

Grade 1 Unit 7: PBL Arctic

Unit Purpose

Think back to your most positive experience as a student—a time that was meaningful to you. Why did this leave a lasting impression? How did your teacher make this experience possible? What learning was embedded in this experience?

Talk with your colleagues about your experiences and memories. It's likely you'll find some consistent themes: working with peers, independence, choice, engagement, content-specific learning, and applying learning in a real-world context. Project-based learning offers all of this and more!

Watch [this video from PBLWorks](#) to see project-based learning in action. The teacher is knowledgeable and passionate about the topic. The children are making choices about what they do and how they do it, they're asking questions, reflecting, and interacting with peers and adults by discussing their ideas and feedback.

Project Based Learning (PBL) is a critical aspect of Success Academy's (SA) school design. Our scholars learn the thrill of becoming experts in a subject when they have extended time to immerse themselves in a fascinating topic from a cross-disciplinary perspective— including through field studies; art projects; and classes in science, reading, writing, and/or math. The culmination of PBL studies are museum presentations scholars can share with others; this allows scholars to demonstrate the learning and engagement they have achieved.

The arctic environment is rich in animal life, while at the same time presenting unique challenges to all who make their life there.

Through books, videos, experiments, writing, and art projects, our scholars will explore the Arctic's extreme conditions and the ways living things survive in this extreme part of the world. They will learn about the remarkable adaptations of its animal life. Scholars will think more deeply about the way in which animals thrive within their ecosystem.

Pre-work

Before launching the unit with your scholars, read all of the texts in the unit to ensure you have the necessary content knowledge to facilitate this study.

- Articles:
 - [What We Do \(and Don't\) Know About the Arctic: A Deeper Look at a Remarkable Ecosystem](#)
 - [Arctic: National Geographic](#)
 - [The Arctic Ocean, explained](#)
- Unit Books:
 - *Inuit* by Kevin Cunningham
 - *A Walk in the Tundra* by Rebecca Johnson
 - *Amazing Arctic Animals* by Jackie Glassman

Learning Objectives

- Participate in shared research and writing projects
- Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text
- Ask and answer questions about key details from a text or information presented orally in order to gather additional information or clarify something that is not understood
- Describe the connection between individuals, events, ideas, or pieces of information in a text
- Use the illustrations and details in a text to describe its key ideas
- Write informative texts, introducing a topic and developing the topic using facts or details
- Demonstrate grade-level appropriate conventions of capitalization, punctuation, and spelling when writing

Guiding Questions and Essential Understandings

- What does it look like and feel like in the Arctic?
 - Scholars will be able to describe the harsh arctic climate.
 - Though short, the Arctic also has a mild season.
- How have animals adapted to the arctic environment? Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
 - These adaptations help them survive in their arctic habitat.

- How have people adapted to the arctic environment?
 - Historically, and in modern times, people have been able to live and thrive in the arctic climate through their own adaptations.
 - The Inuit people used to use ice and animal skins for insulation.

PBL Museum

The culminating museum showcases scholars' project work and content knowledge of the Arctic. Communicate with parents throughout the unit about the study and museum.

Museums and project work should exhibit best effort and should be eye-catching and beautiful.

You will need lots of space! Plan for how to use your classroom to display scholar work. Include wall space both within and outside of your four walls.

Prepare scholars to present their museum to visitors, guide guests on a tour of their projects, and clearly demonstrate their excitement and expertise of the Arctic.

Effective Management of PBL Materials

Scholars will work with a variety of materials as they create their projects.

- Construction paper
- Watercolor paint
- Watercolor pencils
- Crayons
- Markers
- Black Sharpie pens
- Black Sharpie markers
- Index cards
- Colored tissue paper
- White glue
- White puff paint

- Boxes of sugar cubes (1 per igloo)
- Cardboard base (1 per igloo)

Experiments:

- Shortening
- 3 plastic zip bags
- spoon
- strong tape
- 2 bowls
- ice
- water
- 2 small jars (with lids) filled with water–baby food jars work best.
- 1 pat of butter in each jar

Field Studies

Scholars engage in one **optional** field study over the course of their Arctic study. Refer to your school’s Critical Path for each event.

- American Museum of Natural History
 - Scholars tour the American Museum of Natural History to observe dioramas in the Hall of Ocean Life and the Hall of North American Mammals.

Projects and Experiments

Projects are not the dessert; they are the main course of project based learning. Scholars will explore and learn about the Arctic through these exciting projects.

- **Camouflage Collage**
 - Scholars create collages of camouflaged arctic animals, using mixed materials to add realistic scenes and vegetation.
 - [Sample 1](#)
 - [Sample 2](#)
- [Arctic Animal Grow Chart](#)

- Each scholar contributes to a [grow chart](#) that includes a note card for each animal, what it looks like, its adaptations, and whether it is predator or prey in the Arctic.
- [Arctic Animal Big Book](#)
 - Each scholar will research an animal using books, articles, and virtual field studies. Every scholar will publish a page in a class book that will be compiled by the teacher.
- [Arctic Summer/Winter Mural](#)
 - Scholars will work in groups to draw or paint the Arctic to show its plants and wildlife in the winter months, and other groups will show the Arctic during the summer.
- [Insulation Experiment](#)
 - Scholars will test a blubber substitute to see how blubber insulates animals in the frigid waters of the Arctic Ocean.
- [Hibernation Experiment](#)
 - Scholars will conduct an experiment that shows how animals burn more fat when they are moving around and exerting energy than when they are at rest.
- [Arctic Animal Sort](#)
 - Scholars will sort out the set of arctic animals. Scholars will be asked to choose, and describe, two different ways in which they could group the arctic animals.
- [Arctic Animals Zoom In](#)
 - Scholars will select one arctic animal that they have read about or has been added to the grow chart over the course of this unit. Scholars zoom in on the specific features of this arctic animal.
- [Build an Inuit Igloo](#)
 - Scholars will create igloos using glue and sugar cubes to show one way the Inuit people used to adapt to the cold arctic winters.
- [ABC Class Book](#)
 - Scholars will work together to create a big book about the animals they have studied over the course of this unit. Scholars will work either on their own or in pairs to select an animal from the grow chart and highlight some important characteristics.

Week 1

Guiding Questions and Essential Understandings

- What does it look like and feel like in the Arctic?
 - Scholars will be able to describe the harsh arctic climate.
 - Though short, the Arctic also has a mild season.

Readings

Note: PBL Read Alouds should be done during your 20-minute Read Aloud block.

- *The Arctic Habitat* by Molly Aloian
 - This book provides an introduction to this cold, vast region and helps children learn about this unique habitat and how the plants and animals have adapted to the harsh environment.
- *Far North* by Jan Reynolds

It's springtime in the Arctic. Family and friends also come together to celebrate the end of the long dark winter. The Sami people work together to round up the reindeer and participate in springtime festivities such as games and reindeer races.

Watch Virtual Field Study

- [Arctic Tundra](#) (4:55)
 - Ask: What is something that surprised you about the arctic tundra after watching this clip?
 - For example: In the winter, the water temperature is warmer than the air (or) flowers grow in the arctic summers.
- [Arctic Adaptations](#) (2:03)
 - Before watching, tell scholars to be on the lookout for a fun fact. After watching, each scholar will write on a piece of paper or white board something they learned about one of the arctic animals. Have scholars share what they learned with a partner.

Writing Assignments and Project Work

- **Explore the Texts**
 - Divide the class into small groups and give each group three to four books to build excitement and spark an interest in the Arctic. Groups explore and discuss the books and pictures with their peers.
 - On a piece of white paper, let scholars freely write, draw, or discuss observations they have made within the books.
- **Map Exploration / Habitat Exploration**
 - Show scholars this [world map](#) of the Arctic Circle. Without prompting, allow kids to talk about what they see on the map.
 - Use photos to promote discussion over the differences between hot and cold climates.
 - How does the [climate](#) differ when looking at the globe as a whole?
 - Cold on either end

- Hot in the middle
 - New York City/SA falls between the very cold northern pole and the hot middle equator.
 - Show the [Arctic Circle](#) on any additional globes, maps, or using Google Earth, so kids have another perspective for locating the region.
 - Discuss that the Arctic is made up of land, ocean, and air habitats— show how to locate the land and ocean on the map.
- **Writing: Arctic Seasons Writing**
 - Show many different photos of the arctic tundra.
 - Allow scholars to observe and discuss what they are seeing in the various photos
 - Distribute one photo to each scholar or pair/group of scholars.
 - On sentence strips, write two to three observations or things that surprised them about that particular photo.
 - Let scholars choose one of their sentence strips to display in the classroom.
- **Arctic Word Wall**
 - You will start the word wall this week and will add new words every day! As a class, decide which vocabulary words need to be added to the word wall. Explain to scholars that this word wall is a tool for them to refer to as they research, read, and write. Just as you model using a glossary in many of the nonfiction texts through the study, model using this word wall to help you understand a new vocabulary word. This is a scholar-driven activity that will grow as the scholars' knowledge grows. Scholars write the words on index cards and display them. When applicable, scholars draw pictures to match. Examples of words to add are adaptation, migration, hibernation, insulation, camouflage, environment, habitat, climate, harsh, blubber.

Week 2

Guiding Questions and Essential Understandings

How have animals adapted to the arctic environment?

- Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
- These adaptations help them survive in their arctic habitat.

Readings

Note: PBL Read Alouds should be done during your 20-minute Read Aloud block.

- [Arctic Ground Squirrel Infographic](#)

- Use the infographic during your study of hibernation to highlight an alternate way of presenting and learning nonfiction information.
- *The Arctic Tern's Journey* by Benjamin Tunby
 - “Arctic terns make a long trip from the top of the world to the bottom and back again every year. In fact, arctic terns have the longest migration of any known animal! From egg to bird and all the way to Antarctica, follow the arctic tern's journey!”
- *Polar Animal Adaptations* by Lisa Jo Amstutz
 - “Snow, ice, and subzero temps make the North and South Poles nearly impossible places to live. But several animals from musk oxen to penguins call these regions home. Find out how their amazing behaviors and body parts have adapted to these harsh conditions.”
 - Make sure to call out which animals in this book are found in the Arctic vs. Antarctica.

Watch Virtual Field Study

- [Arctic Ground Squirrels: Hibernation](#) (4:16)
 - Discuss: What does it mean to hibernate?
- [Science for Kids: Animal Migrations](#) (4:31)
 - What are some reasons why animals migrate?

Writing Assignments and Project Work

- What is an adaptation?
 - Through their study, scholars will come to an understanding of what it means to adapt to an environment.
- Give each scholar one to two Post-It Notes. Scholars explore the unit books by putting a Post-It Note to mark somewhere they notice a special attribute that they think would help the animal survive in the Arctic.
- Scholars share the information they found.
- After scholars explore and share, tell them that different animals have special ways of surviving called adaptations. Some of these adaptations are behaviors (behavioral adaptations), and some are body parts (physical adaptations).
- Use the pictures found [here](#) to generate conversations around the four main [adaptations](#) this unit will focus on.
 - Play the PowerPoint presentation.
 - A single photo will appear.
 - Before clicking to reveal the adaptation, scholars discuss what they notice about the animal.

- [Here](#) is a template to show the components that must be included within your grow chart. Make sure to include a key if you are using pictures like the sample.



- Introduce the grow chart to scholars, explaining that this chart will “grow” throughout the unit, each time you read or learn about a new animal and its adaptations. Each scholar will fill in a portion of the chart. Scholars capture the knowledge gained from their readings and virtual field studies by adding the information about every animal they study to each part of the chart. This gives scholars an opportunity to share what they learned with the class and others and creates a resource to reference and add to throughout the study.
- Scholars talk with their group, read what they’ve written to each other, and revise when needed. Scholars add color to drawings and use details in their writings and illustrations. Provide ample blank 5 × 8 note cards for scholars to use as they work.
 - Share examples as they’re completed. Highlight neat and detailed writing and drawings and clear language.
 - Tape note cards to the chart as they’re completed with scholars as an exciting way to show them how their chart grows and becomes a learning tool with all their collaborative work!

- There must be a minimum of 10 animals on your chart.
 - Suggested animals include orca, narwhal, beluga, harp seal, walrus, polar bear, arctic fox, arctic hare, caribou, arctic ground squirrel, snowy owl, arctic tern, puffin, lemming, brown/grizzly bear
 - Each week, scholars must have time to explore books and pictures of arctic animals that will help them collectively add to the grow chart.

Week 3

Guiding Questions and Essential Understandings

How have animals adapted to the arctic environment?

- Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
- These adaptations help them survive in their arctic habitat.

Readings

Note: PBL Read Alouds should be done during your 20-minute Read Aloud block.

- *Walk in the Tundra* by Rebecca Johnson
 - “Take a walk on the tundra. In this cold, harsh biome on the top of the world, summer is short. How do plants and animals of the tundra live? Discover how they depend on each other for survival as you travel through this fascinating land.”
- *Arctic Foxes of the Tundra* by Joyce Jeffries
 - Readers will discover some of the specific and amazing ways the arctic fox has adapted to life in the tundra.
- *Hiding in the Polar Regions* by Deborah Underwood
 - This book introduces readers to polar habitats and the animals that live and survive there using camouflage.
 - Make sure scholars are clear on animals of the Arctic vs. Antarctica

Writing Assignments and Project Work

- [Expert Illusionists— Hiding in Plain Sight](#)
 - Distribute the [photographs](#) to scholars. One to two per pair or group.
 - Ask scholars “what do you notice?” (Do not initially mention the word camouflage.)
 - If they have more than one photo, ask how the photos are the same and how they are different.
 - What do you think about this?
 - What surprised you about the photo?

- What do you call this ability? (camouflage)
 - What is camouflage? (hiding in plain sight)
 - Have students define this the best that they can.
 - Why do animals use camouflage?
 - Note: A predator and prey may use camouflage for different reasons.
 - Can you think of any other animals that use camouflage?
 - Have scholars share their photos with the group or under the ELMO so that all scholars get a chance to see each photo quickly.
- Camouflage is a physical adaptation that many animals rely on for survival.
- **Follow-up [Writing Activity: Hiding in Plain Sight](#)**
 - Scholars select an arctic animal, three are suggested, but scholars can choose an alternate animal if they prefer, that relies on camouflage. They will then draw and write about how that animal uses camouflage to survive.
- **Camouflage Collage**
 - Scholars will use colored tissue paper and glue to create a collage of an arctic animal hidden in plain sight.
 - Examples of these collages can be found [here](#) and [here](#).
 - Scholars should write a caption for their collage.

Week 4

Guiding Questions and Essential Understandings

How have animals adapted to the arctic environment?

- Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
- These adaptations help them survive in their arctic habitat.

Readings

- *In Arctic Waters* by Laura Crawford
 - This rhythmic, cumulative prose (similar to *The House that Jack Built*) follows polar bears, walruses, seals, narwhals, and beluga whales as they chase each other around "the ice that floats in the arctic waters."
- *A Walrus' World* by Caroline Arnold
 - Follow along as a mother walrus keeps her baby safe and fed for the first few years of his life.

Watch Virtual Field Study

- [Polar Bear Adaptations by Polar Bears International](#) (3:10)
 - Ask: What are some ways the polar bear has adapted to living in the Arctic?

Writing Assignments and Project Work

- [Blubber Experiment - Insulation](#)
 - Scholars test a blubber substitute to see how blubber insulates animals in the frigid waters of the Arctic.
- [Staying Warm in the Arctic](#)
 - Arctic animals stay warm in different ways than you and me. Scholars will illustrate and write captions to highlight these differences.
- **Arctic Animal Sort**
 - Scholars cut out their animal cards.
 - Scholars will sort the animals from the grow chart into categories of their choosing. Scholars should complete their first sort— this could be based on adaptations, habitat, size, color, predator/prey to name a few.
 - After they have finished grouping the cards, scholars will describe in writing or drawings the way in which they decided to group their animals.
 - Repeat the process a second time and ask scholars to pick a **different** way to group their animals.

Week 5

Guiding Questions and Essential Understandings

How have people adapted to the arctic environment?

- Historically, and in modern times, people have been able to live and thrive in the arctic climate through their own adaptations.
- The Inuit people used to use ice and animal skins for insulation.

Readings

Note: PBL Read Alouds should be done during your 20-minute Read Aloud block.

- *Frozen Land* by Jan Reynolds
 - This book describes the traditional ways of life of an Inuit family living in the Canadian Northwest Territories and some of the changes they have had to face.
- *Building an Igloo* by Ulli Steltzer
 - This book follows a father and son team participating in the ancient Inuit art of igloo building.
- *Arctic A to Z* by Wayne Lynch
 - “Using a plant, animal or phenomenon for each letter of the alphabet, Lynch describes the unique ways in which systems for living differ where temperature

and light can be amazingly extreme. Lynch also dispels the myth of the Arctic as a perpetually frozen landscape by introducing us to the birds, mammals, insects and plant life that thrive in the short yet glorious sun-filled days of summer.”

- Additional ABC Books
 - Scholars need a chance to create a vision for the type of book they will be creating. Allow scholars time to explore these ABC books and any other additional ABC books in your classroom.
 - *Alphabet City* by Stephen T. Johnson
 - *On Market Street* by Arnold Lobel
 - *Eating the Alphabet* by Lois Ehlert

Watch Virtual Field Study

- [How to Build an Igloo \(excerpt\)](#) (2:53)
 - Full selection: [How to Build an Igloo](#) (10:29)
- [How an Igloo Keeps You Warm](#) (5:16)

Writing Assignments and Project Work

- Discuss with scholars: What are the challenges of living in the Arctic? How did the people of the Arctic, the Inuit, originally adapt to their surroundings and overcome these challenges?
 - One main outcome of this conversation should be that scholars understand that not all people live the same way but everyone needs food, shelter, and clothing, but we all do it in different ways.
- [Build an Inuit Igloo](#)
 - Discuss the following with scholars before beginning this project:
 - The Arctic is one of the coldest environments on Earth. Winters are long with few hours of daylight.
 - Before they lived in modern homes, the Inuit had to adapt to this extreme climate by building sturdy shelters to protect themselves from the harsh winds and bitter cold.
 - The Inuit word for home is “igloo.” During the summer, the igloos were made from a wooden frame with animal skins and whale bones. During the winter, however, igloos were made from blocks of ice!
 - Inuit are the native people that live in the Arctic. You may know the term “Eskimo” for those that live in the Arctic. “Eskimo” is the Native American word for “eater of raw meat.” However, the arctic people are officially known as Inuit, which means “people.” (Inuit is plural. Inuk is singular. Therefore, one person who lives in the Arctic region is called an Inuk.)

- How were these ice homes built? How did they work to keep people warm?
 - Inuit people carved large blocks of dry, hard snow. First, they placed a circular ring of blocks on level ground. The second row of blocks were tilted slightly inward. As each row was stacked, the walls grew taller, and the blocks would begin to arch together. The structure was a dome. Finally, the key block is placed on the top. The builders cut a hole in this key block for ventilation. This hole allowed air and smoke from the fire to escape.
 - The entrance into the igloo was a tunnel. This prevented warm air from escaping and cold air from entering the structure. The doorway was small, so people had to crawl inside.
 - The blocks of ice acted as **insulators**. The structure trapped body heat inside. There was gradual thawing on the inner walls. But, when the people would leave the igloo to go hunting during the day, the hardened snow would refreeze into ice. This thawing and refreezing actually strengthened the blocks.
- [Arctic Animals Zoom In](#)
 - Scholars will select one arctic animal that they have studied over the course of this unit. Scholars zoom in on the specific physical features of this arctic animal.
- [ABC Class Book](#)
 - Each scholar will complete one page in the Arctic ABC book.
 - If you have less than 26 scholars, tap a couple of scholars to create more than one page in the book.

Week 6

Guiding Questions and Essential Understandings

- How have animals adapted to the arctic environment?
 - Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
 - These adaptations help them survive in their arctic habitat.
- How have people adapted to the arctic environment?
 - Historically, and in modern times, people have been able to live and thrive in the arctic climate through their own adaptations.
 - The Inuit people used to use ice and animal skins for insulation.

Readings

Note: PBL Read Alouds should be done during your 20-minute Read Aloud block.

- *Inuit* by Kevin Cunningham
 - Readers will experience what makes the Inuit people distinctive and exceptional. Readers will get to know each tribe's culture, influence, and history.
- *Living in the Arctic* by Allan Fowler
 - Learn about the people who live in the Arctic region of the world and how it impacts their lives.
- *Polar Bears in Danger* by Roberta Edwards
 - Kids will learn about polar bears while also thinking about how their habitat is changing.

Writing Assignments and Project Work

- **Arctic Big Book**
 - Each scholar will research an animal from the grow chart using books, articles, and virtual field studies. He will publish a page in a class book that will be compiled by the teacher.
 - Sample big book pages can be found [here](#) and [here](#). **Choose one template** and have **all** scholars/groups use the same template for your class big book. Click [here](#) for a look at how you might use the Big Book template pages.
 - Your book should include a Table of contents and an introduction.
 - The introduction should speak to the Arctic as well as adaptations.
 - The template for these pages will likely be [different](#) than the animal specific pages.
 - You will likely have two to three kids working on each page.
 - Click [here](#) to look through samples from a bird unit big book for inspiration.
- **Project: Arctic Winter Arctic Summer Mural**
 - Show this [Arctic Winter Arctic Summer](#) photo to scholars. Discuss what they notice about the differences in the photos.
 - In small groups, scholars will create murals depicting these two drastically different seasons. Scholars use either crayons, markers, or paint to create their murals.
 - Each scholar should write an individual caption to accompany the mural. The caption should note either a fun fact, an observation, or something the scholar found interesting when comparing the two arctic seasons.

Week 7

Guiding Questions and Essential Understandings

- What does it look like and feel like in the Arctic?
 - Scholars will be able to describe the harsh arctic climate.

- Though short, the Arctic also has a mild season.
- How have animals adapted to the arctic environment?
 - Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
 - These adaptations help them survive in their arctic habitat.
- How have people adapted to the arctic environment?
 - Historically, and in modern times, people have been able to live and thrive in the arctic climate through their own adaptations.
 - The Inuit used to use ice and animal skins for insulation.

Writing Assignments and Project Work

- Finalize
 - Grow Chart
 - Arctic ABC Book
 - Arctic Animal Big Book
 - Camouflage Collage
 - Summer/Winter Mural
 - Igloo
 - Any other museum project work

Week 8

Guiding Questions and Essential Understandings

- What does it look like and feel like in the Arctic?
 - Scholars will be able to describe the harsh arctic climate.
 - Though short, the Arctic also has a mild season.
- How have animals adapted to the arctic environment?
 - Arctic animals primarily adapt by insulating, migrating, hibernating, and using camouflage.
 - These adaptations help them survive in their arctic habitat.
- How have people adapted to the arctic environment?
 - Historically, and in modern times, people have been able to live and thrive in the arctic climate through their own adaptations.
 - The Inuit people used to use ice and animal skins for insulation.

Writing Assignments and Project Work

- [Reflecting on the Arctic Study](#)
- Museum Day!

What Else Do I Need?

Note: You will read aloud some PBL-specific texts during the 20 min. Read Aloud to help build content knowledge of the Arctic. Use the rest of your Read Aloud blocks to read great non-PBL specific books.

- *The Arctic Habitat* by Molly Aloian
- *Far North* by Jan Reynolds
- *The Arctic Tern's Journey* by Benjamin Tunby
- *Polar Animal Adaptations* by Lisa Jo Amstutz
- *Walk in the Tundra* by Rebecca Johnson
- *Arctic Foxes of the Tundra* by Joyce Jeffries
- *Hiding in the Polar Regions* by Deborah Underwood
- *A Walrus' World* by Caroline Arnold
- *In Arctic Waters* by Laura Crawford
- *Frozen Land* by Jan Reynolds
- *Arctic A-Z* by Wayne Lynch
- *Building an Igloo* by Ulli Steltzer
- *Living in the Arctic* by Allan Fowler
- *The Inuit* by Kevin Cunningham
- *Polar Bears in Danger* by Roberta Edwards

More Outstanding, Non-PBL Specific Read Alouds

- *Mr. Popper's Penguins* by Richard and Florence Atwater (multi-day book; 2-3 weeks)
- *Waiting for the Biblioburro* by Monica Brown
- *Zen Shorts* by Jon Muth