Food, Water, Shelter, Space

3rd grade unit

Created by Emily Miller, Student of Alaska Pacific University, Master of Science in Outdoor and Environmental Education Candidate

POLAR BEARS INTERNATIONAL

Transfer Goals:		Essential Questions:
Students will be able to independently use their learning to: • Develop models to evaluate ecosystem(s) and communicate ecological phenomena • Enjoy creative expression and emotion with the natural world • Make informed decisions through problem solving and communication		What do polar bears need to survive?
3-LS4-3, 3-LS3-2	• Hula hoops or yarn • 10-15 random objects	*Students will know:* • The 4 building blocks of life, i.e. food, water, shelter, space *Students will be skilled at...* • Identifying the fundamentals of life *Students will understand that...* • Adaptations guide the diversity of life

Description:

This lesson explores the 4 fundamentals of life needed in a habitat to sustain life. Food, water, shelter, and space are needed for animals to survive and thrive. By investigating the Arctic ecosystem, students will learn that each fundamental aspect of life looks a little bit different depending on the different animal. I.e. A fish gets its water from its space and food. This lesson will allow students to create a song and dance as an assessment tool for learning.

Vocabulary:

Fundamental: A basic need
Shelter: Something that protects and covers
Habitat: A place where animals live having food, water, shelter, and space

Duration: 45 minutes- 1 hour

Lesson Plan

Engage:

- Create two large circles on the floor and label them “need” and “want”.
    - You could use hula hoops or yarn to make the circles.
- Layout 10-15 items of variety and ask the students to think about those items as something we need to survive or something we have for enjoyment.
    - Make sure there is a component of Food, Water, Shelter, and Space within the items.
- As a class, have an open discussion about each item and which circle they belong in.
    - Some items might be hard to decide. For example, seeing glasses could be essential for someone’s survival, but are not necessarily food, water, shelter, or space.
    - Allow these items to take an open-ended type of exploration.

Explore:

- Once the items have been sorted, introduce students to the 4 fundamentals of survival: Food, Water, Shelter, and Space. Explain that every animal needs food, water, shelter, and space to survive. Remind them that sometimes those things look a little bit different than we might think for certain animals. If an animal does not have one of the 4 fundamentals of survival, the animal will not be able to survive and will need to leave to find those items.
- Ask students to take a moment to rearrange their arrangement accordingly and discuss.

Elaborate:

- Ask students if a polar bear has the same living requirements as humans. Explain that although polar bears live in a different climate than most people, they still need food, water, shelter, and space.
- Allow students to separate in groups and compare different habitats to understand that particular animals can survive in a habitat better than others. Compare an animal that you see commonly in your local area to an animal that lives in the Arctic.

Evaluate:

- Introduce students to the following song and hand movements. This song is sung to the tune of “Twinkle Twinkle Little Star”.

  Refrain:
  Food, Water, Shelter, Space
  Makes a happy living place,
  I live in my habitat,
  Eating bits of this and that,
  Food, water, shelter, space,
  Makes a happy living place!

- After students have practiced this portion of the song, you can challenge them to replace the highlighted lines with a specific animal in the Arctic discussed previously.

  Example:

  Food, Water, Shelter, Space
  Makes a happy living place,
  I live on the cold ice pack

finding seals for a yummy snack (Polar Bear)
Food, water, shelter, space,
Makes a happy living place!
I swim in the frigid waters
But my blubber keeps me hotter (Seal)

I live high up in a tree
Fish and mice can't hide from me (Eagle)

I like to swim with my pod
All white and my head looks odd (Beluga)

I make food out of sun
My toes are long but I can't run (Plant)

I like to hop instead of run
My thick white fur keeps me warm (Snowshoe Hare)

Extension:

- Allow students to create their own refrain, accurate to their local ecosystem and share.
- For other modalities of learning, you can introduce movement to the song:

  Example:
  Food (Hands-on your belly)
  Water (Hands up to mouth)
  Shelter (Create a roof over your head with your hands)
  Space (Open your arms wide)

- To allow more creativity, students can make up movements for the specialty animal refrains.

  Example:
  I swim in frigid water (rub arms like you are cold)
  But my blubber keeps me hotter (pat belly like its blubber)

Adaptation:

- If an outdoor space is available, allow students to explore a very small area for about 5 to 10 minutes.
- Let students use this time to observe 1 or 2 living items, i.e. a tree, bug, bird, squirrel, etc.
  - Make sure to emphasize that it must be living
  - This could be done in groups or individually
- Allow students to create their own refrain from what they observed using the 4 fundamentals of life to help them
- Have students share their item and refrain

Tip: When taking your students outside, be sure to set safety guidelines and expectations before allowing them their independent exploration time. Gauge your group accordingly and only do what you as a leader are comfortable with...
Guidelines:

- *If you can't see me, I can't see you*
- *Stay between X and Y*
- *Buddy up*

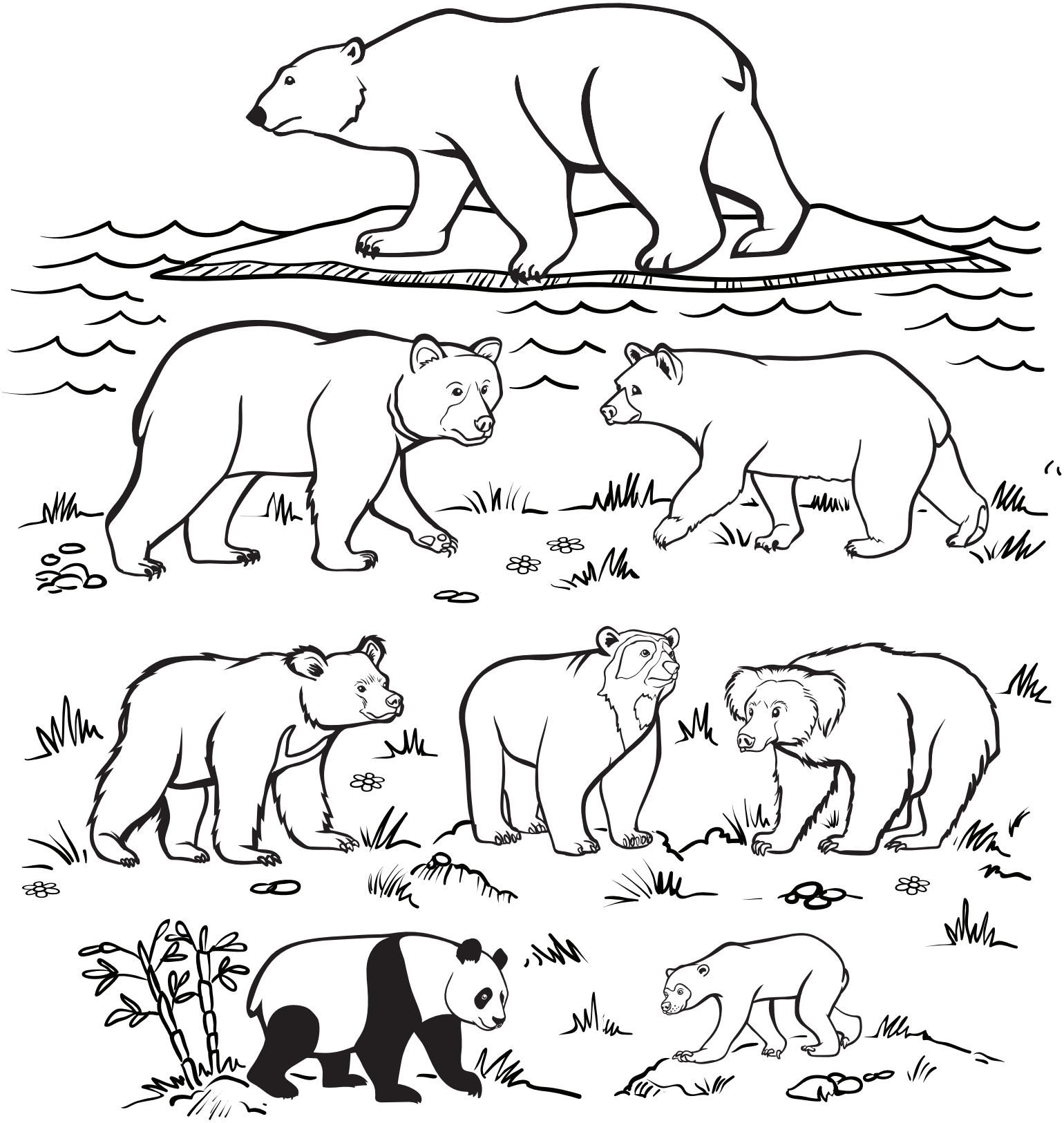
	• *When you hear me say "Polar Bear" you must come back to me*

References

Adapted from ʻŌhiʻa Project. (1989). A happy place to live. An environmental education guidebook for Hawaiʻi (pp. 48-51). Honolulu, HI: Bernice Pauahi Bishop Museum and Moanalua Gardens Foundation
https://www.nps.gov/common/uploads/teachers/lessonplans/HALE%20HABITATS%20Food%20Water%20Shelter%20Space.pdf

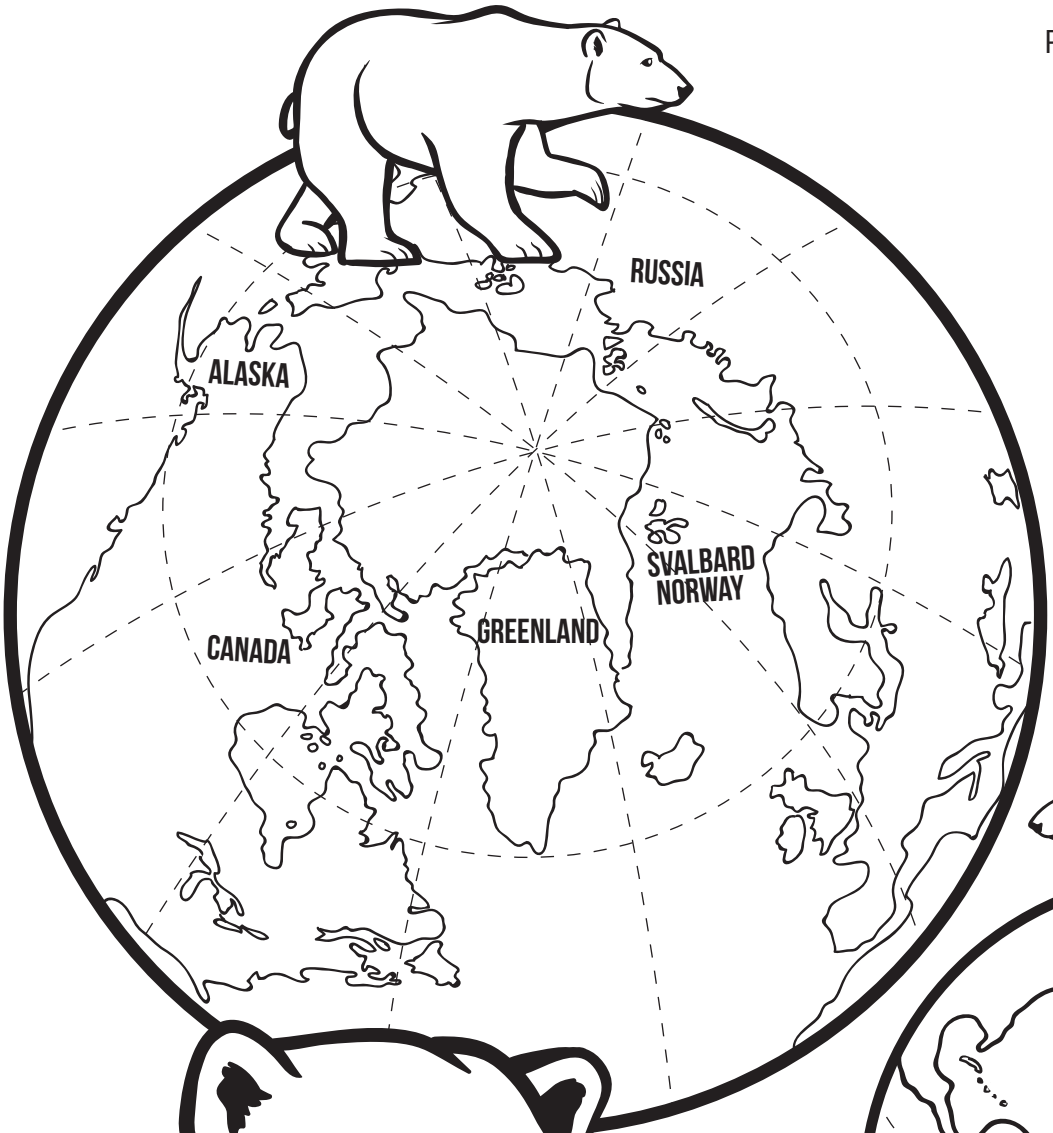
What Is a Polar Bear?

COLOR IN THE BEARS AND HABITATS BELOW TO HELP YOU REMEMBER WHAT THEY LOOK LIKE IN THE WILD AND HOW THEY ARE DIFFERENT FROM EACH OTHER.



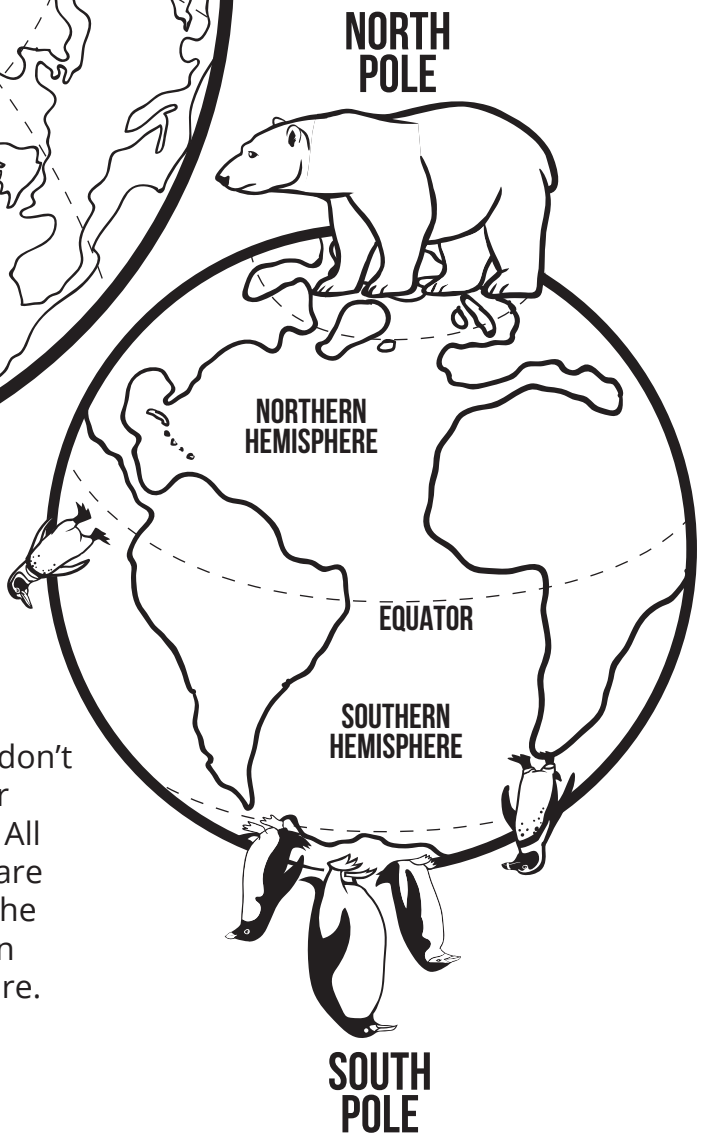
Polar bears are the biggest bears of all! They are also the only bear that needs the land and the sea, because they use sea ice as a platform to find food. Polar bears need sea ice to survive!

Where Do Polar Bears Live?



Polar bears are found in Canada, the U.S. (Alaska), Greenland, Norway (Svalbard), and Russia.

They are called by different names across the Arctic, including nanuq and isbjørn.



Polar bears don't live near penguins! All penguins are found in the Southern Hemisphere.

Bear-y Adapted

3rd grade unit

Created by Emily Miller, Student of Alaska Pacific University, Master of Science in Outdoor and Environmental Education Candidate
"What is a Polar Bear" coloring sheet created by Peppermint Narwhal

Transfer Goals:

Students will be able to independently use their learning to:

- Develop models to evaluate ecosystem(s) and communicate ecological phenomena
- Cultivate confidence in creating solutions when challenged with a multi-level problem

Essential Questions:

How do polar bears survive in the Arctic?

Standards:

3-LS3-2
3-LS4-2

Materials:

- "What is a Polar Bear" coloring sheet
- Picture of an American black bear, brown bear, and polar bear
- Map of North America
- Three large sheets of paper with an outline of each bear
- Colorful construction paper
- Pencils
- Scissors
- Glue

Objectives:

Students will know:

- The functionality of adaptations
- Polar bear natural history

Students will be skilled at:

- Identifying adaptations and their functions on a polar bear
- Recognizing polar bear natural history information

Students will understand that:

- Adaptations guide the diversity of life

Description:

All organisms have evolved with adaptation to help them survive in their natural environment or habitat. For example, a polar bear's hollow, translucent fur reflects light presenting with colors around its habitat. Polar bears often look white because their habitat has a lot of snow and ice most of the year, their fur reflects that white color.

Vocabulary:

Adaptation: Something that an animal is born with or the ability to do to help it survive in its natural habitat

Roach: A large hump on the back of the shoulders of a brown bear. This hump is made of strong muscle attachments for digging.

This adaptation helps them camouflage while hunting.
This lesson will help students understand that different animals live in different places because of adaptations that help them survive there.

Duration: 45 minutes- 1 hour

Lesson Plan

Engage:

- Allow students to color the "What is a Polar Bear" coloring sheet.
- Once they have finished coloring, have each student take a moment to circle the three bears that live in North America.
- Review the region where polar bears, black bears, and brown bears live on a map.

Explore:

- Ask students to close their eyes and imagine where each of the three bears lives. As a class, go through the 5 senses that they would feel if they were living in those habitats as each bear.
  For example,
  - Polar bear = cold, frigid water, fishy smell, windy sound, and salty air taste
  - Brown bear = cool, water on skin, fresh summer smell, sounds of water, taste of salmon
  - Black bear = warm, tree bark feeling, the smell of trees, sounds of wind through the forest, the taste of fresh berries

Explain:

- Show the "Polar Bear Adaptations" video https://www.youtube.com/watch?v=Xbx6bqCjT0E
- Ask students to think about how each bear looks and if their features and characteristics help them live where they do. List a few key different adaptations each bear has.
  - Polar Bear:
    - Thick oily fur to keep it warm and dry
    - Big webbed paws to help it swim
    - Sharp claws to pull up seals and dig out a den
    - Translucent fur to help camouflage
    - Thick fat layer to stay warm (4 inches)
  - Brown Bear
    - Big claws for digging up roots to eat and catching fish
    - Hump on the back for powerful digging (roach)
    - Big nose for smelling food
    - Large teeth for hunting
    - Shedding fur for winter and summer
  - Black Bear
    - Small
    - Large teeth for hunting
    - Short, curved, sharp claws for climbing
    - Sleek black coat that sheds
    - Big ears for hearing

- Big nose for smelling

Elaborate:

- Draw or print an outline of each bear outline on three large sheets of paper. Divide students into three groups and disperse one bear outline to each group.
- Have students in each group draw, cut, and paste elements of the habitat of their bear around the picture of their bear. Remind them to think back to the 5 senses activity. Make sure that all elements of food, water, shelter, and space are included.
- Display each poster around the room and ask each group what they learned about bears and where bears live.
- Use this time to discuss how each environment or habitat has life forms that have adapted to the environment's climate, food source, and other factors. Be sure to highlight that all animals have adapted to survive in their environment.

Evaluate:

- Prep students for a short response journal activity.
- If you took a polar bear to Texas and took a black bear to the Arctic of Alaska, do you think the bears would be able to live in their new homes? Why or why not?

Extension:

- Polar & Panda Bears—polar opposites? Or possibly related?: https://www.youtube.com/watch?v=yhjrpMq7j5o
- After the journal activity, allow students to draw a new and improved polar bear that could survive in Texas and a new and improved black bear that could survive in the Arctic of Alaska. Make sure they label their drawing and explain why the new adaptations would help them survive.
- Blubber Glove- Adaptation experiment https://www.youtube.com/watch?v=KfcDx1dXZw8

Adaptation:

- For a shorter activity just looking at polar bear adaptations, introduce the phenomenon of their translucent fur. Allow students to take plastic wrap, look through a single sheet to explain translucent. Give each student a sheet and have them ball it up. Ask the students what color the ball is. They should answer white.

https://polarbearsinternational.org/polar-bears-changing-arctic/polar-bear-facts/adaptions-characteristics/

References

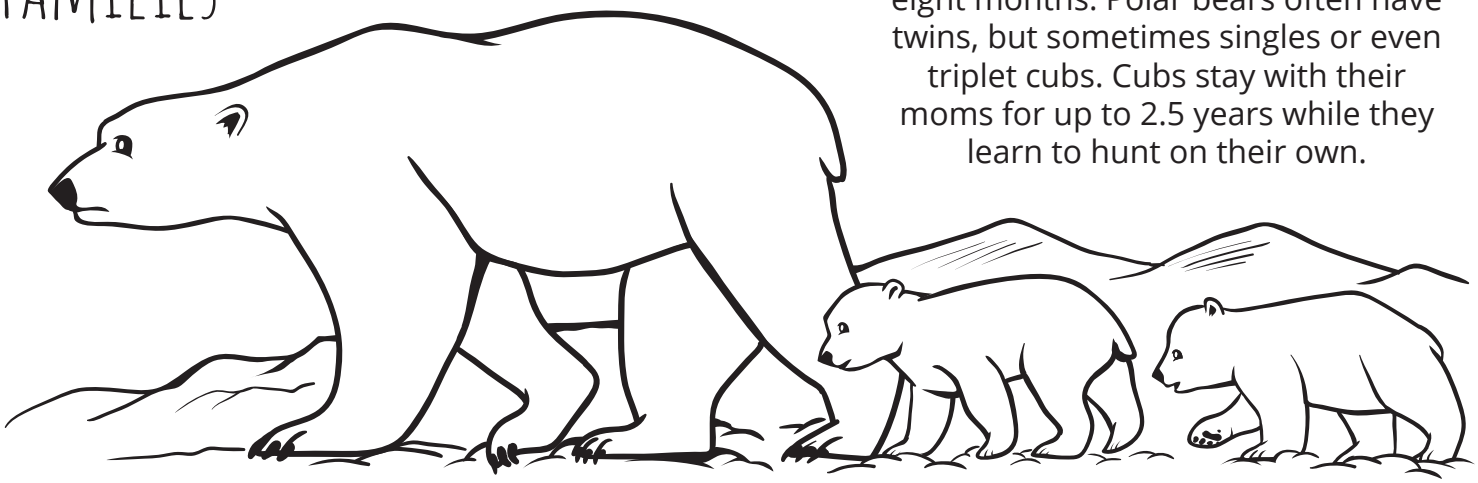
- "What is a Polar Bear" coloring sheet created by Peppermint Narwhal
- Project Wild: What Bear Goes Where?
- "Polar Bear Adaptations" Video https://www.youtube.com/watch?v=Xbx6bqCjT0E
- Polar & Panda Bears—polar opposites? Or possibly related?: https://www.youtube.com/watch?v=yhjrpMq7j5o
- Blubber Glove- Adaptation experiment https://polarbearsinternational.org/polar-bears-changing-arctic/polar-bear-facts/adaptions-characteristics/

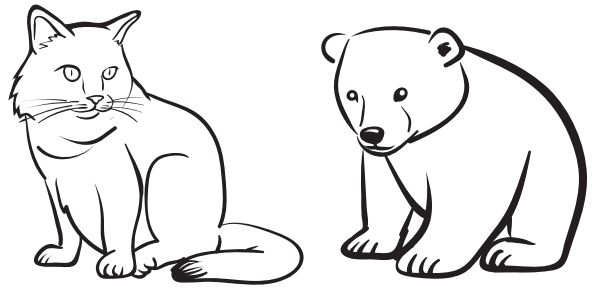
- Polar Bear Characteristics
  https://polarbearsinternational.org/polar-bears/characteristics/

A Polar Bear Life

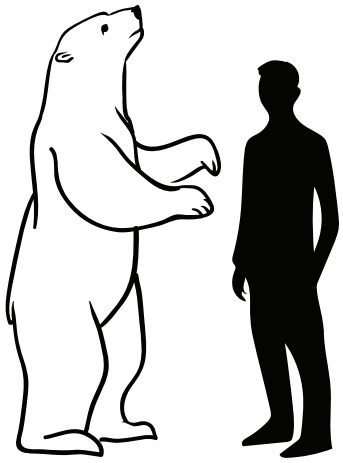
Families

Females that give birth to cubs stay on land from July through the following February, about seven or eight months. Polar bears often have twins, but sometimes singles or even triplet cubs. Cubs stay with their moms for up to 2.5 years while they learn to hunt on their own.





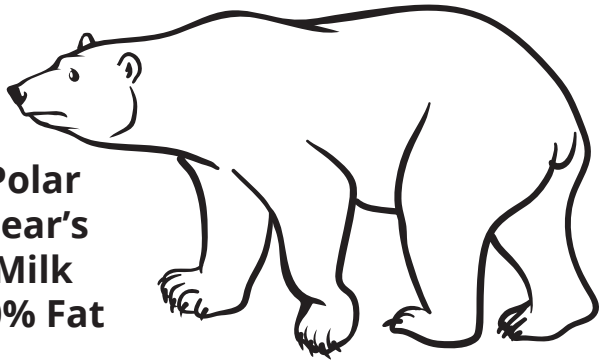
A newborn polar bear is only about the size of a stick of butter. After just one or two months, a cub is as big as a house cat.



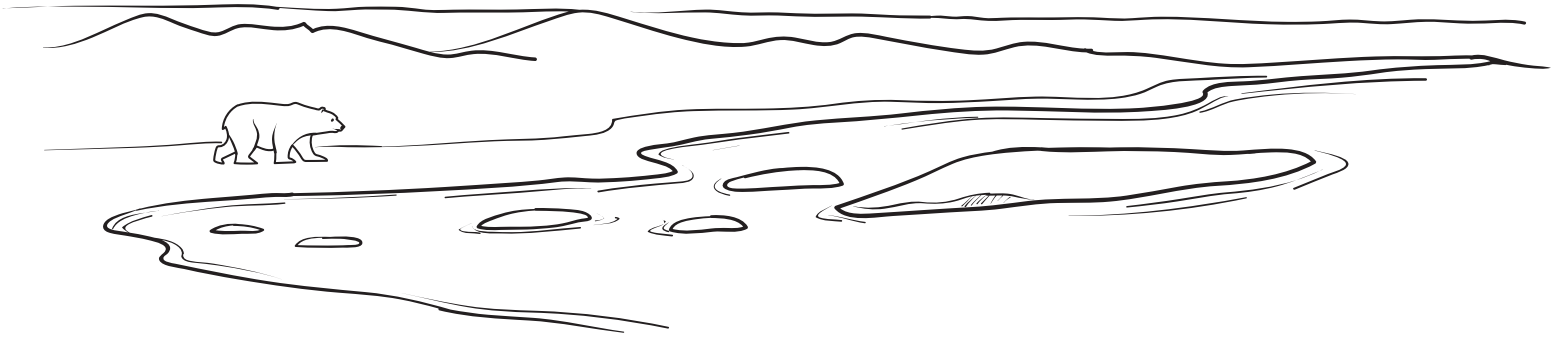
Although cubs start small, by the time they are eight months, they are 90 times bigger than they were at birth. They are also taller than a grown man!

Cow's Milk 4% Fat

Polar Bear's Milk 30% Fat

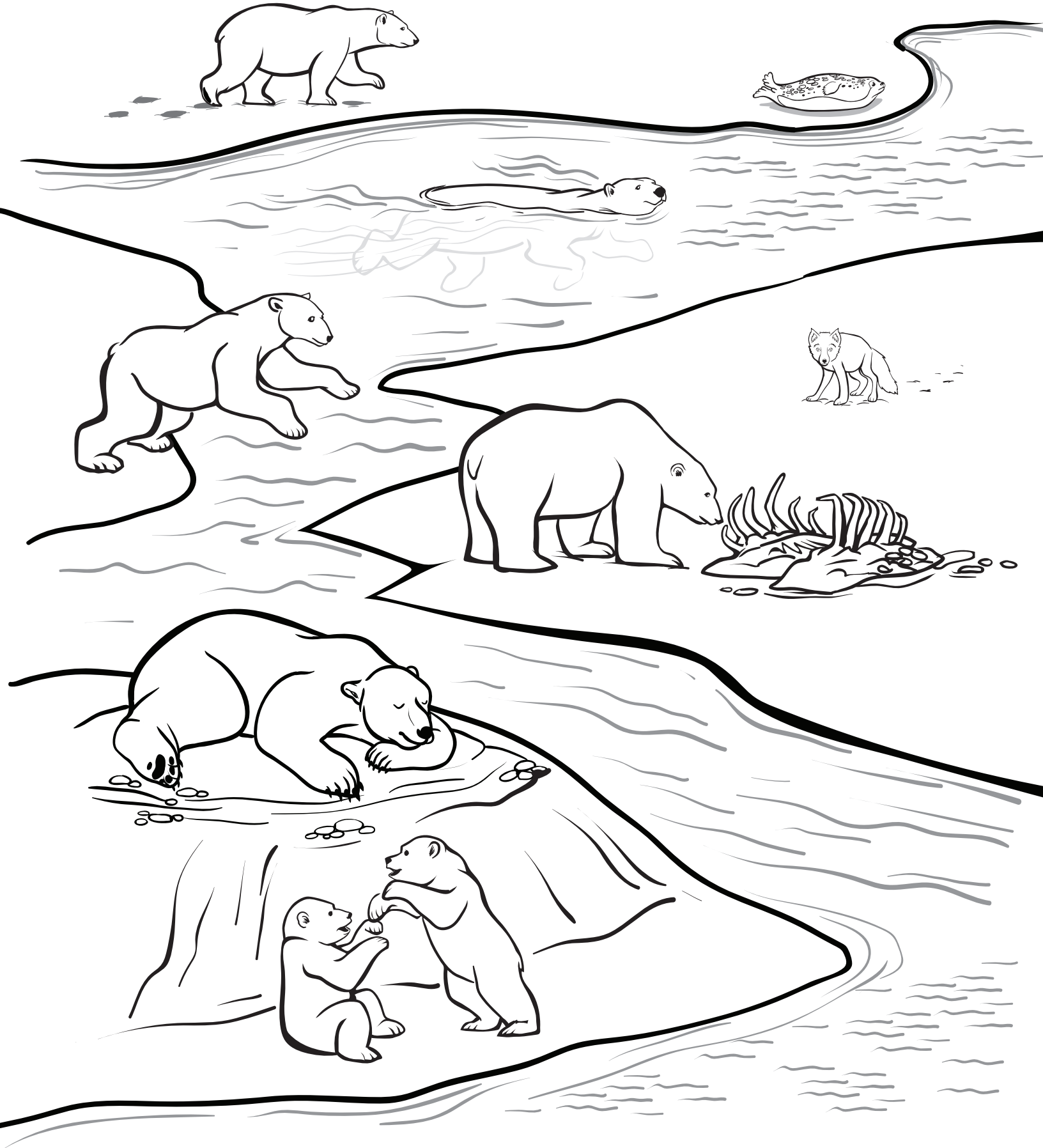


The main reason polar bear cubs grow so fast is because their mother's milk is high in fat. Polar bear milk is 30% fat. Cow milk is just 4% fat.



A Polar Bear Life

What Do Polar Bears Like Doing?



Polar Bear Life Cycle Model

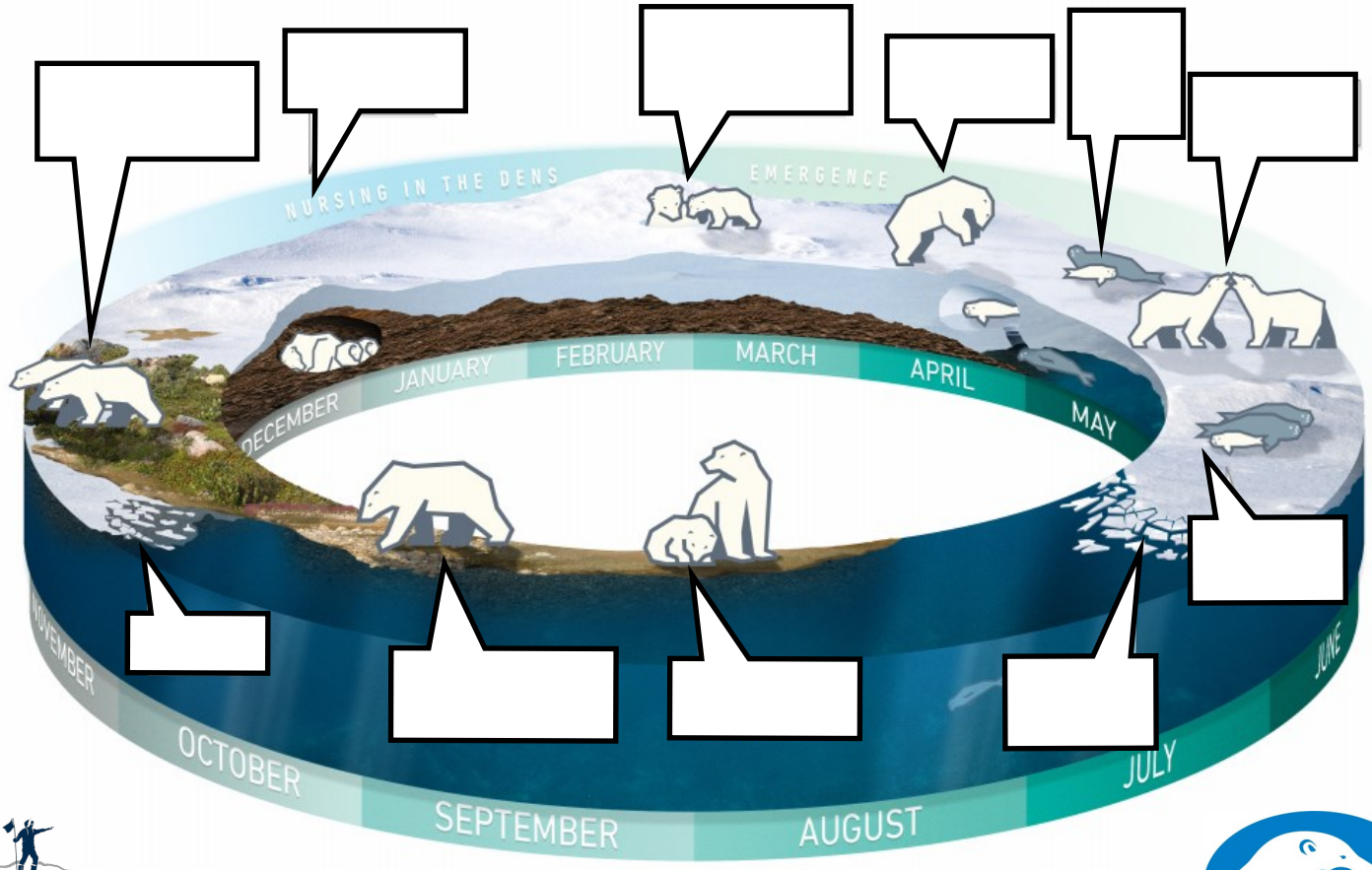
Directions:

Cut on the dotted line and detach the "My Polar Bear Life Cycle Model". Cut out all of the individual word bubbles from the word bank. Read the descriptions in the word bubbles and match them to the correct place on your Polar Bear Life Cycle Model. Once you have found the right order, paste the word bubbles onto your Polar Bear Life Cycle Model and now you have a completed model.

Word Bank:

- Seals start pupping.
- Polar bears congregate on coast to wait for sea ice.
- Families rest inland, conserving energy during their fast.
- Sea ice freezes up.
- Sea ice breaks up and families return to land.
- Single females mate on sea ice.
- Polar bear families hunt this easy prey.
- Seals start molting.
- Pregnant females find or build dens in peat or riverbanks inland.
- Females nurse their cubs in the den.
- Female and cubs emerge from den and travel to sea ice.

My Polar Bear Life Cycle Model



FRONTIERS NORTH ADVENTURES

Graphics designed by Frontiers North Adventures

Worksheet Created by Emily Miller

POLAR BEARS INTERNATIONAL

Life Cycles

3rd grade unit

Created by Emily Miller, Student of Alaska Pacific University, Master of Science in Outdoor and Environmental Education Candidate
"A Polar Bear Life" coloring sheet created by Peppermint Narwhal

Transfer Goals:

Students will be able to independently use their learning to:

- Develop models to evaluate ecosystem(s) and communicate ecological phenomena
- Enjoy creative expression and emotion with the natural world
- Make informed decisions through problem solving and communication

Essential Questions:

How are polar bear life cycles different from other animals?

Standards:

3-LS1-1

Materials:

- Life cycle videos
- "A Polar Bear Life" coloring sheet
- "Polar Bear Life Cycle Model" worksheet

Objectives:

Students will know:

- The life cycle of a polar bear

Students will be skilled at...

- Summarizing the life cycle of a polar bear
- Recognizing polar bear natural history information

Students will understand that...

- Arctic ecosystems are dynamic.

Description:

Every organism has a cycle of birth, growth, reproduction, and death in common. Each organism is unique in its life cycle and each stage can look very different. In this lesson, students will look at different life cycles of the Arctic and create a model to illustrate the life cycle of a polar bear. Students will use informed decision making during an activity to test their understanding.

Vocabulary:

Life Cycle: A series of stages that a living thing goes through during its life

Duration: 1-1.5 hours

Lesson Plan

Engage:

- Watch the polar bear life cycle videos
  Ursula:
  https://www.youtube.com/watch?v=yirhn7_tBzE
  Mothers and Cubs:
  https://www.youtube.com/watch?v=Z69k5_L_6B0&list=PLtVrwxiZ_3tSlY-zIbO3jZ12Wjuzm3wsk&index=6
- Ask students to color the "A Polar Bear Life" coloring sheet
- Facilitate discussion by asking these questions:
  - What is a life cycle?
  - Who has a life cycle?
  - What factors of a life cycle are missing from these videos?

Explore:

- Allow students to work in groups. Ask them to begin their "Polar Bear Life Cycle Model".

Explain:

- Remind students that all animals have the same components of a life cycle, but they might look a little different.
- Briefly review the life cycle of a chicken or another simple life cycle, and allow students to help you create a diagram similar to the Polar Bear Life Cycle Model.

Elaborate:

- Use this information to compare and contrast the two different animal's life cycles.
- A Venn diagram could be useful here.

Evaluate:

- Snowball Fight compare and contrast activity
  - Create 4 signs and post them in different areas around the room, i.e. Polar Bear, Chicken, Both Animals, Neither Animals. These signs will direct your students during the game.
  - Distribute a blank piece of paper to every student and have them write a statement that corresponds to one of the animal life cycles that were reviewed and are on the signs
    For example:
    "Lays eggs"
    "Can have 1, 2, or even 3 cubs at a time"
    "Breathes air"
    "Leaves their babies after birth"
  - After they have written their statement, have them crumple their paper into a snowball. Before starting the activity, make sure each student has a snowball.
  - Explain the rules of the snowball fight.
    - When you hear "Life Cycle", begin throwing snowballs
    - Walk, no running
    - Calm voices
    - When you hear "Freeze", stop and freeze in your spot Immediately
  - After everyone freezes, each student will pick up one snowball.

- Go around the room, one at a time, and have students open their snowball, read the statement and walk to the sign they think their statement goes with. I.e. “Lays eggs”, let students walk to the Chicken sign.

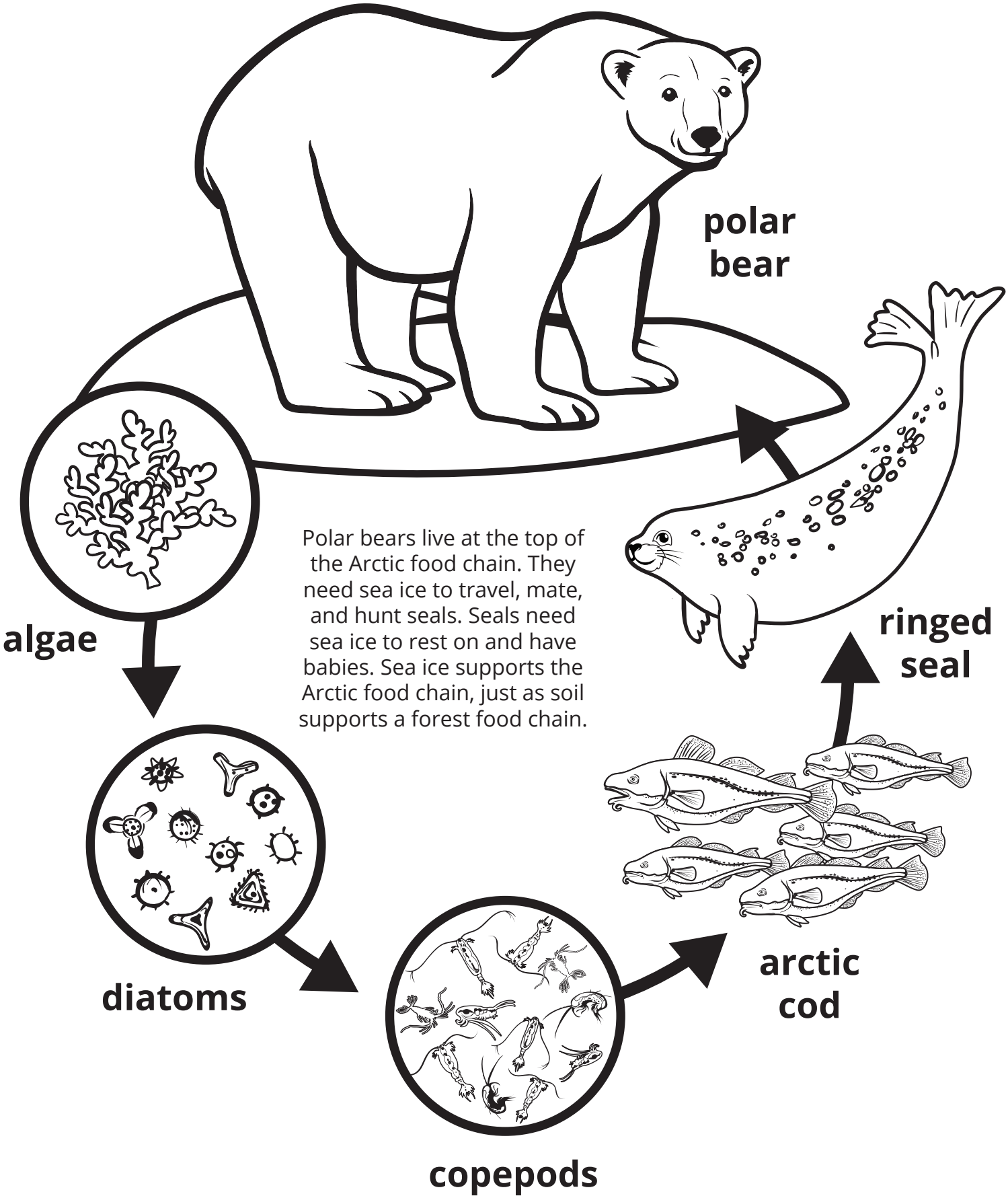
Extension:	Adaptation:

• If time allows, the snowball activity can be played multiple times with different, simple, and familiar animal life cycles.
• Polar Bear Habitat Diorama
  ○ https://www.youtube.com/watch?app=desktop&v=ibYhmwZ-8PI
	• As another assessment activity, have students act out the polar bear life cycle in groups
	  ○ I.e. Hunting, denning up, teaching young…

References

- “A Polar Bear Life” coloring sheet created by Peppermint Narwhal
- Ursula: https://www.youtube.com/watch?v=yirhn7_tBzE
- Mothers and Cubs: https://www.youtube.com/watch?v=Z69k5_L_6B0&list=PLtVrwxiZ_3tSlY-zIbO3jZ12Wjuzm3wsk&index=6
- Polar Bear Habitat Diorama https://www.youtube.com/watch?app=desktop&v=ibYhmwZ-8PI

An Arctic Food Chain



Polar bears live at the top of the Arctic food chain. They need sea ice to travel, mate, and hunt seals. Seals need sea ice to rest on and have babies. Sea ice supports the Arctic food chain, just as soil supports a forest food chain.

Polar Pyramid

3rd grade unit

Created by Emily Miller, Student of Alaska Pacific University, Master of Science in Outdoor and Environmental Education Candidate
"Arctic Food Chain" coloring sheet created by Peppermint Narwhal

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Transfer Goals:

Students will be able to independently use their learning to:

- Develop models to evaluate ecosystem(s) and communicate ecological phenomena
- Enjoy creative expression and emotion with the natural world
- Make informed decisions through problem solving and communication

Essential Questions:

What supports polar bears in a food chain?

Standards:

3-LS4-4

Materials:

- Pencil
- Paper cups
- "Arctic Food Chain" - coloring sheet

Objectives:

Students will know:

- The food web of the Arctic

Students will be skilled at:

- Designing a food web for an Arctic ecosystem where polar bears fit in
- Evaluating the importance of niche species by defending a food web
- Recognizing polar bear natural history

Students will understand that:

- Arctic ecosystems are dynamic

Description:

Organisms at each trophic level play important roles in supporting a food chain. In the Arctic Ocean, the food chain is also dependent on a non-living factor, sea ice. This lesson explores the phenomena of sea ice and develops an understanding of why a balanced ecosystem is vital. This lesson also explores scenarios of unbalanced ecosystems to introduce multi-level problems/solutions

Vocabulary:

Organism: Something that is living

Duration: 1-1.5 hours

Lesson Plan

Engage:

- Share this "Polar Bears: By the Number" video with students before beginning the lesson https://www.youtube.com/watch?v=l0rTHXEMW7M
- Recipe for the Arctic:
    - Give each student an imaginary deed to one square mile of land in the Arctic. Have the students create their own arctic dream, complete with as many plants, animals, oceans, and ice as they desire. Let their creativity run wild. To encourage imagination you could suggest
    - Rainbow ice
    - Sparkle polar bears
    - Lemonade flavored water
    - Bubble gum flowers
    - Have the students list the ingredients of the Arctic and draw a picture of it.
    - End the activity by asking if the individual Arctic ecosystems could maintain themselves over a long period of time. Are there plants for the plant eaters to eat? Are there smaller animals for the predators to eat? Are there decomposers to cycle energy? Is there soil?
- Transition this activity into explaining that every ecosystem needs a cycle of food and energy movement.
- Introduce the "Arctic Food Chain" coloring sheet and allow students to take some time coloring

Explore:

An Arctic Pyramid

- Prepare at least 26 paper cups with the organisms listed below written on them
    - Those animals will be in tropic levels 1, 2, 3, or 4
    - I.e. for a group of 26 a suggested ratio of (Level 1 to Level 4) 14-7-4-1.
        - Use these species
            - Level 1- Algae
            - Level 2- Arctic Cod
            - Level 3- Ringed Seals
            - Level 4- Polar Bear
        - If you have more than 26 students, be sure to have the ratio listed above and then add random cups marked with level. This will challenge students to test their knowledge.
- Pass the cups out randomly to students, and make sure each student gets one.
    - If you have a smaller group some students may get more than one cup.
- Ask students this question "Where does Earth get its energy?
    - Answer: From the Sun
- Now ask "What are the first organisms that use energy from the Sun?"
    - Answer: Plants and Algae
- Once they get that answer you may tell the students that they are going to build a pyramid with their cups.
- Allow students to build a pyramid on their own, set a time, and tell them they have 10 minutes.

- Once the students have finished, check that the cups are in the correct order.
    - If not, help students rearrange the pyramid.

Explain:

- As a class, discuss what would happen if you took a cup from the pyramid.
    - Demonstrate the importance of algae by physically taking a cup out of the pyramid to see what would happen.
- Have each student take 1 minute and write down what they think would happen to the other animals and algae if polar bears went extinct. While they are writing, take away the polar bear cup, add 1 seal, take away 4 cod and add 5 algae.
- Have the students try and reconstruct the pyramid as best as possible.
- Discuss as a class why the system cannot be supported or balanced.

Elaborate:

- Use the platform that cups are stacked on to represent sea ice within the system.
- Share the Arctic Food Chain sheet with the class. Read the description to the class and discuss the importance of Ice.

Evaluate:

- Allow students to go back to their recipe for the Arctic and add Ice if they haven't already.

Extension:

- For a further assessment for understanding, you could have students redraw their dream Arctic ecosystem but instead make it with an unbalanced scenario.
    - I.e. overfishing of cod

Adaptation:

- For a more hands on approach, you could allow children to make a human pyramid instead of using cups.

References

- "Arctic Food Chain" coloring sheet created by Peppermint Narwhal
- Polar Bears: By the Number Video https://www.youtube.com/watch?v=l0rTHXEMW7M
- Sharing Nature With Children, by Joseph Cornell