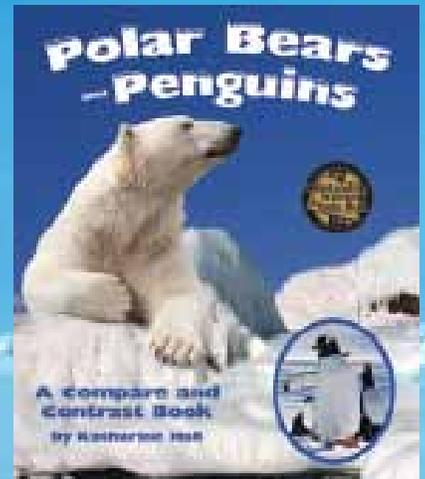
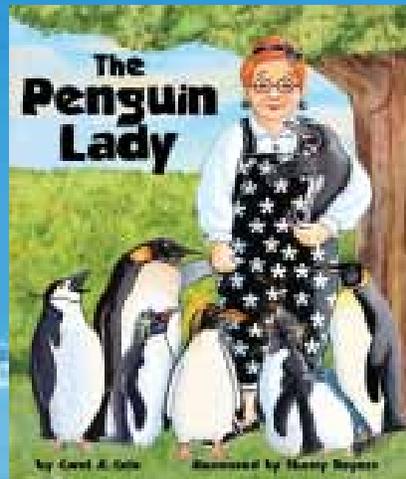
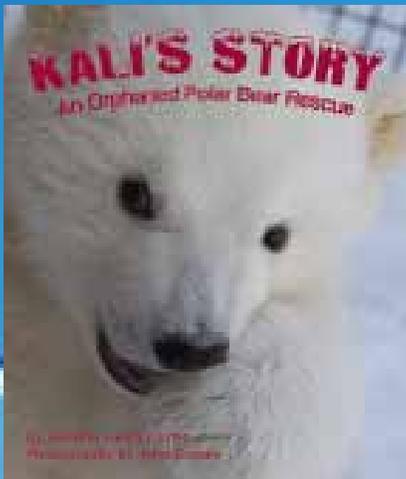


# Teaching Activity Guide

## Polar Animals



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# How to Use This Activity Guide (General)

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There are a wide variety of activities that teach or supplement all curricular areas. The activities are easily adapted up or down depending on the age and abilities of the children involved. And, it is easy to pick and choose what is appropriate for your setting and the time involved. Most activities can be done with an individual child or a group of children.

**For teachers in the classroom:** We understand that time is at a premium and that, especially in the early grades, much time is spent teaching language arts. All Arbordale titles are specifically selected and developed to get children excited about learning other subjects (science, geography, social studies, math, etc.) while reading (or being read to). These activities are designed to be as comprehensive and cross-curricular as possible. If you are teaching sentence structure in writing, why not use sentences that teach science or social studies? We also know and understand that you must account for all activities done in the classroom. While each title is aligned to all of the state standards (both the text and the For Creative Minds), it would be nearly impossible to align all of these activities to each state's standards at each grade level. However, we do include some of the general wording of the CORE language arts and math standards, as well as some of the very general science or social studies standards. You'll find them listed as "objectives" in italics. You should be able to match these objectives with your state standards fairly easily.

**For homeschooling parents and teachers in private schools:** Use as above. Aren't you glad you don't have to worry about state standards?

**For parents/caregivers:** Two of the most important gifts you can give your child are the love of reading and the desire to learn. Those passions are instilled in your child long before he or she steps into a classroom. Many adults enjoy reading historical fiction novels . . . fun to read but also to learn (or remember) about historical events. Not only does Arbordale publish stories that are fun to read and that can be used as bedtime books or quiet "lap" reading books, but each story has non-fiction facts woven through the story or has some underlying educational component to sneak in "learning." Use the "For Creative Minds" section in the book itself and these activities to expand on your child's interest or curiosity in the subject. They are designed to introduce a subject so you don't need to be an expert (but you will probably look like one to your child!). Pick and choose the activities to help make learning fun!

**For librarians and bookstore employees; after-school program leaders; and zoo, aquarium, nature center, park & museum educators:** Whether reading a book for story time or using the book to supplement an educational program, feel free to use the activities in your programs. We have done the "hard part" for you.

# What Do Children Already Know?

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Young children are naturally inquisitive and are sponges for information. The whole purpose of this activity is to help children verify the information they know (or think they know) and to get them thinking “beyond the box” about a particular subject.

Before reading the book, ask the children what they know about the subject. A list of suggested questions is below. The children should write down their “answers” (or adults for them if the children are not yet writing) on the chart found in Appendix A, index cards, or post-it notes.

Their answers should be placed on a “before reading” panel. If doing this as a group, you could use a bulletin board or even a blackboard. If doing this with individual children, you can use a plain manila folder with the front cover the “before reading” panel. Either way, you will need two more panels or sections—one called “correct answer” and the other “look for correct answer.”

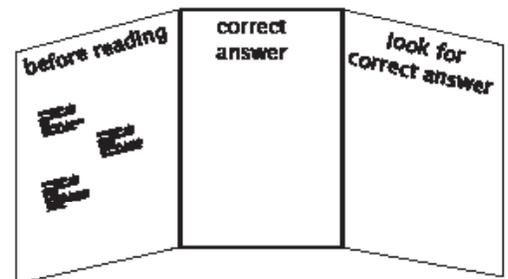
Do the children have any more questions about the subject? If so, write them down to see if they are answered in the book.

After reading the book, go back to the questions and answers and determine whether the children’s answers were correct or not.

If the answer was correct, move that card to the “correct answer” panel. If the answer was incorrect, go back to the book to find the correct information.

If the children have more questions that were not answered, they should look them up.

When an answer has been found and corrected, the card can be moved to the “correct answer” panel.



## Pre-Reading Questions

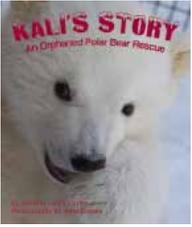
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What is the climate in the Arctic and Antarctic?

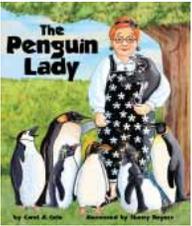
Name some animals that live in the Arctic.

Name some animals that live in the Antarctic.

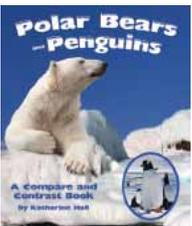
What are some ways that these animals have adapted to the climate (body parts or behaviors)?



- What is a polar bear?
- Where do polar bears live?
- Describe their habitat.
- Who do you think might find an orphaned polar bear in the wild?
- What do baby polar bears (cubs) eat?
- What would you give an orphaned baby polar bear to eat?
- Why do polar bear cubs need adults to teach them things?
- Why is it important for polar bear cubs to have friends when they are little?



- What class of animal are penguins (mammals, birds, fish, reptiles or amphibians)?
- In what part of the world do penguins live in the wild?
- Describe the habitat where penguins live (ocean, land, deserts, or mountains?)
- Can you name some of the different types (species) of penguins?



- Would you ever see polar bears and penguins together in the wild? Why or why not?
- Where do polar bears live in the wild?
- Where do penguins live in the wild?
- What kind of covering (fur, feathers, scales) do polar bears have?
- What kind of cover (fur, feathers, scales) to penguins have?
- What are some things that polar bears and penguins have in common?
- How are polar bears and penguins different?
- What class of animals are polar bears (mammals, birds, fish, reptiles or amphibians)?
- What class of animals are penguins (mammals, birds, fish, reptiles or amphibians)?
- Can you name some of the different types (species) of penguins?
- Can you name some of the different types (species) of bears?

# Comprehension Questions & Writing Prompts

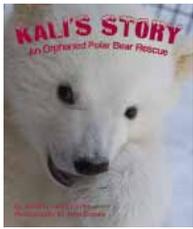
*Objective Core Language Arts, Speaking and Listening: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.*

*Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.*

*Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.*

*Retell stories, including key details, and demonstrate understanding of their central message or lesson.*

*Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.*



Why did the man pull the polar bear cub out of the den?

How did he take the cub to his village?

What did the villages do to help the cub?

Where did the cub's name come from?

How did Kali get to the Alaska Zoo?

On the night he arrived at the zoo, what did the zookeepers give Kali to eat?

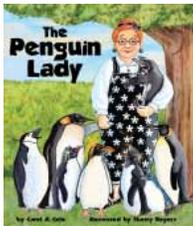
Why couldn't the Alaska Zoo keep Kali?

What were some skills that Kali had to learn from the zookeepers?

What were some of the things that Kali used to learn to "hunt?"

When the U.S. Fish and Wildlife officials found a new home for Kali, what did the people do to help Kali prepare for the trip?

What is the name of Kali's new friend at the Buffalo Zoo?



Why did people give the Penguin lady so many penguins?

Why did the Penguin Lady decide to give the penguins away?

To whom did she give the penguins?

How did the Penguin Lady feel after the penguins were gone?

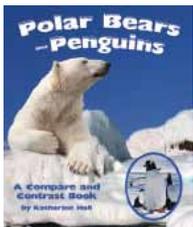
What did she decide to get at the end of the book and why?

Do you think she'll get one or more? Why?

Would someone really have penguins as pets? Why or why not? (critical thinking)

Suppose you were to have a penguin as a pet, what things would it need (think food, climate, habitat) (critical thinking)

What do zoos and aquariums do to care for penguins? (critical thinking)



Which animals live in the Northern Hemisphere?

Which animals live in the Southern Hemisphere?

Which is an ocean surrounded by land: the Arctic or the Antarctic?

Which is land surrounded by ocean (and is a continent?): the Arctic or the Antarctic?

What type of covering do polar bears have?

What type of covering do penguins have?

Name some of the different types (species) of bears.

Name some of the different types (species) of penguins.

If it is winter and dark in the Arctic, what is it like in the Antarctic?

# Language Arts: Comparing Stories

Objective Core Language Arts,:

RI.2.9 Compare and contrast the adventures and experiences of characters in stories,

RL.1.9 Compare and contrast the most important points presented by two texts on the same topic,

RL.2.3 Describe how characters in a story respond to major events and challenges.

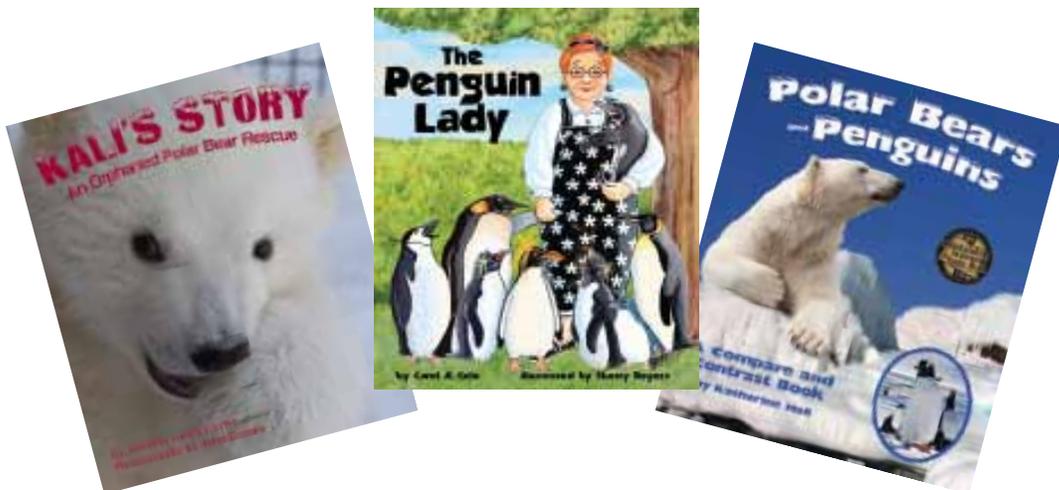
RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic.

All of these books introduce readers to polar animals. Compare and contrast the stories, characters, and events by answering the following questions or explaining the statements:

- Which two books are real (non-fiction) and which is made up (fiction)?
- In which story do the animals use human traits and behaviors?
- Do you think animals could really behave like humans? Why or why not?
- Compare and contrast the way the zookeepers cared for Kali to how the Penguin Lady cared for the penguins. Which way do you think would be better for the animals and why?
- Describe the animals mentioned in the books.
- What are some of the things animals have in common?
- How are the animals different?

## Writing Prompts and Critical Thinking

- While polar bears and penguins live at opposite ends of the Earth, they are sometimes found together at zoos. Why?
- Based on information in the *Polar Bears and Penguins* book, describe the habitat where Kali was found.



# Cross-Curricular Vocabulary Activities

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*Objective Core Language Arts:*

*Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade-level reading and content.*

*Identify new meanings for familiar words and apply them accurately (e.g., duck is a bird & the verb to duck).*

*Use words & phrases acquired through conversations, reading/being read to, and responding to texts.*

*Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade-level topic or subject area.*

*Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences.*

*Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.*

*Use frequently occurring adjectives.*

**Vocabulary Game:** This activity is a very general idea and is designed to get children thinking of vocabulary words that will then be used as the beginning vocabulary list for a science lesson.

Select an illustration from the book and give the children a specific length of time (five minutes?) to write down all the words they can think of about the particular subject. It is helpful to project an illustration on a whiteboard. Use eBook or book preview found at [www.ArbordalePublishing.com](http://www.ArbordalePublishing.com).

The children's word list should include anything and everything that comes to mind, including nouns, verbs, and adjectives. At the end of the time, have each child take turns reading a word from his/her list. If anyone else has the word, the reader does nothing. However, if the reader is the only one with the word, he/she should circle it. While reading the list, one person should write the word on a flashcard or large index card and post it on a bulletin board or wall.

At the end, the child with the most words circled "wins." And you have a start to your science vocabulary list. Note: if a child uses an incorrect word, this is a good time to explain the proper word or the proper usage.

**Glossary/Vocabulary Words:** Word cards may be used (see Appendix) or have children write on index cards, a poster board, or on a chalkboard for a "word wall." If writing on poster board or chalkboard, you might want to sort words into nouns, verbs, etc. right away to save a step later if using for Silly Sentences (on the next page). Leaving the words posted (even on a refrigerator at home) allows the children to see and think about them frequently. The glossary has some high-level words. Feel free to use only those words as fit your situation.

**Using the Words:** The following activities may be done all at once or over a period of several days.

- Sort vocabulary words into nouns, verbs, adjectives, etc. and write what they are on the backs of the cards. When the cards are turned over, all you will see is "noun," etc. (these can then be used for the "silly sentences" on the next page).
- After the cards have been sorted, go over the categories to ensure that all cards have been placed correctly. (Mistakes are a great opportunity to teach!)
- Choose two words from each category and write a sentence for each word.
- Write a story that uses at least ten vocabulary words from the word sort.
- Have children create sentences using their vocabulary words. Each sentence could be written on a separate slip of paper. Have children (individually or in small groups) sort and put sentences into informative paragraphs or a story. Edit and re-write paragraphs into one informative paper or a story.

**Silly Sentence Structure Activity:** This "game" develops both an understanding of sentence structure and the science subject. Use words from the "word wall" to fill in the blanks. After completing silly sentences for fun, have children try to fill in the proper words by looking for the correct information in the book.

# Word Bank

Adjective	Noun		Verb
black	air	ice	breathe
clear	Antarctica	leg	camouflage
dense	Arctic	mammal	catch
fleshy	beak	paws	defend
heavy	bear	penguin	eat
hollow	bill	polar bears	fly
light	bird	predator	gather
Northern	bone	prey	insulate
outer	cub	seal	molt
polar	feathers	snow	move
sharp	feet	snowshoes	overlap
short	fish	spine	roam
slippery	flipper(s)	teeth	steer
Southern	fur	tongue	swim
stiff	hair	water	waddle
waterproof	hemisphere	wing	walk
webbed			
white			







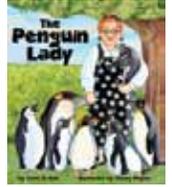
# Language Arts: Sequence Sentence Strips

Cut into sentence strips, laminate if desired, and place in a "center." Have children put the events in order. Children may work alone or in small groups. Cards are in order but should be mixed up when cut apart.

*Objective Core Language Arts:*

*Use temporal words and phrases to signal event order.*

*Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action.*



On her birthday, her Penelope's brother sent her one penguin from the Galapagos Islands.

Then Penelope's sister gave her two Rockhopper penguins from Argentina.

One day Penelope opened her door and there were three Chinstrap penguins from Antarctica waddling across her front porch.

In the spring, four baby African penguins came and she put them in her air-conditioned attic.

Five Little Blue penguins from Australia lounged in the living room. They sat on all her chairs.

That summer, six Royal penguins from an island near Antarctica went swimming in the cool water in her backyard pond.

One fall morning, Penelope found seven King penguins from the Falkland Islands standing in her kitchen.

One winter afternoon, eight Adelie penguins from Antarctica skated on her icy pond. That night, Penelope found their wet scarves piled on her favorite living room chair.

In the den, nine Macaroni penguins from Argentina napped on the piano. Penelope had to tiptoe through her house so she would not wake them up.

There were even ten Emperor Penguins from Antarctica snacking on squid.

Penelope rented a large truck and helped all the penguins up the long ramp into the back of the truck. She drove them to the zoo where they were happy to meet other penguins.



The man pulled the orphaned polar bear cub from the den. They rode back to the man's village on a snowmobile.

The villagers tried to feed the polar bear cub some milk. They named the cub Kali (pronounced Cully) for their village. The villagers put Kali on a plane, sending him to a wildlife vet and her team in North Slope Borough. The vet checked Kali and said he was healthy enough for another plane ride to the Alaska Zoo.

It was just before midnight when Kali arrived at the zoo. He eagerly drank from a bottle filled with fatty puppy formula and whipping cream.

For the next three months, the playful young cub romped in his snowy habitat with the keepers rather than near the zoo's adult polar bears. Kali learned to eat solid food, to drink water from a metal bowl, to swim and to hunt.

Before long, it was time for Kali to go to the another zoo. To help prepare Kali for his journey, the Buffalo Zoo sent him one of Luna's blankets. The zookeepers hoped that Kali would get used to Luna's scent so he would recognize her when they met.

During his first days at the Buffalo Zoo, Kali and Luna were kept in separate dens. They could hear and smell, but not see or touch, each other. Finally, the cubs had their first play date. Initially shy, the cubs now play non-stop.

# Galapagos: Endangered



Galapagos Penguins get their name from the islands around which they live off the coast of Ecuador around the equator.

These penguins mate for life. If there is a lot of food, they will breed 2 - 3 times per year and will lay 1 - 2 eggs in a cave or rock crevice each time. Both parents incubate the eggs for about 40 days. Even if both eggs hatch, the parents will only raise one. One parent will always be with the chick for about a month. After that time, the chick can stay alone. When the chick is about two months old, it is ready to go out on its own.

Because they live in a warm climate, they spend most of the day in the cool sea water to keep cool. When on land, they hold their flippers away from their body to stay cool.

To keep their feet from getting sunburned on land, they hold their flippers over their feet.

They stand 16-18 inches tall and weigh 5-8 pounds. What is something 16-18 inches tall or long? Find something that weighs 5-8 pounds.

They eat small fish, mullets and sardines.



## Rockhoppers: Vulnerable



Rockhoppers hop 4-5 feet to move around when on land or ice, hence the name. This species has recently been split into northern and southern species.

Rockhopper Penguins breed during the spring and summer. The female lays 2 eggs in a rocky burrow. Both parents will incubate one of the eggs until it hatches after about five weeks. The other egg is either lost or doesn't hatch. The chick is cared for by both parents for about 3 weeks when it joins all the other chicks in a large group called a creche. The chicks are considered to be adults and go off on their own when they are about 10 weeks old.

They stand 20-24 inches tall and weigh 6-7 pounds. What is something 20-24 inches tall or long? Find something that weighs 6-7 pounds.

They eat crustaceans, squid and small fish.

Because penguins live in the Southern Hemisphere, their spring and summer is during our fall and winter.

Rockhoppers hop 4-5 feet. How far can you hop?



## Chinstrap



Chinstrap penguins have a white chin with a narrow black band across, hence the name.

They use stones to build their nests and then the female lays two eggs. The parents take turns incubating the eggs for 5 or 6 weeks. After hatching, the chicks stay in the nest for approximately a month and then they join all the other chicks in a creche. When they are about 2 to 2 1/2 months old, they head out to sea.

They stand 24-29 inches tall and weigh 10 pounds. What is something 24-29 inches tall or long? How tall are you? How does your height compare to this penguin? Find something that weighs about 10 pounds.

They feed on krill and fish.



## African: Vulnerable



African penguins live in South Africa, hence the name. These penguins mate for life and most breeding takes place in February. The pair build a nest out of bat poop (guano). The female lays two eggs and both parents incubate the eggs for about 6 weeks. The chicks leave the nest when they are several months old.

They stand 24 inches tall and weigh 7 to 11 pounds. What is something 24 inches tall or long? Find something that weighs 7 to 11 pounds.

They eat small fish, anchovies, sardines, squid and crustaceans.



## Little Blue / Little Penguin



The smallest of all penguins, Little Blue penguins get their name from their small size and the blue coloring of their feathers.

They usually mate for life. They build a nest or dig a burrow for a nest in August or September. The female usually lays 2 eggs at a time but if there is a lot of food available, she may lay eggs three times each year. Both parents incubate the eggs for about 5 weeks. Both parents care for the chicks for about 3 weeks. For the next 5 weeks, the parents will go to sea to hunt and bring food back to the chick. The chicks leave the nest when they are about two months old.

They stand 16-17 inches tall and weigh 2-4 pounds. What is something 16-17 inches tall or long? Find something that weighs 2-4 pounds.

They eat small fish and shrimp.



## Royal: Vulnerable



Royal penguins gather in huge breeding colonies on Macquarie Island (between Australia and Antarctica) in October. The nest is a shallow hole in the ground. The female usually lays two eggs but the first one is small and the parents push it out of the nest so they can concentrate their efforts on the larger egg. Both parents incubate that egg for about a month. The male cares for the chick for the first 3 or 4 weeks and the female brings food to both. After that, the chick joins a creche and both parents hunt and bring food back for the chick. The chick goes to sea when it is about two months old.

They stand 29-35 inches tall and weigh 11-18 pounds. What is something 29-35 inches tall or long? Find something that weighs 11-18 pounds.

They eat krill, crustaceans, small fish and squid



# King



King penguins are the second largest penguins.

These penguins begin to breed in November and December (summer for them). The female lays one egg and the parents take turns incubating it in a fold of fat on their feet. The chick hatches after about almost two months. The chicks stay in a large creche, guarded by a few adults while most parents hunt and bring back food. The chicks leave the creche the following spring or early summer (October or November).

They stand 36-37 inches tall and weigh 30-35 pounds. What is something 36-37 inches tall or long? How many feet is that? How tall are you? How does that compare to a King penguin? Find something that weighs 30-35 pounds. They eat fish, squid and crustaceans.



# Adelie



The French explorer Admiral Durmont d'Urville discovered these penguins and named them after his wife, Adelie. These penguins were featured in the movie *Happy Feet*.

These penguins breed in large colonies in September and October (spring for them). Thousands of birds will compete for the best nesting sites and they will line a hole in the ground with pebbles. It is common for penguins to steal pebbles from other nests. The female will lay two eggs in early November and the parents will take turns incubating the eggs for just over a month. When they hatch, one will be stronger than the other and the weaker one may or may not survive. Both parents care for the chicks for the chicks and

when they are 3 or 4 weeks old, they'll go to the creche. The chicks go to sea the following March.

They stand about 24 inches tall and weigh 8-10 pounds. What is something inches 24 tall or long? How many feet is that? How tall are you? How does that compare to an Adelie penguin. Find something that weighs pounds.

They eat small fish and shrimp.



## Macaroni: Vulnerable



What do the macaroni penguin and Yankee Doodle have in common? They both “wear” feathers on their heads. Around the time of the American Revolution, men who wore feathers in their hats were called “macaronis.” When sailors discovered these penguins, they thought the head feathers made the penguins look like they were wearing feathered hats, hence the name.

These penguins breed during the summer (winter in the Northern Hemisphere) in large colonies. The couple’s nest is a shallow hole in the ground. The female lays 2 eggs but the parents will only incubate the larger one for about a month. The male cares for the chick at first and the female brings them food. When the chick is about a month old, it goes to a creche so both parents can hunt

for food. The chick goes to sea when it is about 10 weeks old.

They stand 27-29 inches tall and weigh 10-15 pounds. What is something 27-29 inches tall or long? Find something that weighs 10-15 pounds.

They eat crustaceans, squid and fish.



# Emperor

Emperor penguins are the largest penguins in the world. These are the penguins featured in the movies *Happy Feet* and *March of the Penguins*.

These penguins travel over 50 miles from the sea to their breeding site. The female will lay one egg in May or June. She gives the egg to the male who holds it in a special pouch on his feet. The female returns to the ocean to hunt and eat while the male incubates the egg for about two months. The large group of males huddle together to stay warm. The females return in the spring, about the time the chicks hatch. The female takes over feeding the chick and the male take his turn hunting and eating in the ocean. When the chicks are about 2 months old, they go to a large creche and they'll go to the ocean with their parents when they are about 5 months old.

They stand 44-45 inches tall and weigh 60-70 pounds. What is something 44-45 inches tall or long? How many feet is that? How tall are you? How does that compare to an Emperor penguin? Find something that weighs 60-70 pounds. How much do you weigh? How does that compare to an adult Emperor penguin?

They eat fish, squid, and crustaceans.



## Yellow-eyed: Endangered



Yellow-eyed penguins are one of the most endangered and the least known of all the penguins. They live in forests and scrub areas of New Zealand. Their yellow eyes with a bright yellow stripe running around the head make these penguins easy to tell apart from other penguins.

Penguin pairs stay together for life. They build their nest out of sticks up against rocks or trees for protection. While these penguins live in colonies, each pair will build their nest out of site of others.

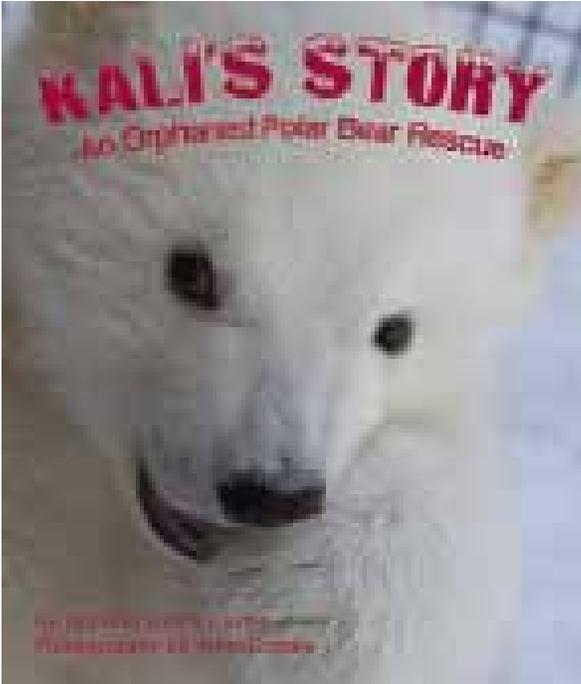
The female lays two eggs between mid-September and mid-October. Both parents take turns incubating the eggs for up to two months. After the chicks hatch, the parents take turns watching the chicks while the other one searches for food. The chicks go off by themselves in February or March.

The penguins are large and can stand just over 2 feet (65 cm). How tall are you and how do you compare to the height of this penguin? They weigh up to 13 pounds (6 kg). What can you find that weighs 12 or 13 pounds?

Yellow-eyed penguins eat squid and several types of fish including red cod, opal fish, sprat and silversides. They dive for up to 3 ½ minutes to catch food.



# Polar Bears: Vulnerable



Unlike penguins that only live in the Southern Hemisphere, polar bears only live in the Arctic (Northern Hemisphere).

Polar bears rely on sea ice for hunting their favorite meals: ringed seals. As marine mammals, the ringed seals need to breathe oxygen from the air. They poke holes in the ice so they can come up to breathe. The seals may have several breathing holes that they keep clear of ice. Polar bears wait near these holes to grab the seals when they poke their noses out of the water. As the ice thins and melts, the seals don't have to rely on these breathing holes, they can just come to the surface of the water. That makes it more difficult for the bears to find and catch

the seals. Without seals to eat, polar bears eat smaller fish and even plants growing on land. However, that's not enough food to fuel a polar bear's needs and many polar bears are starving.

Adult males weigh anywhere between 770 and 1400 pounds (350 to 650 kilograms). They are 6.5 to almost 10 feet long (2 to 3 meters) and stand 5.3 feet (1.6 meters) at the shoulders. How tall are you and how does that compare to the height of a male polar bear? How much do you weigh? How does that compare to the weight of an adult polar bear?



# Animal Sorting Cards

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*Objective: Classify organisms according to one selected feature, such as body covering, and identify other similarities shared by organisms within each group formed.*

*Describe several external features and behaviors of animals that can be used to classify them (e.g., size, color, shape of body parts).*

*Identify observable similarities and differences (e.g., number of legs, body coverings, size) between/among different groups of animals.*

## Animal Card Games:

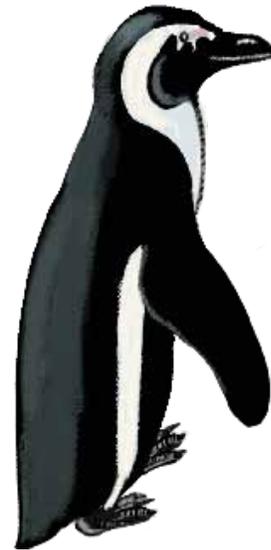
**Sorting:** Depending on the age of the children, have them sort cards by:

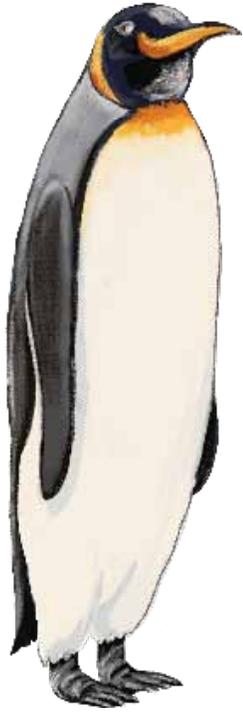
where the animals live (habitat)	tail, no tail
number of legs (if the animals have legs)	colors or skin patterns
how they move (walk, swim, jump, or fly)	animal class
type of skin covering (hair/fur, feathers, scales, moist skin)	
what they eat (plant eaters/herbivores, meat eaters/carnivores, both/omnivores)	

**Memory Card Game:** Make two copies of each of the sorting card pages and cut out the cards. Mix them up and place them face down on a table. Taking turns, each player should turn over two cards so that everyone can see. If the cards match, he or she keeps the pair and takes another turn. If they do not match, the player should turn the cards back over and it is another player's turn. The player with the most pairs at the end of the game wins.

**Who Am I?** Copy and cut out the cards. Poke a hole through each one and tie onto a piece of yarn. Have each child put on a "card necklace" without looking at it so the card hangs down the back. The children get to ask each person one "yes/no" question to try to guess "what they are." If a child answering the question does not know the answer, he/she should say, "I don't know." This is a great group activity and a great "ice-breaker" for children who don't really know each other.

**Charades:** One child selects a card and must act out what the animal is so that the other children can guess. The actor may not speak but can move like the animal and imitate body parts or behaviors. For very young children, you might let them make the animal sound. The child who guesses the animal becomes the next actor.







# Adaptations

*Objective: Identify adaptations that help plants and animals survive and grow in their environment*

*Identify external parts of plants and animals*

*Observe and compare the structures and behaviors of different kinds of plants and animals*

*Compare and explain how external features of plants and animals help them survive in different environments.*

Plants and animals have adaptations to help them live in their habitat. Polar bears and many, but not all, of the penguins live in cold, polar habitats. Some penguins live in temperature or even tropical climates!



## Coverings

All birds have feathers. Some penguins have 70-80 feathers per square inch to stay warm. They have muscular control of their feathers and can raise (to cool down) and lower them (to warm up) at will. Penguins that live in warmer climates have fewer feathers per square inch than penguins from colder climates. If warm on land, they'll hold out their flippers to cool down. Some also have patches near their eyes with no feathers where heat can escape. They can also release heat through their feet! If cold, they'll tuck flippers close to their bodies.

The short feathers overlap. The outer stiff part of the feather is waterproof. The inner part of the feather is downy and traps warm air against the body—keeping the penguin warm in cold air and water. A layer of fat under the feathers also provides some insulation.

Polar bears have black skin under their fur to trap warmth and hold onto heat. They have two layers of fur. The thick underfur is like a blanket—it insulates the bears to keep them warm. The outer layer of fur contains long guard hairs that are clear and hollow like straws. These hairs act like a wet suit to keep the underfur warm and dry. Water, snow, and ice shake off polar bears easily. We see white or cream-colored fur because of the way the sun reflects off the hollow hairs.



### **Movement**

Penguins are birds. Their wings look like flippers but the motion is the same as that of other birds flying through the air. They actually “fly” through the water instead of the air! Most birds have light, hollow bones for flying. Penguins have heavy, dense bones for swimming.

Penguin legs appear short because their body covers their legs almost to their ankles. That’s why they waddle when they walk. Some penguins hop, jump, or even slide on their tummies to move when on land!

Polar bears have four strong legs for walking and swimming. The paws can be up to 12 inches (30 cm) wide. The width helps to spread the bears weight over the snow, acting like snowshoes. The front paws are round in shape and the back paws are long. The paws have five “toes” with claws that are used to grab prey and to run through the snow or on the ice. Pads on the bottom of the paws help prevent the bears from slipping on the ice. Also, hair growing between the pads and toes helps prevent slipping and keeps the paws warm.

### **Camouflage**

Penguins have light chests and dark backs to hide (a type of camouflage called counter-shading) in the ocean. If seen from below, their light chest is hard to see in the light coming from above. Their dark back is hard to see from above against the dark depths of the ocean.

The white-looking fur helps polar bears blend (camouflage) into the snow and ice.





### Getting Food

Even though penguins spend most of their time in the water, they breathe oxygen from the air. They come up to the surface to breathe. Some dive deep for food and can hold their breath for up to 15 minutes (Emperor). Others (Royal or Chinstrap) can only hold their breath for a minute or two.

Bills or beaks are used to catch and eat food and to defend themselves and their young. They don't have teeth. Instead, they have fleshy spines on their tongue and inside of the beak to help keep slippery fish in their bills.

Even though it is cold and dark, winter is a good time for polar bears to eat their favorite prey, seals. Seals live in the ocean but breathe oxygen from the air. Seals poke breathing holes in the ice so they can get air. Polar bears hunt near these breathing holes and grab a seal when it comes up to breathe. When the ice melts, the seals don't need breathing holes so it's harder for polar bears to find and catch their prey. Like other types of meat eaters, polar bears have sharp teeth to grab prey and tear meat. Polar bears roam for hundreds of miles to find food.

### Nests and Dens

Penguins living in warmer climates nest in underground burrows, those in cooler climates make nests on the surface, and the largest (Emperor and King) penguins carry the eggs on their feet.

Except for females giving birth in maternity dens, polar bears do not live in dens. If the weather is unusually cold, polar bears might dig a temporary shelter in the side of a snowdrift.



# Penguins Physical or Behavioral Adaptations?

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*Objective: Identify adaptations that help plants and animals survive and grow in their environment*

*Identify external parts of plants and animals*

*Observe and compare the structures and behaviors of different kinds of plants and animals*

Circle whether you think the adaptation is physical (P) or behavioral (B):

1. P/B Galapagos penguins hold their flippers over their feet to prevent sunburn.
2. P/B Male Emperor penguins huddle together for warmth while they incubate their egg on their feet.
3. P/B Penguin wings are like flippers to help them swim.
4. P/B The light-colored chests helps hide penguins from predators in the ocean below them and the dark-colored backs hides them from predators above.
5. P/B Most penguins dive deep to catch food.
6. P/B Like all birds, penguins breathe oxygen from the air.
7. P/B Like all birds, penguins lay eggs. Since the eggs must be exposed to oxygen, penguins lay the eggs on land or ice, not in the water.
8. P/B Penguins have waterproof feathers.
9. P/B King and Emperor penguins have pouches to hold eggs on their feet to incubate them.
10. P/B Many penguins locate their chicks in the creche by sound.

# Penguin True or False?

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*Objective: Critical thinking skills*

Circle whether you think the statement is true or false:

1. T/F Penguins live at the North and South Poles (Arctic and Antarctic).
2. T/F Penguins have thick fur to stay warm.
3. T/F Penguins are fish.
4. T/F Because Penguins spend most of their time in the water, they breathe oxygen from the water.
5. T/F All penguins are black and white.
6. T/F Some penguins are vulnerable or endangered because of changing environments.
7. T/F Penguins hunt and catch mice and small mammals for food.
8. T/F Penguins fly through the water, not air.
9. T/F Most birds have light hollow bones to help them fly but penguins have heavy, dense bones for swimming.
10. T/F Penguins talk and dance.

# Counting and Adding Penguins

How many penguins did Penelope Parker have?

$$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = ?$$

Sometimes it's easier to put the numbers into groups of tens to add.



1 Galapagos penguin + 9 Macaroni penguins = ? penguins



2 Rockhopper penguins + 8 Adelie penguins = ? penguins



3 Chinstrap penguins + 7 King penguins = ? penguins



4 African penguins + 6 Royal penguins = ? penguins



10 Emperor Penguins



5 Little Blue penguins

How many groups of ten are there?

If you add the groups of ten together, how many penguins are there?

Are there any groups that don't have ten? How many penguins?

What do you get when you add all the groups of ten and the non-groups of ten?

# Math: Measuring (compare & contrast)

*Objective Core Mathematics Measurement:*

*Order three objects by length; compare the lengths of two objects indirectly by using a third object.*

*Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length*

*Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (up to 10)*

*Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.*

*Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.*

*Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.*

*Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.*

What standard measuring tool would you use to measure something in:

Inches or centimeters

Feet or meters

Pounds or kilograms

Try to imagine how big or small something is compared to something you know.

What are some other things about the same size?

What is something that weighs about the same?

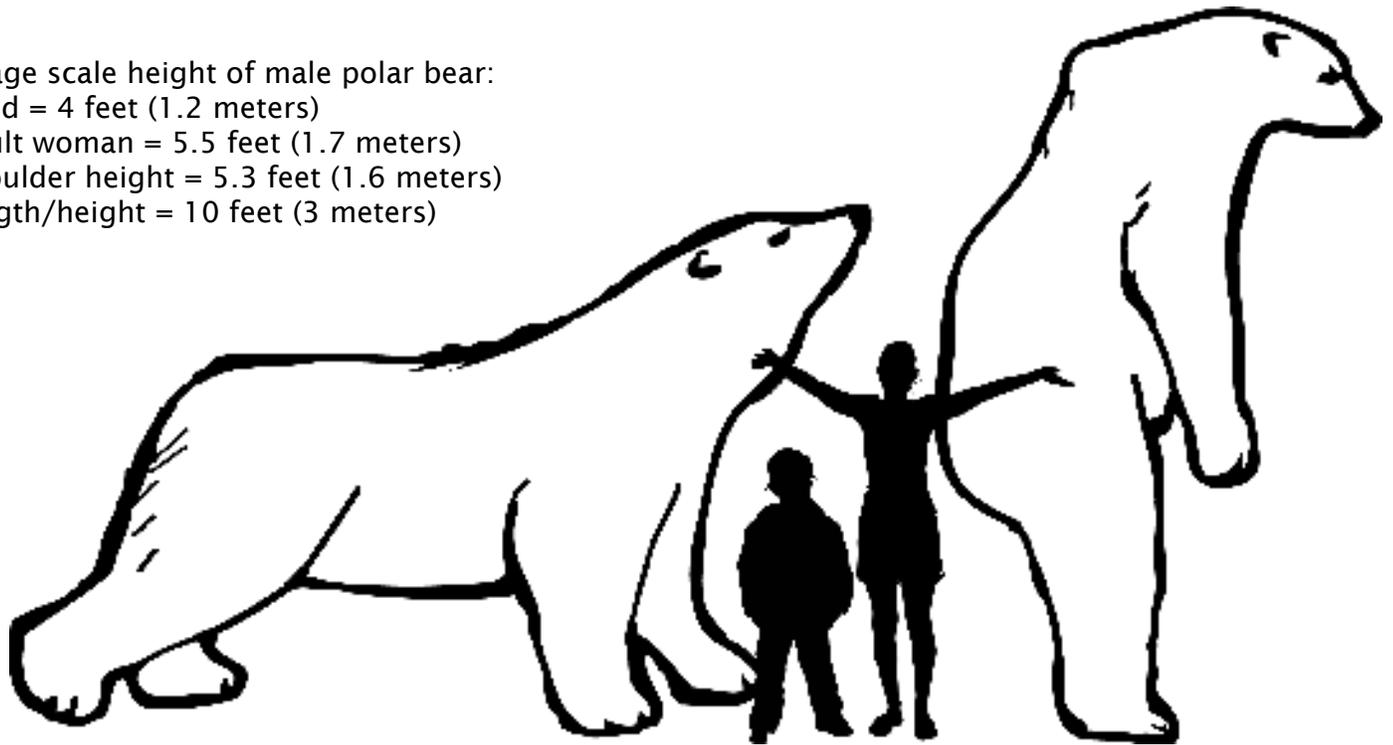
How big is it?

Using the right measuring tool (yard stick or measuring tape) and chalk, mark off how big something is on the playground, sidewalk, or driveway.

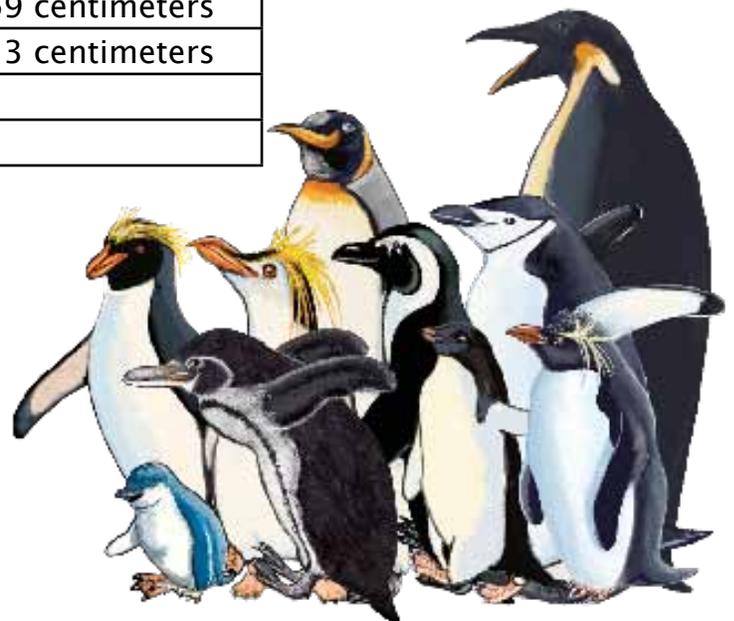
If you were to lie down on or next to the line, how many times would you have to lie down in order to equal the size?



Image scale height of male polar bear:  
 child = 4 feet (1.2 meters)  
 adult woman = 5.5 feet (1.7 meters)  
 shoulder height = 5.3 feet (1.6 meters)  
 length/height = 10 feet (3 meters)



type of penguin	inches/feet	centimeters
Male polar bear (standing)	10 feet	3 meters
Adelie penguin	20 inches	51 centimeters
African penguin	27 inches	69 centimeters
Chinstrap penguin	29 inches	74 centimeters
Emperor penguin	42 inches	1.1 meters
Galapagos penguin	21 inches	48 centimeters
King penguin	35 inches	89 centimeters
Little Blue penguin	10 inches	41 centimeters
Macaroni penguin	28 inches	71 centimeters
Royal penguin	27 inches	69 centimeters
Rockhopper penguin	21 inches	53 centimeters
you		
an adult		



# Penguins and Polar Bear Map Activity

*Objective: reading maps, geography, know that plants and animals live in different locations*

The red indicates the approximate range and distribution of polar bears.

The yellow indicates the approximate range and distribution of penguins.

The blue latitude lines indicate the location of polar regions.

The red latitude line represents the Equator.

In which hemisphere do polar bears live?

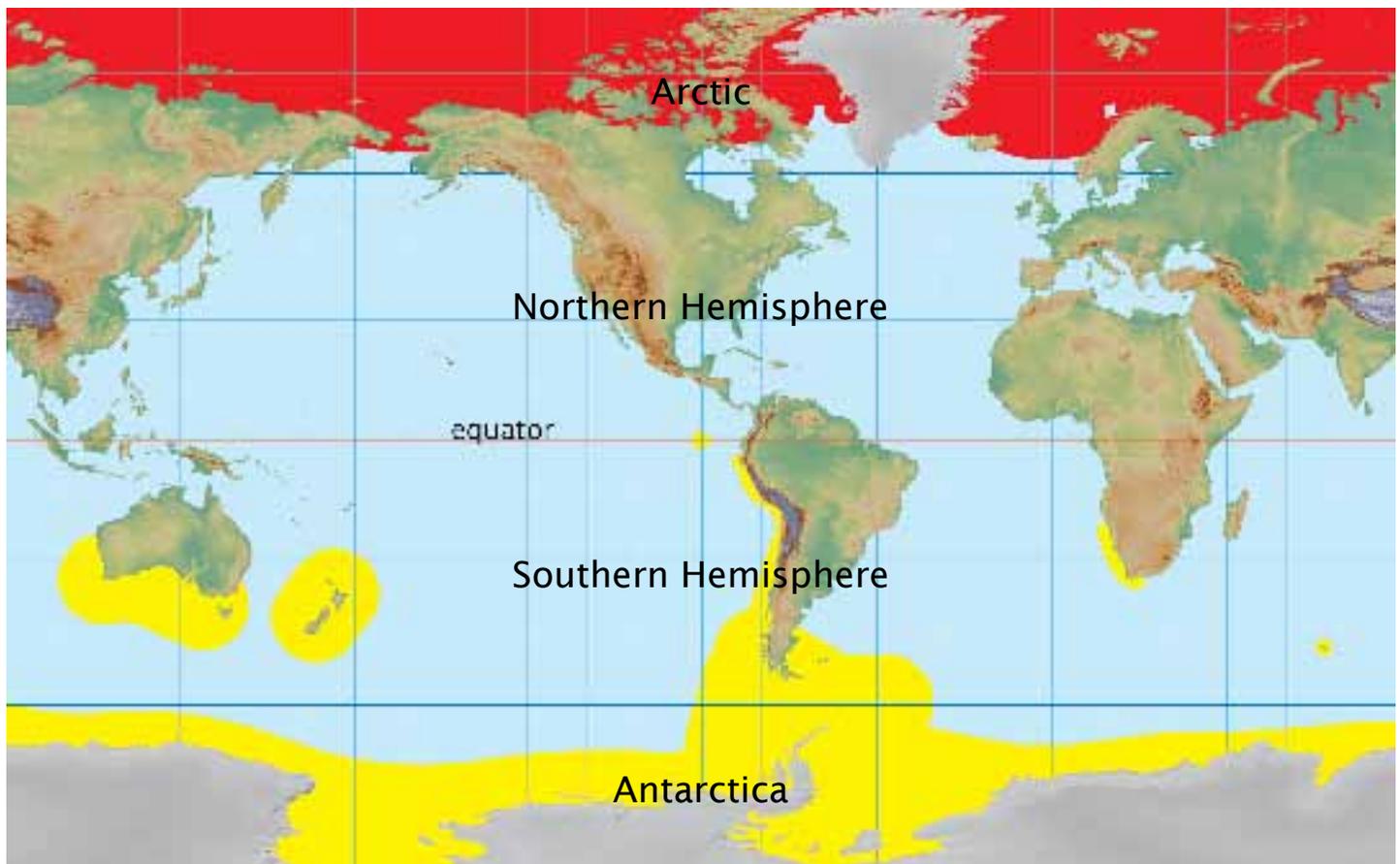
In which hemisphere do penguins live?

Which of the two animals only lives in a polar region?

In which polar region does that animal live, the Arctic or Antarctica?

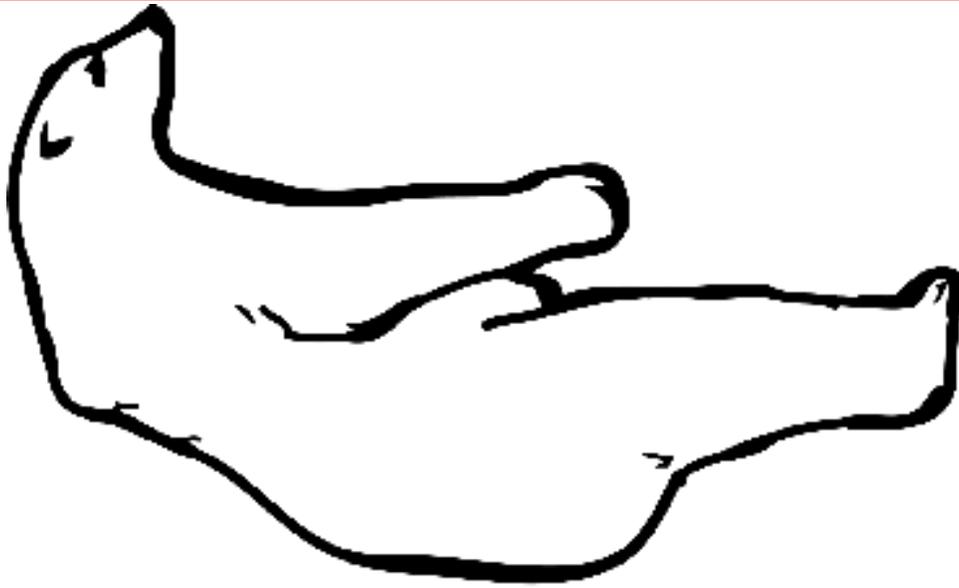
Which animal has a species that lives near the equator?

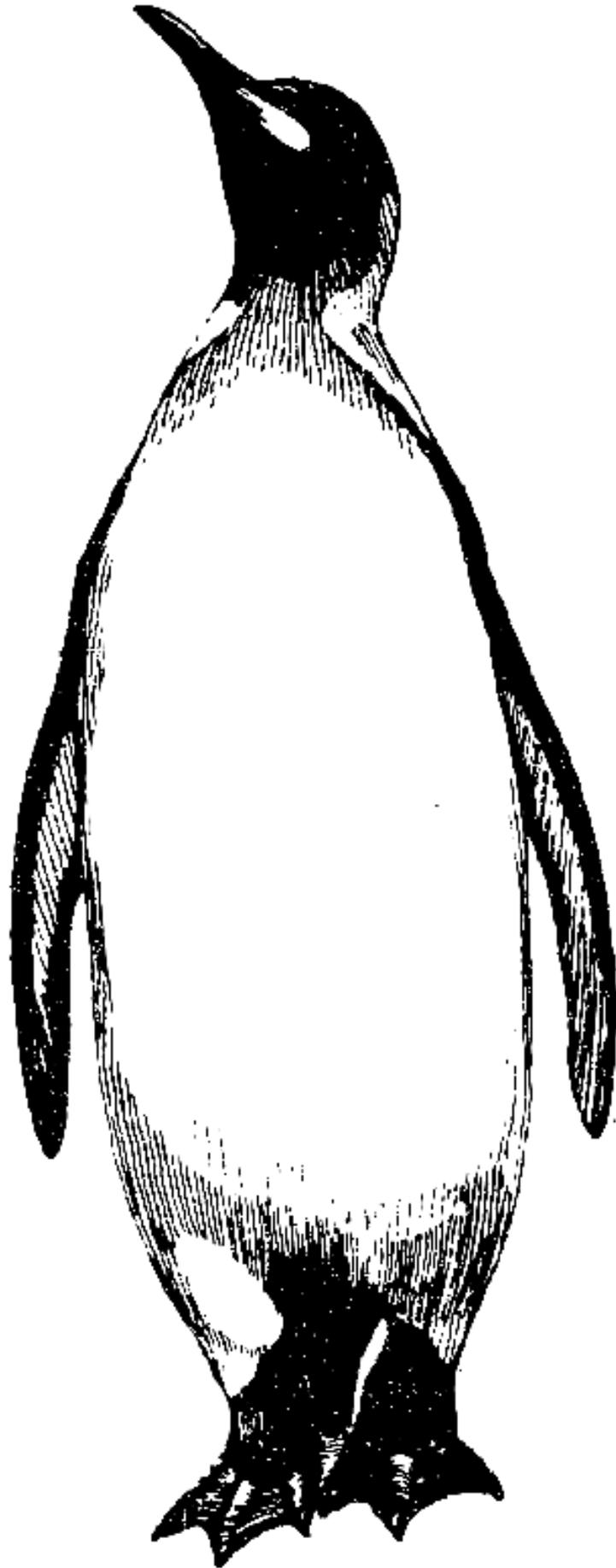
If an animal has a species that lives near the equator, is it considered only to be a polar animal?



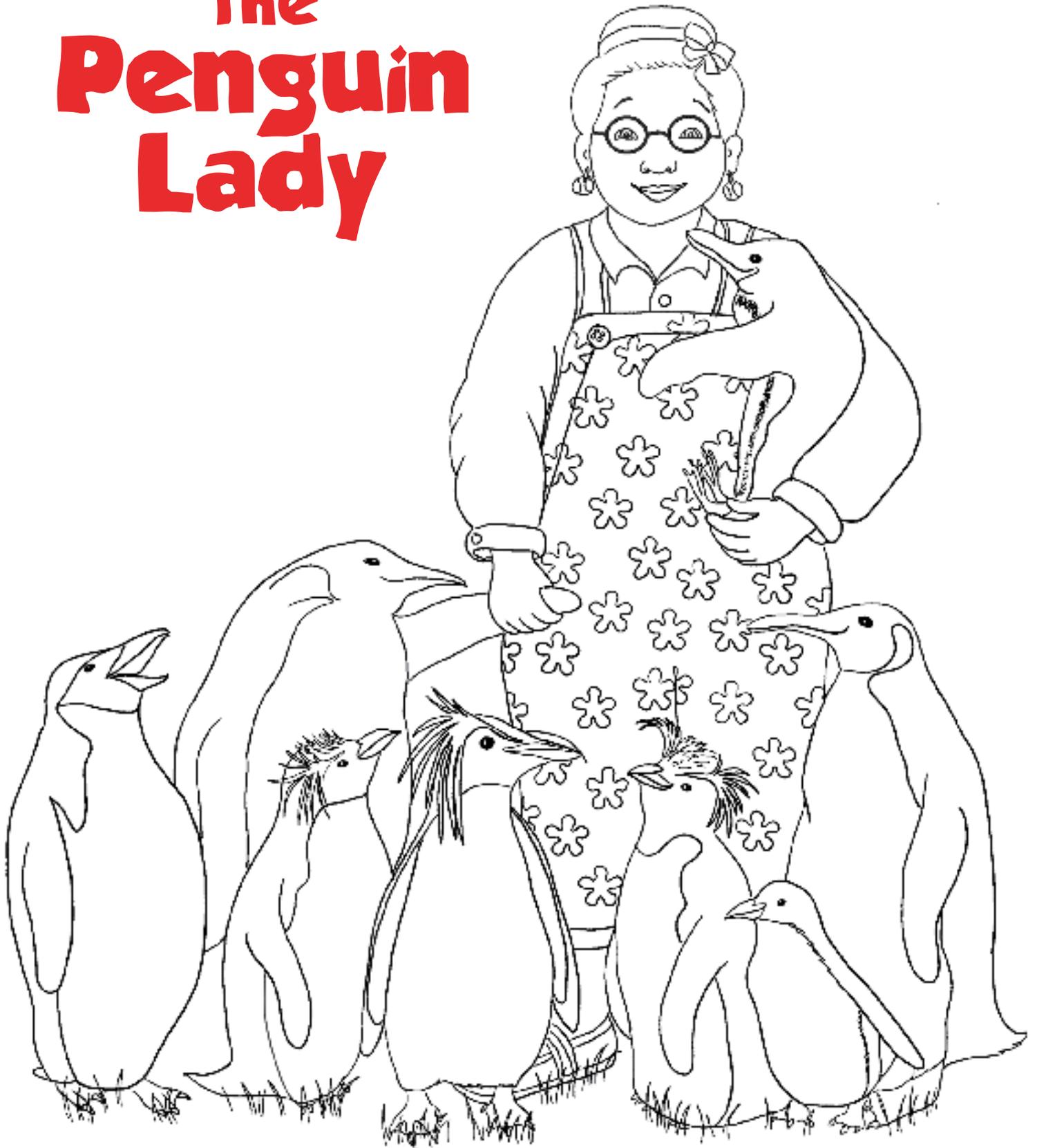
# Coloring Pages

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# The Penguin Lady



# Answers

## Silly Sentences

### Kali's Story

1. Polar bears have **black** skin under their **fur** to trap warmth and hold onto heat. They have **two** layers of fur. The thick underfur is like a blanket—it **insulates** the bears to keep them warm. The **outer** layer of fur contains long guard hairs that are clear and **hollow** like straws. These **hairs** act like a wet suit to keep the underfur warm and dry.
2. We see white or cream-colored fur because of the way the sun reflects off the **hollow** hairs. The **white**-looking fur helps the bears blend (**camouflage**) into the snow and ice.
3. Polar bears shed and replace their fur (**molt**) every year during May or June when it is relatively warm.
4. Like other types of meat eaters, polar bears have **sharp** teeth to grab **prey** and tear meat.
5. Polar bear **paws** can be up to 12 inches (30 cm) wide. The width helps to spread the bears weight over the snow, acting like **snowshoes**.
6. Polar bears **swim** for long distances. They have an extra, **clear** eyelid so they can see underwater with their eyes closed!

### Penguin Lady

1. Penguins are **birds**. Their **wings** look like **flippers**.
2. They **fly** through the **water** instead of the **air**!
3. Like all **birds**, penguins **breathe** oxygen from the **air**.
4. They use their **webbed feet** to **steer** while swimming.
5. Bills or **beaks** are used to **catch** and **eat** food and to **defend** themselves and their young.
6. They don't have **teeth**. Instead, they have **fleshy spines** on their **tongue** and inside of the **beak** to help keep **slippery fish** in their bills.
7. Penguin **legs** appear **short** because their body covers their legs almost to their **ankles**. That's why they **waddle** when they **walk**.
8. Most birds have **light, hollow bones** for **flying**. Penguins have **heavy, dense bones** for **swimming**.
9. All **birds** have **feathers**. Some penguins have **70-80** feathers per square inch to stay warm.
10. The **short** feathers **overlap**. The **outer, stiff** part of the feather is **waterproof**.

### Polar Bears and Penguins: A Compare and Contrast Book

1. **Polar** bears live in the **Northern** Hemisphere but **penguins** live in the Southern **Hemisphere**.
2. Polar bears live in the **Arctic** and some penguins live in the water around **Antarctica**.
3. Polar bears are covered in **fur** but penguins are covered in **feathers**.
4. A polar bear is a type of **bear** but there are many different types of **penguins**.
5. Polar bears **roam** alone or in small groups of a mother and her young **cubs**.
6. Penguins **gather** in giant colonies that can number in the **hundreds** or **thousands**.
7. Polar bears are **mammals** but penguins are **birds**.
8. Polar bears and penguins both **walk or move** on land and **swim** in the ocean.
9. Polar bears eat **seals** but seals eat **penguins**.
10. Polar bears have wide **paws** to help them walk on **snow** and **ice** and **penguins** have **flippers** to help them **fly** through the water.

## Penguin Physical or Behavioral Adaptations

1. P/B Galapagos penguins hold their flippers over their feet to prevent sunburn.
2. P/B Male Emperor penguins huddle together for warmth while they incubate their egg on their feet.
3. P/B Penguin wings are like flippers to help them swim.
4. P/B The light-colored chests helps hide penguins from predators in the ocean below them and the dark-colored backs hides them from predators above.
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8. P/B Penguins have waterproof feathers.
9. P/B King and Emperor penguins have pouches to hold eggs on their feet to incubate them.
10. P/B Many penguins locate their chicks in the creche by sound.

## True or false questions

1. T/F Penguins live at the North and South Poles (Arctic and Antarctic). **False. Penguins live only in the Southern Hemisphere and some, like the African and Galapagos penguins, live in warm climates.**
2. T/F Penguins have thick fur to stay warm. **False. Penguins are birds so have feathers, not fur.**
3. T/F Penguins are fish. **False. Penguins are birds.**
4. T/F Because Penguins spend most of their time in the water, they breathe oxygen from the water. **False, they breathe oxygen from the air.**
5. T/F All penguins are black and white. **False. Many penguins are black and white but there are blue and white penguins and they have other colors in their beaks, feathers, or eyes.**
6. T/F Some penguins are vulnerable or endangered because of changing environments. **True**
7. T/F Penguins hunt and catch mice and small mammals for food. **False. Penguins hunt in the ocean and most each small fish, squid, and small crustaceans.**
8. T/F Penguins fly through the water, not air. **True**
9. T/F Most birds have light hollow bones to help them fly but penguins have heavy, dense bones for swimming. **True**
10. T/F Penguins talk and dance. **False, only in make-believe stories and movies.**

## Polar Bear and Penguin Map Activity

In which hemisphere do polar bears live? **Northern**

In which hemisphere do penguins live? **Southern**

Which of the two animals only lives in a polar region? **polar bears**

In which polar region does that animal live, the Arctic or Antarctica? **Arctic**

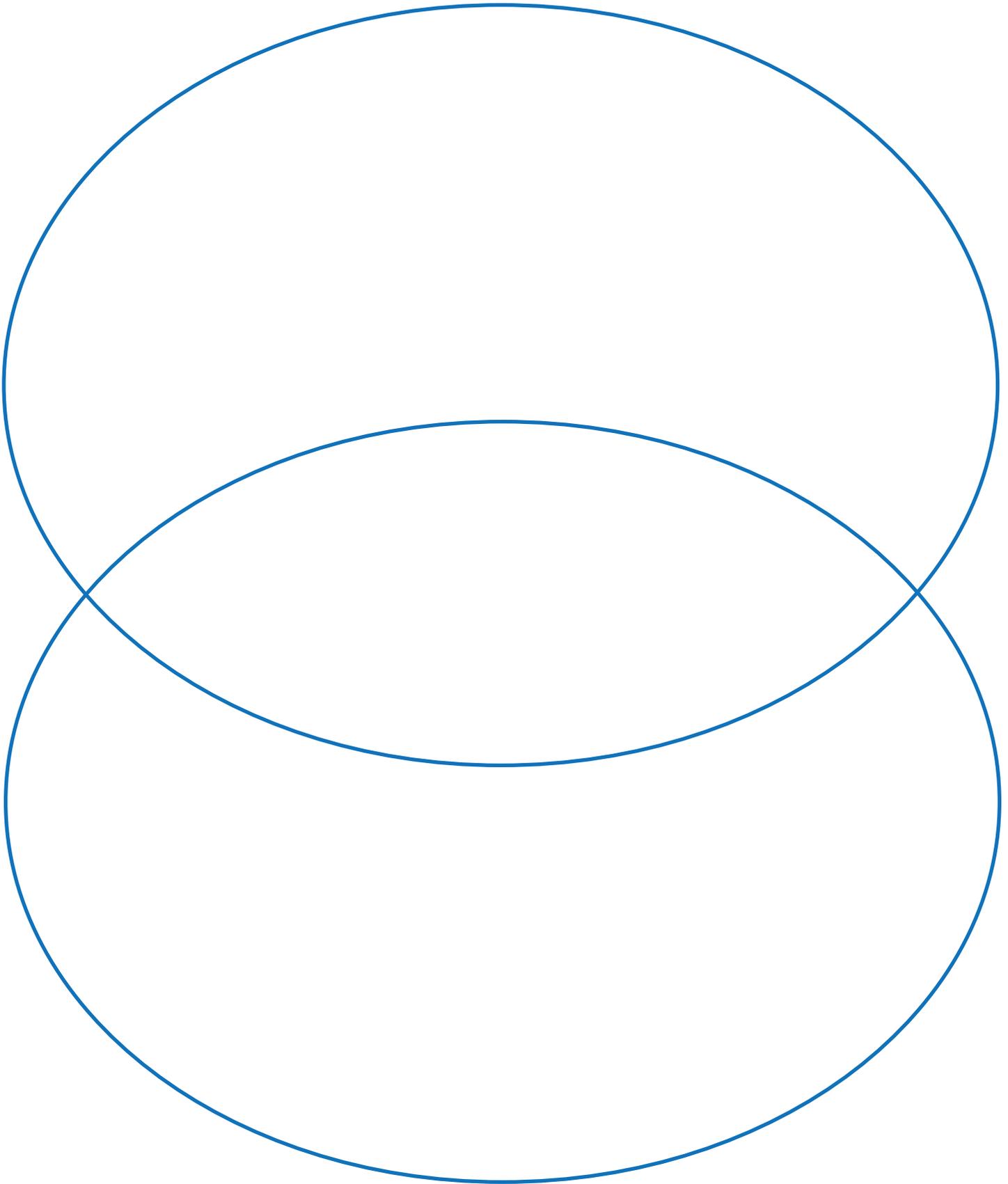
Which animal has a species that lives near the equator? **penguins**

If an animal has a species that lives near the equator, is it considered only to be a polar animal? **No. Polar animals are found in polar regions but not all polar animals live only in the polar regions. Some animals, like penguins and seals may live in polar, temperate and even tropical regions.**



## Appendix B—Venn Diagram

Compare and contrast two different penguin species or a penguin and a polar bear.



## Appendix C—Vocabulary Cards

**Antartica**

**Arctic**

**beak**

**bird**

**breathe**

**camouflage**

**cub**

**defend**

**feathers**

**flippers**

**fly**

**fur**

**hemisphere**

**hollow**

**ice**

**insulate**

**mammal**

**mold**

**Northern**

**outer**

**overlap**

**paws**

**penguin**

**polar**

**polar bears**

**predator**

**prey**

**seal**

**slippery**

**snow**

**snowshoes**

**Southern**

**swim**

**waterproof**

**webbed**

**wing**