chain: www.nwf.org/Kids/Ranger-Rick/Games/Fish-Food-Game.aspx

STUDENT PAGE

SPECIES OF THE FOOD WEB

Phytoplankton

- Microscopic plants that drift near the ocean's surface
- Absorb sunlight and nutrients from water
- Diatoms are one of the most common kinds of phytoplankton

Zooplankton

- Tiny animals that live near the ocean's surface and in deeper waters
- Some kinds of zooplankton feed on phytoplankton; others feed on other zooplankton
- Most are very small, though some, such as krill, grow to be several inches long
- Some, such as copepods, have feathery body parts that help filter phytoplankton from the water

Antarctic Toothfish

- Large fish that swim in the ocean's middle region
- Up to six feet long and almost 300 pounds
- Eat mostly other fish and some carrion (dead penguins and sea mammals)

Emperor, Adelie, Macaroni and Chinstrap Penguins

- Flightless aquatic birds
- Eat krill, octopus, squid and fish

Giant Squid

- Giant squid have eight arms and two tentacles, each of which has two rows of suckers
- Can be up to 50 feet in total length including tentacles, and weigh up to 1000 pounds
- Eat deep-sea fishes and other squid
- Can be aggressive and have been known to attack much larger animals such as whales

Spectacled Porpoise

- Marine mammals that live in Antarctic surface waters
- Reach up to six feet in length and 180 pounds
- Black above and white below for camouflage, like the much larger killer whale
- Eat fish, octopus, and squid as well as bottom-feeders such as shrimp and mollusks.

Leopard Seals

- Large seals common to Antarctic coast
- Reach up to to six feet in length and 1300 pounds
- Females are larger than males
- Eat krill, squid, fish, and sometimes small penguins



Elephant Seals

- Very large seals that live in the Antarctic as well as the Arctic Ocean
- Up to 16 feet long and over 6000 pounds
- In the Antarctic, they eat mostly fish, squid, skates, and penguins

Sperm Whales

- Largest toothed whales
- About 50 feet and 75 tons
- Eat squid and fish

Blue Whales

- Largest animals ever known on earth, at almost 100 feet long and 200 tons
- Filter-feeders with baleen instead of teeth, they eat krill almost exclusively
- The total number of blue whales in the Antarctic Ocean is almost certainly less than 3000. Whales are hard to count!

Albatross

- Very large seabirds found extensively in the Southern hemisphere's oceans
- Giant Albatross have the largest wingspans of any bird on earth
- Eat fish, squid and krill from the surface and by diving

Turquet's Octopus

- Can be found in very deep waters - up to 12,000 feet - as well as in shallow and mid-level waters
- Only about four inches long, not including tentacles
- Eat krill, small fish and shrimp





ACTIVITY SEVEN

WRITER'S CORNER

Subjects: Language Arts, Visual Arts, Social Studies

LEARNING OBJECTIVES:

- Communicate thoughts and opinions effectively using a variety of media.

MATERIALS:

- Writing supplies or computer access
- Optional: audio or video recording equipment, art supplies

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.
 - Antarctica is far away from where most people live, and is a very unfamiliar environment in many ways. What makes Antarctica unique? Should we care about what happens there? What would you tell someone to persuade him or her that it is important to protect Antarctica?
 - Our polar regions are getting warmer. With older students discuss the science of global warming and climate change. What are the effects of climate change on Antarctica? Why does what happens there affect us in the United States? Why does it matter to you?
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/ focuses on the science and impacts of global warming and climate change, and on actions that help address global warming.

ACTIVITY EIGHT

WHAT YOU CAN DO TO HELP PENGUINS, PUFFINS AND SEABIRDS!

Use the concepts and resources presented throughout this guide or the suggestions below to lead a brainstorming session with your students on actions they can take to benefit wildlife and the environment as individuals, a class or a whole school.

Make a list of Simple Steps you can take to fight climate change and help penguins, puffins and other seabirds!

- 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 compact fluorescents.
- Learn more and add to your list at www.nwf.org/energy.

Get involved! Join an organization that works to protect penguins 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.

Dispose of garbage and chemicals properly! Chemicals can end up in the oceans and harm plants and animals.

Use reusable bags and recycle whenever possible. Plastic bags are especially dangerous for marine animals because the bags can be mistaken for food such as jellyfish.

Write a letter! Let people know when you think something is important.

Want to help your school take big steps to protect wildlife and the environment? Ask your students to develop a plan for taking action as individuals or as a class. Post a chart to document progress on class activities or everyone's pledges for individual actions in the classroom or in a common area of the school.



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.eco-schoolsusa.org

Find the Eco-Schools USA Water Pathway at www.eco-schoolsusa.org/water

ACTIVITY NINE

CROSSWORD PUZZLE

Use the clues to help you fill in this crossword puzzle about penguins and the other animals that share their habitat.

Find the answers on page 2 of this guide.



ACROSS:

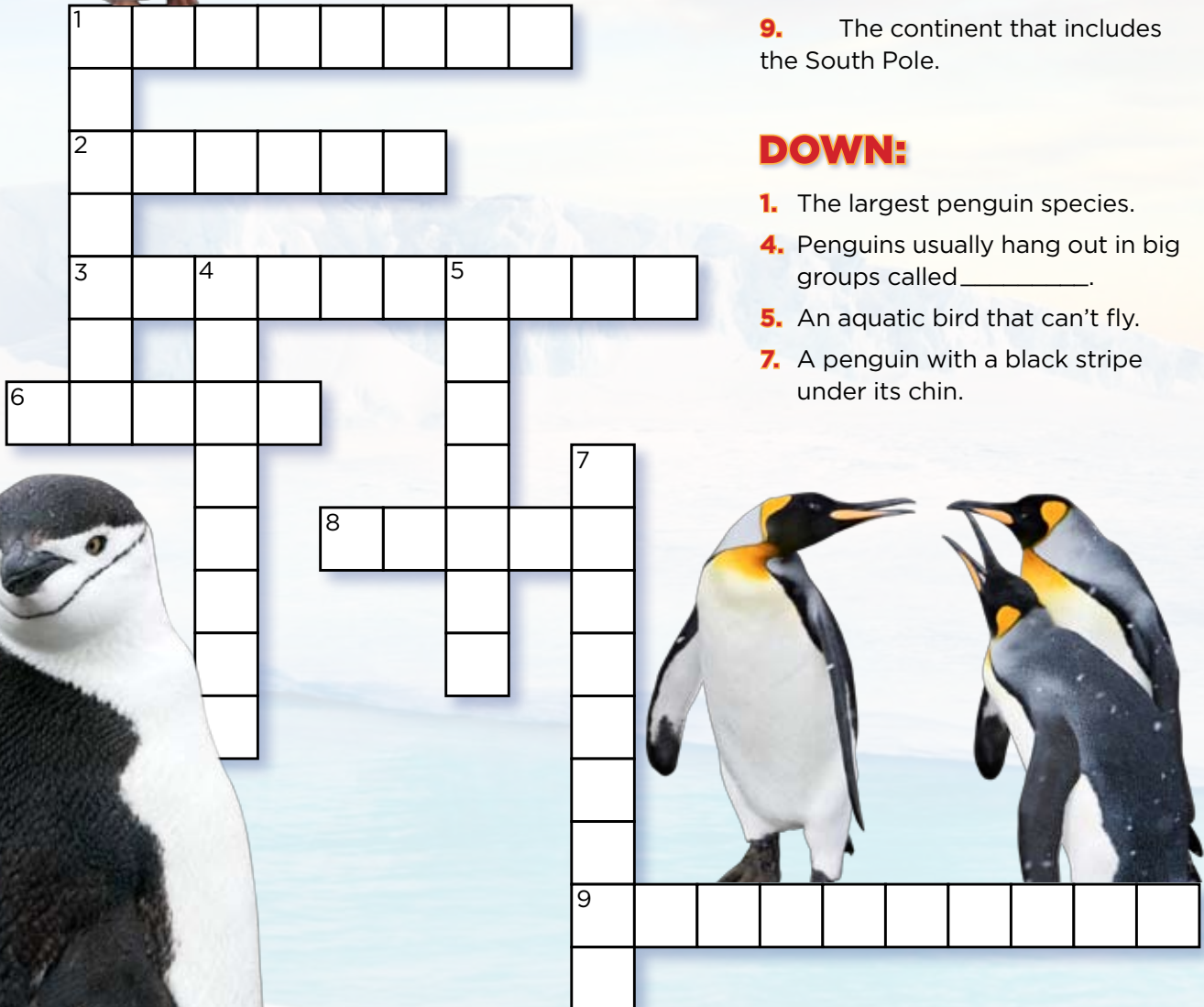
1. The male of this seal species has a trunk.
2. The smallest of all seabirds.
3. This penguin hops on both feet.
6. Penguins eat many of these small crustaceans.

8. Almost all penguins live _____ of the equator.

9. The continent that includes the South Pole.

DOWN:

1. The largest penguin species.
4. Penguins usually hang out in big groups called _____.
5. An aquatic bird that can't fly.
7. A penguin with a black stripe under its chin.



PENGUIN FUN FACTS

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

KNOW YOUR PENGUINS

- Nearly all penguins live south of the equator. Only a few species live on snow and ice.
- There are about 17 different species of penguins, ranging from the crow-sized Little Penguin to the kid-sized Emperor Penguin.
- All Chinstrap Penguins have black head markings that look like they are wearing helmets with straps.
- King Penguins dive up to 700 feet deep - deeper than almost any other kind of penguin.
- The slightly larger Emperor penguin can dive up to 1800 feet and stay underwater up to 20 minutes!
- Magellanic Penguins breed in South America, on the coasts of Argentina and Chile.
- Most of the time Chinstrap Penguins live on icebergs out in the open ocean, but they nest on shore.
- Gentoo Penguins build simple nests out of pebbles or twigs, feathers, and bits of seaweed.
- Rockhopper Penguins got their name because they often hop on both feet on land. Like other penguins, they also can walk, run and jump.

PENGUIN FAMILIES

- Penguins usually hang out in big groups called colonies. They eat and nest together all the time.
- Penguin parents take turns sitting on their eggs and feeding the chicks once they have hatched.
- An adult recognizes and feeds only its own chick, even in a crowded colony.

PENGUIN ADAPTATIONS

- Though they are birds, penguins spend most of their lives in the water as fast and powerful predators.
- In the sea, penguins have double camouflage - their white bellies help hide them from predators looking up at them and their black backs from predators looking down.
- Penguins molt, growing all new feathers, once per year. This can take 2-5 weeks. They build up fat reserves beforehand and don't eat at all during the molt.
- A penguin can burst out of the water and up onto the ice, leaping up to three or four times its own height, or they are able to just ride in on the surf.
- Some penguins can cruise underwater about as fast as an Olympic swimmer. To speed things up, they might leap in and out of the water the way porpoises do.
- Penguins have short legs set far back on their bodies. That makes them more streamlined underwater, but when they walk upright on land, waddling is about the best they can do.

PENGUIN PREDATORS

- Penguins have no special fear of humans, although they generally will not approach closer than about 10 feet.
- Adult penguins in the ocean are eaten by elephant seals, leopard seals and orcas, or killer whales.
- Skua, large gull-like seabirds, eat penguin eggs and chicks.

NATIONAL EDUCATION STANDARDS

ACTIVITY ONE

WHAT I KNOW ABOUT ANTARCTICA

English/Language Arts: NCTE/IRA

Standard 5: Communication strategies
Standard 6: Applying knowledge
Standard 7: Conducting research
Social Studies: NCSS
Theme 3: People, Places, and Environments

ACTIVITY TWO

WHAT MAKES A PENGUIN A BIRD

Science: NSES

Grades K-4 Standard C: Life Science

Characteristics of organisms

Grades 5-8 Standard C: Life Science

Diversity and adaptations

English/Language Arts: NCTE/IRA

Standard 4: Communications skills

ACTIVITY THREE

SORTING PENGUINS

Science: NSES

Grades K-4 Standard C: Life Science

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

Grades 5-8 Standard C: Life Science

Diversity and adaptations, Populations and ecosystems

English/Language Arts: NCTE/IRA

Standard 4: Communication skills
Standard 5: Communication strategies
Standard 6: Applying knowledge
Standard 7: Conducting research

ACTIVITY FOUR

PENGUIN YEAR

Science: NSES

Grades K-4 Standard C: Life Science

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

Grades K-4 Standard D: Earth and Space Science

Changes in earth and sky

Grades 5-8 Standard C: Life Science

Regulation and behavior, Diversity and adaptations,

Populations and ecosystems

Grades 5-8 Standard D: Earth and Space Science

Earth in the solar system

English/Language Arts: NCTE/IRA

Standard 4: Communication skills
Standard 5: Communication strategies
Standard 6: Applying knowledge
Standard 7: Conducting research

ACTIVITY FIVE

FEET ARE NEAT

Science: NSES

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Diversity and adaptations, Populations and ecosystems

English/Language Arts: NCTE/IRA

Standard 4: Communication skills





NATIONAL EDUCATION STANDARDS

ACTIVITY SIX

FOOD WEB ON THE WALL

Science: NSES

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Diversity and adaptations, Populations and ecosystems

English/Language Arts: NCTE/IRA

Standard 4: Communication skills

ACTIVITY SEVEN

WRITER'S CORNER

SCIENCE: NSES

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

ACTIVITY EIGHT

WHAT YOU CAN DO

Social Studies: NCSS

Theme 9: Global Connections, Theme 10: Civic Ideals and Practices

ACTIVITY NINE

CROSSWORD PUZZLE

SCIENCE: NSES

Grades K-4 Standard C: Life Science

Characteristics of organisms, Organisms and environments

Grades 5-8 Standard C: Life Science

Diversity and adaptations, Populations and ecosystems

PENGUIN 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