



LAPLAND

notebook

NAME



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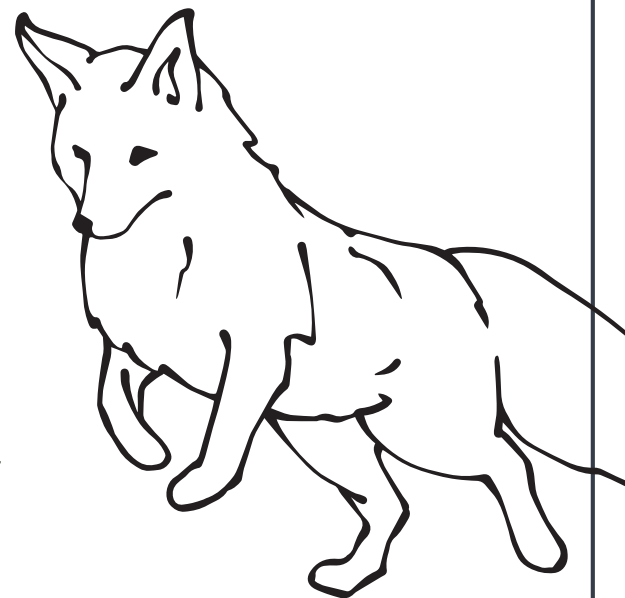
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THE ARCTIC TUNDRA: NATURE'S FROZEN DESERT

The Arctic tundra is one of the coldest and most unique places on Earth. Found in the northernmost parts of the world, like Lapland in Finland, it's a habitat where the ground is frozen solid for most of the year. This frozen ground, called permafrost, stays icy even during the short summer months. It's like nature's freezer, storing ice and keeping the land beneath it cold. Because the tundra is so cold, only certain plants and animals can survive here.

What Lives Here?

The Arctic tundra might look empty at first, but it's full of life if you look closely. Tiny plants like mosses and lichens cover the ground, holding onto what little water and nutrients they can find. These plants are tough—they have to survive in shallow soil and grow quickly during the short summer before the freezing winter returns.

Animals in the tundra are just as tough! Reindeer roam the snowy plains, using their hooves to dig through the snow for food. Arctic foxes, with their thick white fur, blend into the snow to hide from predators. Even ringed seals make their homes along the icy coasts, staying warm with their layers of blubber.

Trees or No Trees?

Did you know that the southern parts of Lapland, closer to the Arctic Circle, still have trees? Forests of birch, pine, and spruce thrive in these areas. But as you travel farther north into the heart of the tundra, the trees disappear. The frozen ground and harsh climate make it impossible for deep-rooted trees to grow, leaving a vast, treeless landscape. This gradual change from forest to tundra is known as the tree line.

Why Is the Tundra So Cold?

The Arctic tundra is cold because it's far from the equator, where the sun's rays are strongest. In the tundra, the sun is lower in the sky, and during winter, it doesn't rise at all! This long, dark season is called the polar night. When summer comes, the sun shines all day and night, but it's still not enough to warm the frozen ground completely.

What Makes the Tundra Special?

One of the tundra's coolest features is permafrost. Because it's frozen year-round, it locks water in the ground like an ice chest. This frozen water makes the soil difficult for plants to grow deep roots, so only small plants like mosses and lichens survive. During the summer, the top layer of permafrost melts slightly, creating shallow ponds and marshes. These pools provide water for animals and are perfect for insects like mosquitoes, which bring food to birds.

Nature's Extreme Challenge

The Arctic tundra is like nature's extreme challenge. It's cold, harsh, and full of surprises. The plants and animals that live here have found amazing ways to adapt and thrive, making this frozen desert one of the most fascinating places on Earth.

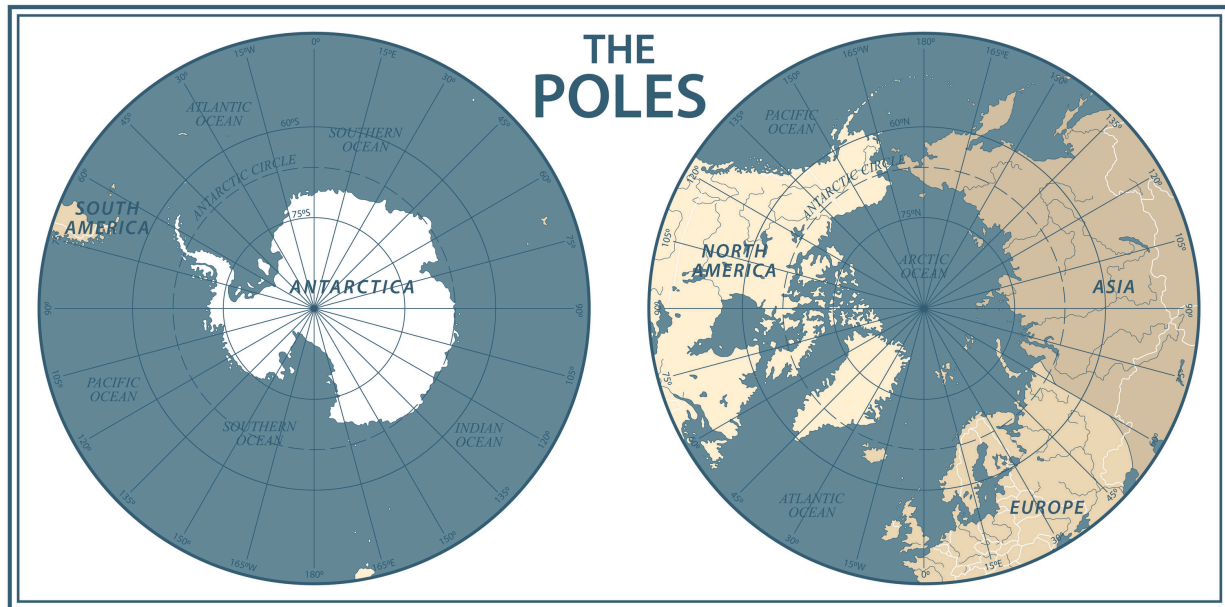
POLAR REGIONS K-W-L CHART

In the first column, write what you already know about Lapland and the Polar Regions. In the second column, write what you want to know about Lapland. After you have completed your study this month, come back and write what you’ve learned in the third column.

What I K now	What I W ant to Know	What I’ve L earned



EXPLORING THE POLAR REGIONS



The polar regions are the coldest places on Earth! There are two polar regions:

- **The Arctic:** located in the northern hemisphere, includes icy seas, tundra, and areas like Lapland, Finland.
- **The Antarctic:** located in the southern hemisphere, is home to the icy continent of Antarctica.

These regions are covered in snow and ice, and the sun shines very little during the winter. Despite the cold, many amazing plants, animals, and people have learned how to survive here.

Question for Thought:

Why do you think animals and people living in polar regions have to adapt in special ways to survive?

MAP IT - LAPLAND

Where is Lapland?

Lapland is located north of the Arctic Circle, primarily in northern Finland, but it also extends into Sweden, Norway, and Russia. This icy region is known for its snowy landscapes, reindeer herding, and the magical Northern Lights.

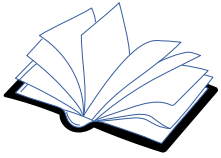
Find Lapland and the Arctic Circle on the Map!

1. Use a globe or map to locate the Arctic Circle.
2. Next, find Finland on the map.
3. Below, color all of Finland light blue to mark the country.
4. Highlight the northern part of Finland to show where Lapland is located. Label it as "Lapland".
5. Explore nearby countries within the Arctic Circle. Label Sweden, Norway, and Russia.
6. Draw small snowflakes over the Arctic Ocean to represent the frozen waters surrounding the region.





THE ARCTIC: A FROZEN WONDER



AURORA BOREALIS: THE DANCING LIGHTS IN THE SKY

The Dancing Lights in the Sky

Have you ever heard of the colorful lights that swirl and dance across the night sky? These are the Northern Lights, or Aurora Borealis, one of the most magical sights in the Arctic! These glowing ribbons of green, pink, and purple light are not magic—they're caused by science. High above Earth, the sun sends out tiny particles called solar winds. When these particles bump into gases in the Earth's atmosphere, they create a glowing light show. Green is the most common color, but if you're lucky, you might see red, yellow, or even purple!

Why Do They Appear?

Why do the Northern Lights show up near the North and South Poles? It's all because of Earth's magnetic field. Think of Earth as a giant magnet with the strongest pull at its poles. The magnetic field guides the sun's particles to these areas, where they interact with gases like oxygen and nitrogen in the atmosphere. This collision creates energy, which is released as light. That's why you'll see these lights in places like Lapland, Finland, but not in warm, sunny places like Florida or Mexico.

Colors in the Sky

Did you know the colors of the Northern Lights depend on what gases the solar particles hit? Green and yellow are caused by oxygen, while red happens at higher altitudes where the air is thinner. Blue and purple are made by nitrogen. Each color lights up the sky in a unique way, making every Aurora Borealis display different from the last!

When Can You See the Northern Lights?

To see the Northern Lights, you'll need to visit during the dark winter months, especially between September and March. During this time, the long polar nights and clear skies give the best chance of spotting the auroras. In Lapland, people bundle up in warm clothes and head outside to watch this breathtaking natural show. Some even camp out under the stars or take special tours to find the best viewing spots.

The Northern Lights Around the World

The Aurora Borealis isn't the only light show in the sky. Did you know there's also an Aurora Australis? These southern lights happen near the South Pole in places like Antarctica and southern Australia. While fewer people live near the South Pole, both types of auroras are created the same way—by the sun's solar winds interacting with Earth's magnetic field.

For thousands of years, people have been amazed by the Northern Lights. Indigenous groups like the Sámi of Lapland have stories and legends about them, believing they bring good luck or messages from ancestors. Even today, the lights continue to inspire artists, scientists, and explorers. The Aurora Borealis is not just a beautiful sight; it's a reminder of the incredible science happening high above our heads.



THE DANCING LIGHTS IN THE SKY

After reading the passage “Aurora Borealis: The Dancing Lights in the Sky,” answer the following questions. *Then, create your own Northern Lights art! Use watercolors or pastels for the best results, as these materials allow you to blend colors to create your masterpiece!*

1. Explain how the sun and Earth work together to create the Northern Lights.
2. Why are the Northern Lights seen most near the poles?
3. What determines the colors of the Northern Lights?
4. When is the best time to see the Northern Lights?
5. What are the Aurora Australis?
6. Why are the Northern Lights special? Based on the passage, why do scientists and artists find the Northern Lights so fascinating?



THE DANCING LIGHTS IN THE SKY

CREATE A STUNNING ARCTIC SKY COVERED IN NORTHERN LIGHTS



Today, you created your own version of the Northern Lights with milk and soap. Reflect on the activity and record your observations.

1. What colors did you see?

2. How did the colors move when you added the soap?

3. Did the colors mix together or stay separate?

- 1.What surprised you most about this activity?

2. How is this activity like the real Northern Lights?

- 3.If you could change one thing about your experiment, what would it be?

Soap breaks the surface tension of the milk, letting the colors move and swirl. How do you think this relates to how solar winds interact with gases in the Earth's atmosphere to create the real auroras? Write your ideas below.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on its right side, suggesting it's resting on a surface.



THE SCIENCE OF ICE AND SNOW

Snow and ice are nature's way of transforming water into something magical in cold environments. In Lapland, Finland, snow covers the ground for most of the year, turning it into a sparkling winter wonderland where incredible animals and people thrive. But have you ever wondered how snowflakes form or why ice is so important?

HOW SNOWFLAKES FORM

Snowflakes begin their journey high in the sky as tiny drops of water in clouds. When the air becomes very cold, these drops freeze into tiny ice crystals. As the crystals grow, more water vapor sticks to them, forming beautiful and unique shapes. Snowflakes always have six sides because of the way water molecules lock together when they freeze, like tiny puzzle pieces. While no two snowflakes are exactly the same, they all share intricate and symmetrical designs.

Imagine walking through Lapland as fresh snow falls, each flake landing gently on your coat. Every single snowflake took hours to form, drifting through the clouds before joining millions of others to create the soft, powdery snow that blankets the land.

WHAT MAKES ICE SO SPECIAL?

Ice may just be frozen water, but it behaves in fascinating ways. When water freezes, it expands and becomes lighter, which is why ice floats on top of lakes and rivers. This floating ice acts as a shield, keeping the water underneath from freezing completely, which helps fish and other creatures survive Lapland's frigid winters.

Ice can also change over time. When snow melts and refreezes, it becomes denser and harder. That's why snow can pack into strong layers underfoot or turn into slippery ice on roads. In Lapland, people have learned to use ice creatively, building igloos and even entire ice hotels out of this frozen wonder.

SNOW AND ICE IN LAPLAND'S ECOSYSTEM

Snow and ice aren't just beautiful—they're essential for life in Lapland. Reindeer rely on snow to dig down and find lichen, their favorite food. Snow also acts like a fluffy blanket, protecting plants and smaller animals from icy winds and extreme cold.

In this frosty environment, snow and ice shape everything, from the way rivers freeze to how animals find food and stay warm. Understanding how snowflakes and ice form helps us appreciate the incredible ways nature adapts to survive in one of the coldest places on Earth.



WHY ARE NO TWO SNOWFLAKES ALIKE?

What You Are Going to Do

In this activity, you will learn how snowflakes form and explore their unique symmetry. After reading about snow and ice, you will draw your own snowflake designs and reflect on how snowflakes and ice play a role in cold environments like Lapland.

Part 1: Watch the video: [“Why No Two Snowflakes Are Alike”](#). Then, answer the following questions:

VIDEO



1. What causes snowflakes to grow in unique patterns?
2. How do temperature and humidity affect the shape of a snowflake?
3. Explain why it is impossible for two snowflakes to be exactly the same.



SNOWFLAKE SYMMETRY AND CRYSTAL FORMATION

Part 2: Draw Your Snowflakes

Use the space below to design your own snowflakes. Focus on symmetry to create beautiful, balanced designs.

Part 2: Reflection Questions

1. Why do snowflakes form only in very cold conditions?
2. How is ice different from snow?
3. How is ice different from snow?





GROWING CRYSTALS

What You Are Going to Do

In this activity, you will create your own crystals by dissolving a substance (like salt or sugar) in water and letting the solution evaporate or cool. Over time, you'll observe how the crystals form and grow, just like the natural process of crystallization in the Arctic! Use this sheet to record your experiment and observations.

Part 1: Experiment Setup

1. What material are you using to grow your crystals?

☐ Salt

☐ Sugar (rock candy)

☐ Other: _____

2. What did you do to prepare the solution?

Part 2: Daily Observations

Use the chart below to record what you see each day.

Day	What Do You See?	Are the Crystals Changing or Growing?
Day 1		
Day 2		
Day 3		
Day 4		
Day 5		



REINDEER VISION: A TRUE ARCTIC ADAPTATION

Reindeer are Built for Arctic Survival

Reindeer are incredible animals that live in some of the coldest places on Earth, like Lapland in the Arctic. These amazing creatures have special adaptations that help them survive the freezing temperatures and harsh environment. Imagine walking through snow and ice every day, where the wind is icy cold, and food is buried deep under the snow. For reindeer, this is just another winter day!

Thick Fur for Staying Warm

Reindeer have some of the warmest fur in the animal kingdom. Their thick fur isn't just soft—it's specially designed to trap heat. Each hair is hollow, like a tiny tube, which helps trap warm air close to their bodies. This keeps the reindeer cozy even when it's freezing outside. The hollow hairs also help reindeer float when they cross icy rivers, which is another great survival skill!

Small Ears and Tails

Have you noticed that reindeer have small ears and short tails? This might not seem like a big deal, but it's actually very important. Smaller body parts lose less heat than bigger ones. By having small ears and tails, reindeer can hold onto their body heat better, keeping them warm in the cold Arctic weather.

Super Noses

Reindeer noses are built for the Arctic! When they breathe in icy air, their noses warm it up before it reaches their lungs. This helps protect their bodies from the cold. Their noses even help keep the heat in their bodies while they breathe out, so they don't lose too much warmth.

Ultraviolet Vision in the Snow

Reindeer have an amazing ability to see ultraviolet (UV) light, which helps them survive in the snowy Arctic. While the bright, white snow reflects a lot of light, reindeer's UV vision allows them to see things that stand out. They can spot lichen (their main winter food), predators like wolves, and even other reindeer against the snowy background. This special vision helps them stay safe and find food, even in harsh winter conditions.

Saving Energy

During the long Arctic winters, food is harder to find. Reindeer save their energy by slowing down and moving carefully. They don't waste energy running or playing too much when it's cold. Instead, they dig in the snow with their strong hooves to find lichen, a type of plant that grows on rocks and trees. This is their main food during winter and gives them the energy they need to survive.

Reindeer are built to handle the cold in ways that most animals can't. From their fur to their UV vision, every part of their bodies is made to keep them warm and help them save energy. These incredible adaptations allow reindeer to thrive in Lapland's icy wilderness!



REINDEER VISION

What I Learned About Reindeer Eyes

Answer these questions after reading the passage:

1. Why do reindeer eyes change color with the seasons?
2. How does ultraviolet (UV) vision help reindeer in the snow?
3. What is the name of the special part of their eyes that reflects light?

Diagram of a Reindeer Eye

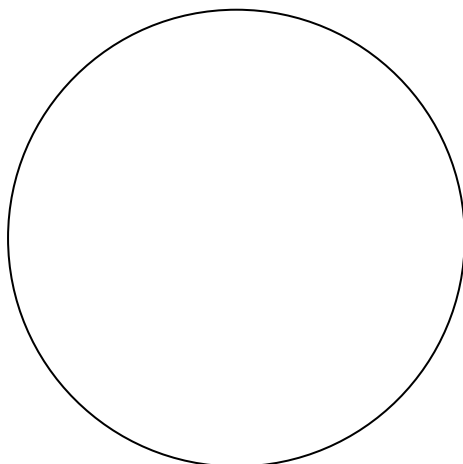
Use the video “The Unique Reason Reindeer Change Their Eye Color” to help you draw a diagram of an eye. Label the following parts:

- Winter Tapetum Lucidum (Blue)
- Summer Tapetum Lucidum (Gold)
- Retina (for UV Vision)

VIDEO



Draw your diagram here and label the parts!





REINDEER VISION: EYE DILATION EXPERIMENT

How Do Human Eyes Adapt to Light?

Although our eyes don't have the extraordinary adaptations of reindeer, they are still capable of adjusting to different light levels. This happens through changes in the size of the black center of the eye, called the pupil. In bright light, pupils become smaller to limit the amount of light entering the eye. In darkness, they grow larger to let in more light, helping us see. These changes are known as dilation (getting larger) and constriction (getting smaller).

In this experiment, you will observe how someone's eyes adapt to different lighting conditions and compare this to the unique adaptations of reindeer eyes.

Step 1: Setting Up the Experiment

Find a partner and a space to test light changes. You'll need a flashlight or two rooms with different light levels (one bright, one dark).

Look closely at your partner's eyes in each condition. Pay attention to the size of their pupils!

Step 2: Observing Eye Dilation

In bright light, the pupils were:

- ☐ Large (dilated)
- ☐ Small (constricted)

In low light, the pupils were:

- ☐ Large (dilated)
- ☐ Small (constricted)

Step 3: Why Does This Happen?

Use what you learned in the experiment and think about why pupils change size:

Why do you think our pupils get smaller in bright light?

Why do they get larger in low light?

Step 4: Comparing to Reindeer Eyes

Reindeer don't just rely on pupil size—they change their eye color, too!

How does reindeer eye adaptation go beyond what we saw in humans?

Why might reindeer need to capture more light in winter?





REINDEER VISION: REFLECTIVE MATERIALS TEST

How Do Different Materials Reflect Light?

Light reflection helps us see objects in the dark. Reindeer rely on a special reflective layer in their eyes to see better in low light. In this experiment, you'll test different materials to find out which reflects light the best, just like the reflective part of a reindeer's eye!

Step 1: Setting Up the Experiment

Materials Needed:

- Aluminum foil, White paper, Black paper, Shiny plastic, Flashlight
- Any other material you'd like to test

What to Do:

1. Choose a material to test.
2. Shine a flashlight onto the material and observe how much light bounces back. Does it reflect brightly or dimly?
3. Repeat with the other materials.

Step 2: Record Your Observations

Materials Tested:

(Check the materials you tested and write down what you noticed!)

- Aluminum foil: _____
- White paper: _____
- Black paper: _____
- Shiny plastic: _____
- Something else: _____

Step 3: What I Discovered

1. Which material reflected light the best?

2. Why do you think that material worked the best?



Write two short paragraphs about what makes reindeer vision special.

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- This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



THE ARCTIC FOX'S WINTER SURVIVAL

The Arctic fox is a master of survival in the freezing tundra. Living in one of the coldest places on Earth, where temperatures can drop as low as -50°C (-58°F), it has incredible adaptations that help it stay warm and thrive. Let's dive into the science of how this small but tough animal keeps cozy in such extreme conditions!

BUILT FOR THE COLD

The Arctic fox's thick fur coat is its most important tool for staying warm. This fur isn't just for looks—it's like wearing a super-insulated jacket. Its fur traps air close to the fox's body, creating a layer of warmth even when the wind howls and snow piles up. In fact, the Arctic fox has the warmest fur of any animal in the Arctic!

But it doesn't stop there. The fox's compact body shape helps it hold onto heat better than animals with long legs or tails. Its small ears, short snout, and bushy tail all work together to reduce heat loss. When it curls up to sleep, the fox uses its tail as a blanket to cover its nose and paws, keeping even the smallest parts of its body warm.

A YEAR-ROUND CAMOUFLAGE

In winter, the Arctic fox's fur turns snowy white, blending perfectly with the icy landscape. This camouflage helps it hide from predators like wolves and snowy owls. When summer arrives, the tundra's snow melts, and the Arctic fox's fur changes to brown or gray to match the rocky ground and grass. This seasonal change in fur color isn't just about hiding—it also keeps the fox cooler in warmer weather by absorbing less heat from the sun.

HOW IT STAYS FUELED

Like all animals, the Arctic fox needs energy to stay active and warm. It eats a variety of foods, including lemmings, birds, and even leftover scraps from larger predators like polar bears. During winter, when food is scarce, the Arctic fox uses its excellent hearing to listen for small animals moving under the snow. Then, it pounces to break through the snow and catch its meal.

LESSONS FROM THE ARCTIC FOX

The Arctic fox teaches us about thermoregulation, which is how animals (and humans!) manage their body temperature. Its thick fur acts as insulation, its body shape conserves heat, and its clever behavior helps it find food and avoid predators. Next time you bundle up in a warm jacket or use a blanket, think about how the Arctic fox survives by using nature's version of these tools!

This small but mighty fox is proof that even in the harshest environments, life finds a way to adapt and thrive.



THE ARCTIC FOX: DIAGRAM LABELING

Directions: Look at the diagram of the Arctic fox. Your job is to label the parts of the fox that help it survive in the cold Arctic tundra. Use the information from the reading passage to guide you.

Here's what to label:

- Thick Fur
- Compact Body Shape
- Short Ears and Snout
- Seasonal Fur Color Change
- Bushy Tail

Make sure your labels are clear and neat, and think about how each adaptation helps the Arctic fox survive in one of the coldest places on Earth!





THE ARCTIC FOX'S WINTER SURVIVAL

Directions: Read the passage about the Arctic fox carefully. Then, answer the following questions using what you've learned. Take your time and think about how the Arctic fox's adaptations help it survive in the cold tundra.

1. How does the Arctic fox's fur help it stay warm in freezing temperatures?
2. What body features help the Arctic fox conserve heat? Name at least two.
3. What kind of foods does the Arctic fox eat?
4. What is thermoregulation, and how does the Arctic fox demonstrate it?
5. Why do you think the Arctic fox's tail is so important for keeping it warm?
6. If you were designing a jacket inspired by the Arctic fox, what features would it have? Why?



FUR AND INSULATION TEST

What You Are Going to Do

In this experiment, you will test different materials to see which one works best at keeping your hand warm. This will help you understand how the Arctic fox's thick fur acts as insulation in freezing temperatures and how clothing engineers design winter gear. Follow the steps carefully and record your observations below.

1. Materials Tested

Write down the materials you will test.

- Material 1: _____ Material 4: _____
- Material 2: _____ Material 5: _____
- Material 3: _____ Material 6: _____

2. Observations

For each material, record how long it took for you to feel the cold through the layer. Use the stopwatch or timer for accuracy.

Material	Time Until Cold Felt (seconds)	Notes (e.g., soft, thin, thick)
1.		
2.		
3.		
4.		
5.		
6.		

Reflection Question

If you were designing a jacket based on this experiment, which material would you use and why?



RINGED SEALS: ARCTIC SURVIVORS

The icy Arctic waters of Lapland are home to an incredible animal—the ringed seal. These seals are true masters of survival, thriving in one of the coldest and harshest environments on Earth. But how do they manage to stay warm and dive deep into the frigid depths without getting crushed by the pressure? Let's dive into the science behind their amazing adaptations!

Blubber: Nature's Winter Coat

Imagine jumping into icy water without a wetsuit—brrr! Ringed seals don't need wetsuits because they have something even better: a thick layer of fat called blubber. Blubber acts like a cozy winter coat, trapping heat inside their bodies and keeping the freezing cold water out. This blubber also gives seals energy when food is scarce, making it a vital part of their survival.

Blubber isn't just about staying warm—it also helps seals float! Since fat is less dense than water, the blubber makes it easier for seals to glide through the water with less effort. This combination of warmth and buoyancy is key to surviving in Arctic waters.

Diving Deep: Built for Pressure

Ringed seals are expert divers, plunging up to 300 feet below the surface in search of fish. But as they go deeper, the water pressure increases. For humans, this much pressure would be dangerous without special equipment, but seals are built to handle it. Their lungs are flexible, allowing them to collapse slightly as they dive deeper. This prevents the pressure from damaging their bodies.

Seals also store extra oxygen in their blood and muscles, which means they can stay underwater for up to 25 minutes without needing to breathe. This incredible adaptation lets them dive deep to find food even when the ice above is thick.

The Arctic Connection

Ringed seals don't just survive in the Arctic—they play an important role in its ecosystem. They are a vital food source for predators like polar bears and Arctic foxes. Their habits, like making breathing holes in the ice, also shape the environment for other animals. By staying hidden in snow-covered lairs on the ice, they avoid predators and protect their pups from the cold.

Ringed seals remind us how animals adapt in extraordinary ways to survive in extreme environments. Their blubber, diving skills, and connection to the Arctic ecosystem make them true champions of the frozen north!



RINGED SEAL ADAPTATIONS

Directions: Read the passage about the ringed seal carefully. Then, answer the questions below to learn more about how these amazing animals survive in the Arctic. Take your time to think about their adaptations and how they connect to their environment. For the last challenge question found on the next page, use your imagination to create something inspired by the ringed seal!

Questions:

1. How does blubber help ringed seals survive in the Arctic?
2. Why is it important for ringed seals to store extra oxygen in their blood and muscles?
3. What makes ringed seals able to dive deep into the ocean without being harmed by water pressure?
4. What role do ringed seals play in the Arctic ecosystem? Name at least two ways they affect other animals or the environment.



RINGED SEAL ADAPTATIONS

Challenge Question:

5. Imagine you are designing a wetsuit inspired by a ringed seal's adaptations. What features would it have to keep humans warm, help them float, and allow them to dive deep like a seal? Write or draw your design below!



BLUBBER GLOVE EXPERIMENT

What You Are Going to Do

In this experiment, you will test how blubber helps keep ringed seals warm in icy water. You will create a "blubber glove" to see how it works as insulation. Then, you'll compare how your hands feel with and without the blubber glove and reflect on what this teaches us about survival in extreme cold.

Experiment Steps

1. Materials You Used:

Write down what you used for the experiment:

2. Observations:

- Which hand felt warmer in the ice water?
 - ☐ Blubber glove hand
 - ☐ Plain glove hand
- Describe how your hands felt:
 - Blubber glove: _____
 - Plain glove: _____

Reflection Questions

1. Why do you think the blubber glove kept your hand warmer?
2. What can we learn from their adaptations to design better survival gear for humans?



THE SAMI PEOPLE AND REINDEER HERDING

The Sami people are the indigenous people of Lapland, a region that stretches across Norway, Sweden, Finland, and Russia. For thousands of years, they've lived in one of the coldest, toughest environments on Earth: the Arctic tundra. Instead of farming animals like cows or sheep, the Sami rely on reindeer herding for their survival. Reindeer are at the heart of Sami culture, providing food, clothing, and transportation. The Sami use every part of the reindeer, showing how much they respect the animals that sustain them.

Reindeer Herding: More Than a Job

Reindeer herding isn't like farming—it's a way of life. The Arctic tundra is covered in permafrost, a layer of frozen ground that stops deep plants from growing. But reindeer don't need deep-rooted plants—they love lichen, a moss-like plant that grows on the ground. Since food is spread out across the tundra, the reindeer have to migrate, moving from one area to another.

The Sami people guide their herds across mountains, forests, and snowy plains to find the best grazing spots. Along the way, they keep the reindeer safe from predators like wolves and make sure they have enough to eat. By herding instead of farming, the Sami respect the reindeer's natural need to roam and survive in the tundra.

How the Sami Thrive in the Arctic

The Arctic tundra is freezing, with long, dark winters and very little food. To survive, the Sami use amazing skills and tools they've passed down for generations. They make warm clothes and boots called gákti out of reindeer hides to protect themselves from the cold. Their portable homes, called lavvu, are like cone-shaped tents made of wood and reindeer hides. These homes are easy to move, so the Sami can follow their herds wherever they go.

Combining Old Traditions with New Tools

Even though many Sami families still herd reindeer the traditional way, some use modern tools like snowmobiles and GPS trackers to keep up with their herds. This mix of old and new ways helps the Sami keep their herding traditions alive, even as the world around them changes. Reindeer herding isn't just a job—it's part of who the Sami are, reminding them of their deep connection to the land, the animals, and their ancestors.

Reindeer herding isn't just important for the Sami—it helps the Arctic tundra, too! Reindeer grazing keeps plants like moss and lichen from overgrowing, helping the tundra stay balanced.





THE REINDEER CONNECTION

The Sami people of Lapland, also known as Sámi, have lived in the Arctic regions of Norway, Sweden, Finland, and Russia for thousands of years. Their way of life is deeply connected to reindeer, which play a vital role in their traditions, culture, and survival in the Arctic tundra.

REINDEER: A WAY OF LIFE

- **Transportation:** For centuries, reindeer have helped the Sami travel across snowy landscapes. Sami sleds, called **ahkio**, are pulled by trained reindeer, making it possible to navigate the harsh Arctic environment.
- **Clothing and Shelter:** Reindeer fur and hides are used to make warm clothing and blankets that protect against freezing temperatures. The Sami also use reindeer hides to cover their traditional tents, called **lavvu**.
- **Food and Tools:** The Sami people use nearly every part of the reindeer. Meat provides nourishment, antlers are used for tools, and bones are crafted into utensils or ornaments. This sustainable use reflects their respect for nature.

HERDING AND MIGRATION

The Sami are skilled reindeer herders, guiding their herds through the tundra in search of food. Reindeer rely on moss and lichen for nourishment, and the Sami must adapt to the seasons, moving with their herds to ensure the animals find enough to eat.

- *Fun Fact: Did you know reindeer hooves change with the seasons? In winter, their hooves grow sharp edges to grip icy ground, and in summer, they become softer for walking on wet tundra.*

MODERN SAMI LIFE

While many Sami people still practice traditional reindeer herding, others now live in towns and cities. However, their connection to reindeer remains an important part of their culture.

FUN FACT ABOUT REINDEER AND THE SAMI

The Sami language has over **400 words** for reindeer, reflecting their deep connection to these animals. Can you do some research and find out a few of these names?



REINDEER MIGRATION AND PERMAFROST EXPLORATION

What You Are Going to Do

In this activity, you will create a model of Arctic permafrost to learn why reindeer migrate. By exploring how frozen soil affects plant growth, you'll discover why reindeer can't stay in one place to graze. Use this journal to record your experiment and reflect on how reindeer herding connects to the tundra environment.

Part 1: Experiment Setup

1. Describe Your Permafrost Model: What materials did you use to create the permafrost and the active layer? Draw your setup below!

2. What did the permafrost feel like when you removed it from the freezer?

Part 2: Testing Rooting in Permafrost

1. What happened when you tried to push the roots (string, pipe cleaners, or twigs) into the frozen layer? What challenges did you notice when trying to "dig" into the permafrost using a pencil or stick?

**Part 3: Reflection Questions**

1. Why do reindeer need to migrate instead of staying in one place?
2. How does permafrost affect the plants that reindeer eat, like mosses and lichens?
3. How might melting permafrost change the tundra and affect reindeer migration?
4. What challenges do you think Sami herders face when guiding reindeer across the tundra?



LAPLAND AND THE MAGIC OF SANTA CLAUS

Lapland: Santa's Magical Home

When people think of Santa Claus, they often picture snow-covered forests, reindeer pulling sleighs, and a cozy workshop filled with toys. Did you know that Santa's "official" home is said to be in Lapland, Finland? This snowy Arctic region is famous for its stunning landscapes, sparkling Northern Lights, and a deep connection to the beloved story of Santa Claus.

Why Lapland?

Lapland's location near the Arctic Circle makes it a magical setting for Santa's home. With its long, snowy winters, thick forests, and wide-open spaces, it feels like a scene from a holiday story. The people of Lapland, including the indigenous Sámi, have lived here for centuries, working closely with nature. Reindeer herding has been an important part of their culture, and these amazing animals are closely tied to Santa's story.

Santa's Village in Rovaniemi

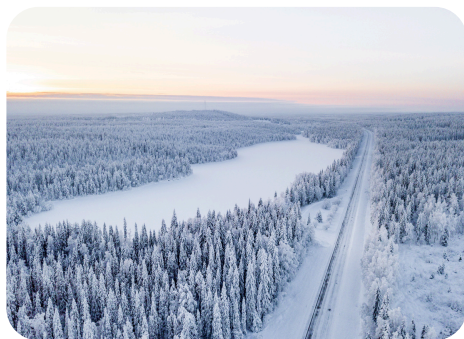
In the 1920s, stories of Santa grew in Lapland. People loved thinking about Santa's workshop and how it might be hidden in the snowy arctic. In the 1950s, Santa's Village was built in Rovaniemi, Lapland. This charming place is now considered Santa's official hometown, where visitors can meet Santa, see his reindeer, and experience the magic of Christmas in the Arctic. Families from around the world come to visit, adding to the excitement and wonder of Lapland.

Celebrating the Magic of Lapland

Lapland isn't just about Santa Claus—it's a place where nature and tradition come together. Visitors can ride in reindeer-drawn sleighs, see the Northern Lights, and even stay in ice hotels! Tourism helps share Lapland's unique culture while supporting the people who live there. At the same time, everyone works together to protect the fragile Arctic environment so it can stay magical for years to come.

A Place Where Magic Comes to Life

Lapland reminds people of the magic that can happen when nature, tradition, and imagination come together. Whether you dream of meeting Santa, watching the Northern Lights, or exploring the snowy Arctic wilderness, Lapland is a place where the spirit of the season shines bright all year long.





SANTA'S MAGICAL CONNECTION TO LAPLAND

What You'll Be Doing:

Discover why Lapland is known as Santa Claus's homeland and explore how it brings holiday traditions to life and tourism dollars to Lapland, Finland. Read the reading passage and watch this promotional video to help you answer the questions.

Watch this Promotional Video for Rovaniemi .
<https://www.youtube.com/watch?v=JH9jCaHWkhM>

VIDEO



Research and Write:

1. Write three facts about how Lapland celebrates Christmas:

-
-
-

Reflection Questions:

1. Why is Lapland considered Santa's home?

2. How does Santa's connection help Lapland's tourism?



Research how tourism in Lapland increases during winter holidays. Write one way tourism helps Lapland and one way it might create challenges for the people and animals of the region. Use a short paragraph for each idea, making sure to explain your thoughts in detail with complete sentences.

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.



DESIGN A SANTA-INSPIRED TOURISM EXPERIENCE

DESIGN A SANTA-INSPIRED TOURISM EXPERIENCE AND CREATE A TRAVEL BROCHURE OR POSTER TO ADVERTISE YOUR EXPERIENCE.



Instructions:



1. **Brainstorm Ideas:** Discuss what makes Lapland magical and why tourists want to visit. Highlight activities like seeing reindeer, visiting Santa's Village, and staying in igloo hotels.

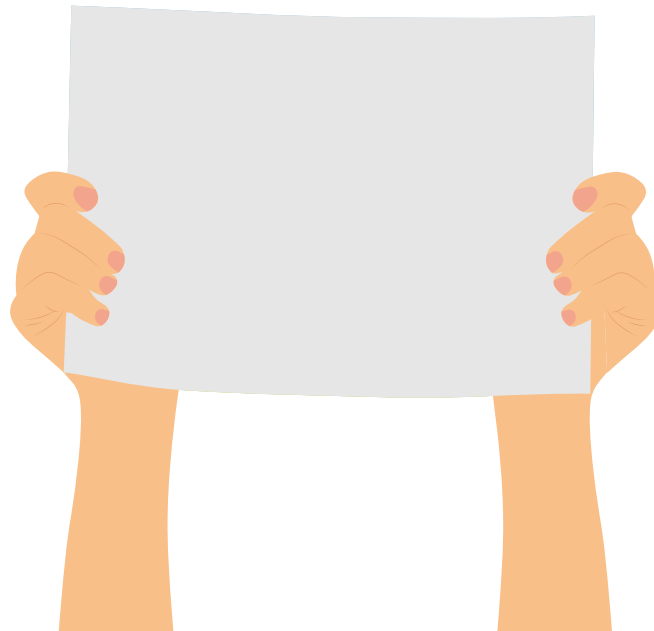


2. **Design a Tourism Experience:**

- Create a travel brochure or poster for their imagined Santa-themed tourism attraction in Lapland. Examples might include "The Arctic Sleigh Ride Adventure" or "A Day with Santa's Elves."
- Include key features of their attraction, such as activities, how it connects to Santa, and how it protects the Arctic environment.



3. **Present:** Share your brochure or poster with the class or family and explain how your experience celebrates the magic of Lapland while promoting sustainable tourism.





SURVIVING THE ARCTIC: SKILLS FOR THE COLDEST PLACE ON EARTH

The Arctic is one of the most extreme places on Earth. In this icy wilderness, temperatures can drop as low as -40°F (-40°C), and strong winds make it feel even colder. The sun disappears for months during the winter, leaving the land in darkness. It's beautiful but challenging, and only the toughest people and animals can survive here.

SHELTER: STAYING WARM IN THE COLD

In the Arctic, staying warm is a matter of life or death. People living in this region have developed clever ways to survive. Traditional snow shelters, like igloos, are built using tightly packed snow blocks. While snow might seem cold, it traps body heat inside, keeping the shelter surprisingly warm. Today, modern Arctic explorers use insulated tents and special sleeping bags to protect themselves from the freezing temperatures.

DRESSING FOR SURVIVAL

The clothes you wear in the Arctic can make all the difference. Layers are the key! The first layer keeps your skin dry, the second layer traps heat, and the outer layer blocks the wind and snow. Thick coats, gloves, and boots lined with fur or synthetic materials help keep the cold out. Arctic explorers often look to the traditional clothing of the Sámi people, who have lived in the region for centuries. They use reindeer fur and wool to make warm, lightweight clothing that allows them to move easily while staying warm.

FOOD AND WATER: FUELING THE BODY

The cold burns a lot of energy, so eating enough food is very important in the Arctic. Explorers and locals rely on high-energy foods, like fish, meat, and nuts, to stay strong. Water can be tricky to find because most of it is frozen. People often melt snow or ice over a fire to get drinking water. But beware—eating snow directly can lower your body temperature and make you even colder!

FINDING YOUR WAY

Navigating the Arctic is another big challenge. Snow and ice cover everything, and landmarks are hard to see. Explorers use tools like compasses, GPS devices, and maps to find their way. The Sámi people rely on their deep knowledge of the land and look for natural markers, like the shape of hills or the position of stars, to guide them. In the dark winter months, they even use the Northern Lights to orient themselves!

LEARNING FROM THE ARCTIC

Surviving in the Arctic is about being prepared and working with nature. By building strong shelters, wearing the right clothes, and knowing how to find food and water, people can thrive in this harsh environment. It's a reminder of how amazing and adaptable humans are—and how much we can learn from those who have called the Arctic home for generations.



MASTERING ARCTIC SURVIVAL

What You'll Be Doing:

Explore the science behind staying warm in the Arctic and learn how people use natural resources to survive.

Shelter Challenge:

Draw and label an Arctic shelter designed to protect you from cold temperatures. Include features like insulation, a heat source, and a sturdy structure.

Research and Write:

Write three things people in Lapland do to stay warm:

**Reflection Questions:**

1. Why is insulation important in the Arctic?
2. What materials could you use to keep heat inside your shelter?

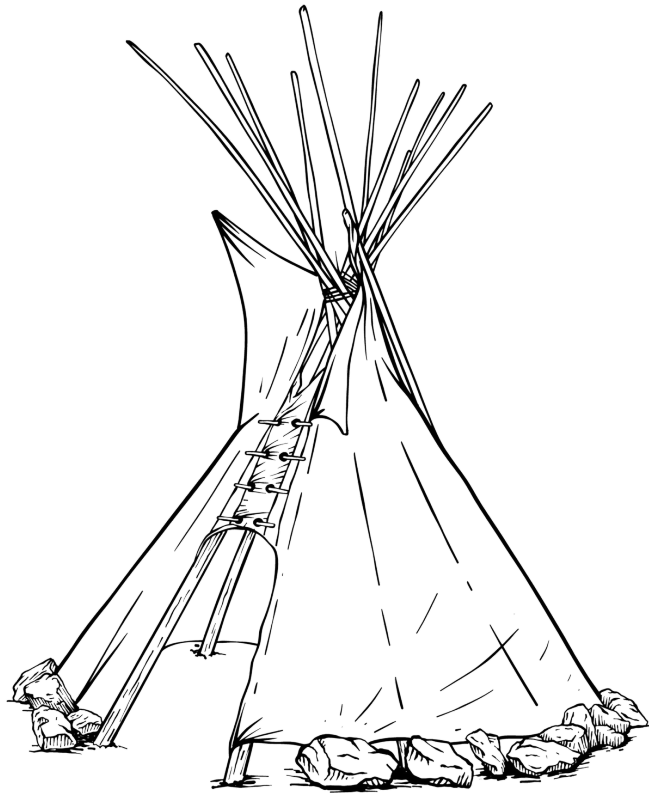
Science of Staying Warm:

Explain how layers of clothing help keep your body heat in:

Bonus Challenge

Research how snow is used as insulation for shelters. Write a few sentences explaining why snow, even though it's cold, can keep people warm. While the Sami people of Lapland traditionally use reindeer hides and wood for their lavvus, many other northern cultures, like the Inuit, use snow to build shelters such as igloos. Snow traps air inside its tiny pockets, creating a layer of insulation that keeps the cold wind out and warmth inside. OR, if you have real snow, try using it to create a model habitat!

LAVVU DESIGN- ENGINEERING



WHAT MAKES A LAVVU SO EFFECTIVE?

Cone Shape and Wind Resistance

The cone shape lets wind flow around the structure, keeping it stable during storms and harsh weather.

Portability and Stability

Lavvus are lightweight and easy to move. The tripod base of wooden poles evenly distributes weight, making the structure sturdy yet portable.

Central Fire and Ventilation

A central fire provides warmth, while the cone shape directs smoke out through the top opening, keeping the shelter warm and ventilated.



IGLOO DESIGN- ENGINEERING

WHY DOESN'T AN IGLOO FALL IN?

Dome Strength and Compression Forces

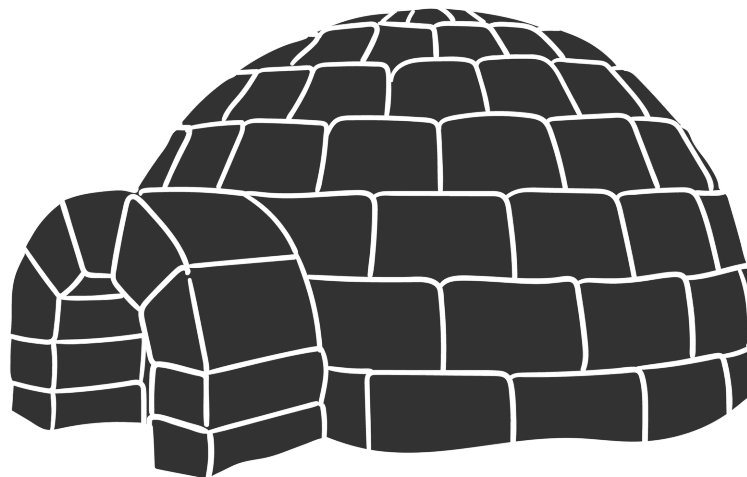
An igloo's dome shape evenly distributes weight, preventing collapse. The tightly packed snow blocks push against each other, creating incredible stability.

Snow as a Building Material

Packed snow is surprisingly strong, with tiny air pockets that provide insulation and structural integrity, allowing it to support heavy loads even in extreme cold.

Tunnel Entrance

The small entrance traps warm air inside and blocks wind, keeping the structure stable and efficient.





BUILD AN ARCTIC SHELTER

Lesson

9

Your challenge is to design and build a model shelter (an igloo or a lavvu) using only balance, structure, and careful engineering. Try it with very little to no glue first! Focus on how weight is distributed and how stability is achieved with the materials available.

Materials I will use:

Imagine: What are your ideas for building your shelter?

Plan: Draw a detailed sketch of your shelter design. Label the materials you'll use and highlight key features, like the dome of an igloo or the pole structure of a lavvu.

Test & Improve: After building your shelter, test its stability and durability with these steps:

Wind Test: Use a fan or blow gently. Did your structure stay upright?

Yes. ☐ No. ☐

Durability Check: Gently shake or move the base. Did it stay together?

Yes. ☐ No. ☐

Lavvu Check: If you built a lavvu, can you take it down and rebuild quickly?

Yes. ☐ No. ☐

Reflect: What did you learn from the activity? What worked? What did not work?

PATHFINDER PROJECT: BRAINSTORM

Once you have chosen your Pathfinder Project, start brainstorming all of the ideas you have to bring this project to life.

The Pathfinder Projects I am most interested in:

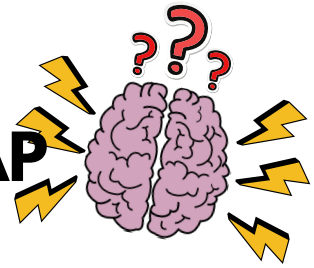
The materials that I will need:

Research I must do first:

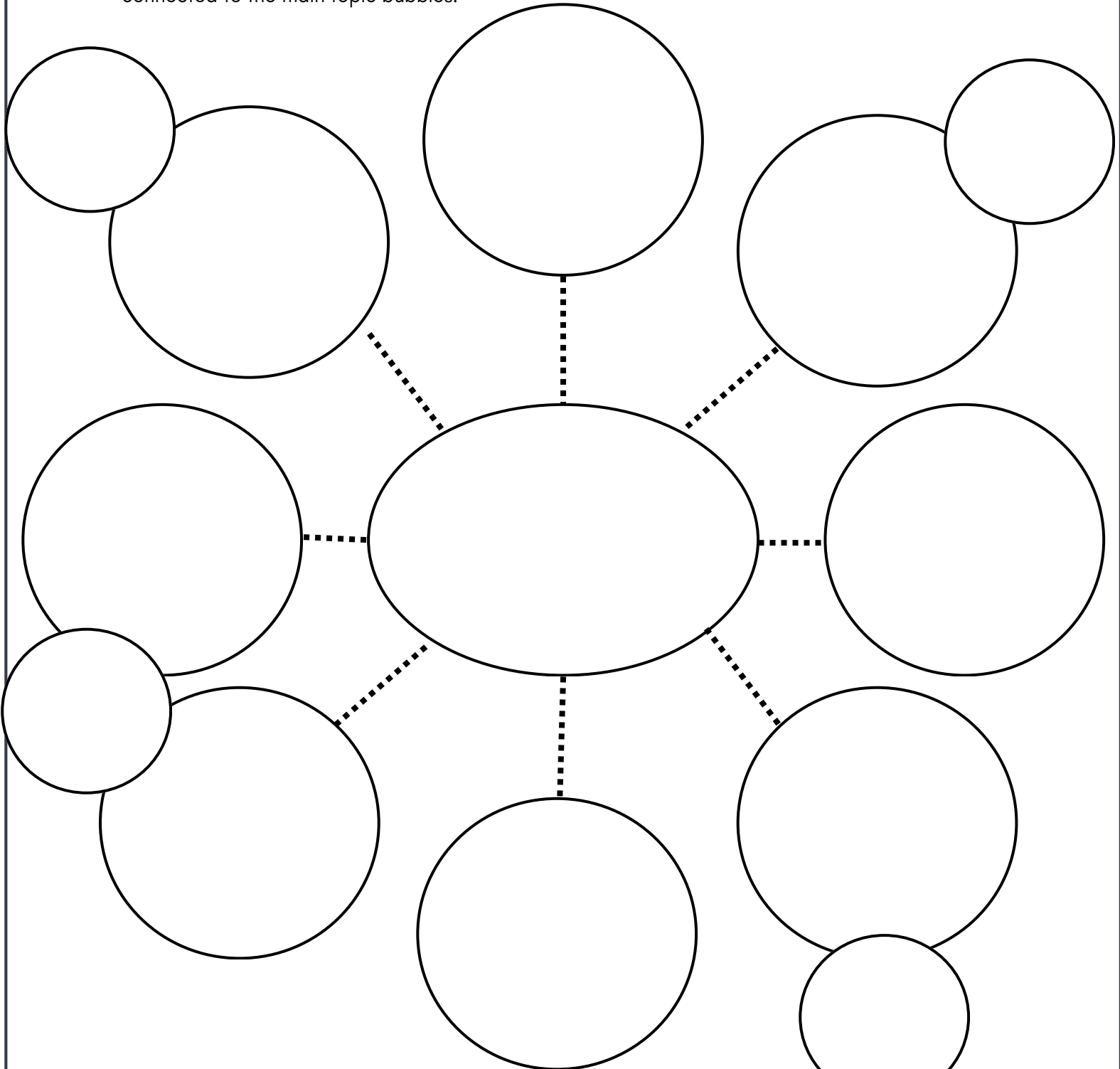
Someone I could interview or learn more from:

Other ideas:

PROJECT PLANNING: MIND MAP



1. **Start in the Center:** Write the name of your chosen project in the middle bubble.
2. **Branch Out:** Think of the main topics or ideas related to your project. Write each one in a separate bubble connected to the center.
3. **Add Details:** For each main topic, think of smaller details or questions. Write these in smaller bubbles connected to the main topic bubbles.





RIDDLE ME THIS

1 I leap through the Arctic waves,
hunting for fish all my days. My
whiskers are long, my blubber is
thick—who am I, slippery and
quick?

2 I dig through the snow, searching for
food, my white coat keeps me in a
stealthy mood. With fur that blends in
and ears that stay warm, who am I,
small but full of charm?

3 My antlers stretch high, my hooves
stomp low, I wander where the icy
winds blow. Pulling sleds or
grazing on lichen—who am I,
strong and striking?

4 I light up the Arctic skies at night,
with colors that shimmer, a
magical sight. I'm not an animal,
but I put on a show—what am I,
dancing in the glow?

5 In the long, dark night, I take my
time, my sharp nose helps me
find what's mine. My paws stay
light on the snowy ground—who
am I, hunting all around?

6 I am a frozen desert, vast and cold,
my tundra's story is ancient and
old. I stretch far and wide under
polar skies—what am I, where the
Arctic lies?

Can you think of a riddle about something cold or snowy to share with a friend?

.....

.....

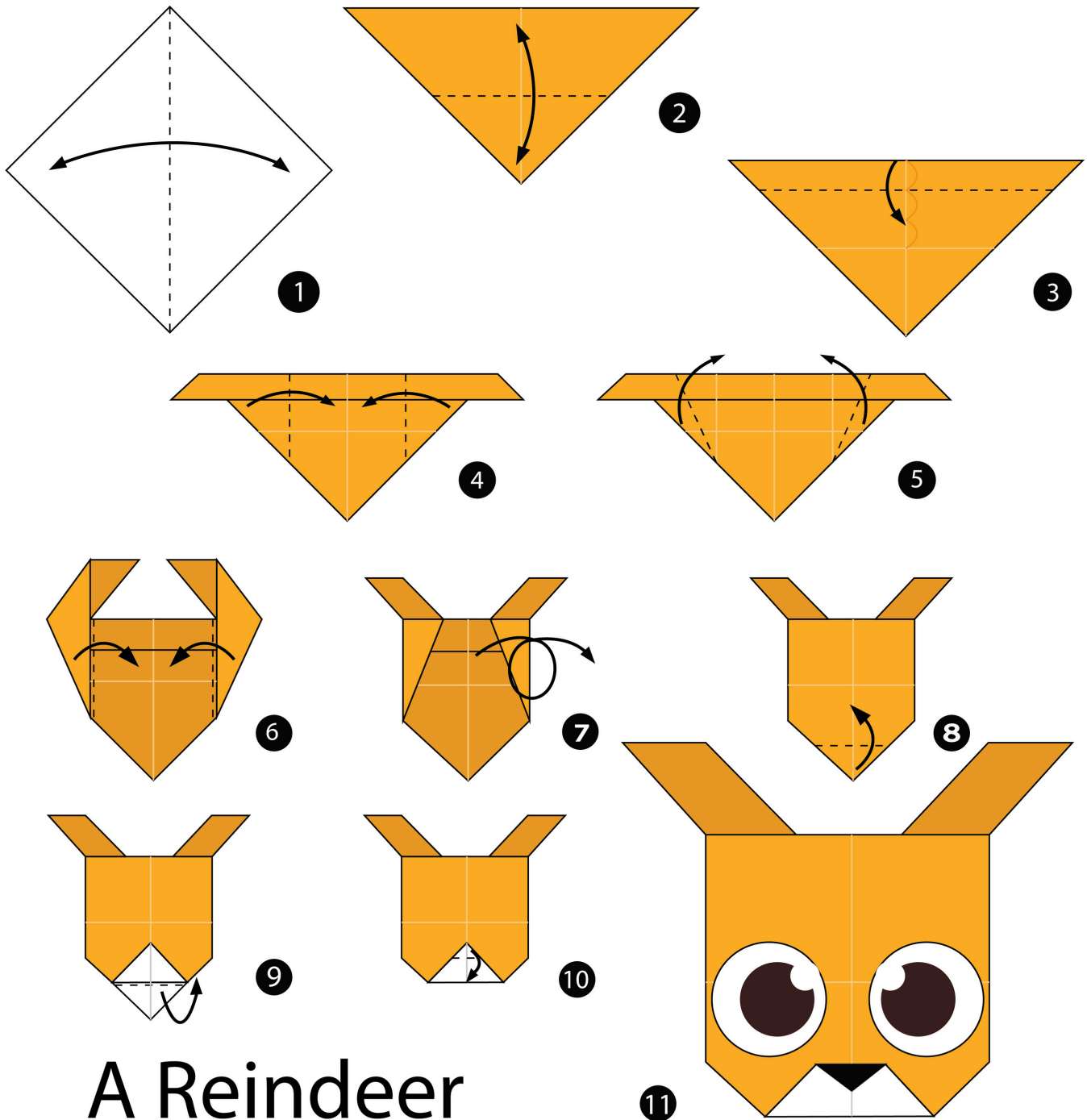


Task: Using the passage above as a prompt, write a short story. Remember to use a variety of nouns, adjectives, verbs and adverbs to make your story more interesting for your readers!

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ORIGAMI REINDEER

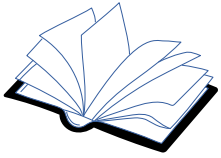


BONUS LESSONS

The Polar Night

Snowy Owls and Silent Flight

Navigating the Arctic



LIFE DURING THE POLAR NIGHT

Life During the Polar Night

The Polar Night is one of the most fascinating features of life in the Arctic. During this time, the sun doesn't rise above the horizon for weeks or even months, leaving the land in near-constant darkness. This happens because of the tilt of the Earth. In the winter, the North Pole leans away from the sun, and the farther north you go, the longer the Polar Night lasts. For people and animals in places like Lapland, Finland, adapting to this darkness is a part of everyday life.

How Do People Adapt?

Living without sunlight for so long might sound challenging, but Arctic communities have found creative ways to thrive. The Sami people, Indigenous to Lapland, use this time to focus on storytelling, crafts, and traditions. Today, modern homes are equipped with electricity to keep rooms bright and cozy, and many people use special lamps that mimic sunlight to stay energized. Celebrations and traditions also help brighten the dark days. In Lapland, winter markets, reindeer races, and Northern Lights tours keep spirits high. The Polar Night is seen as a magical time, with the snow-covered landscape sparkling under the light of the moon and stars.

How Do Animals Survive?

Arctic animals are experts at surviving the Polar Night. Some, like reindeer, rely on their incredible night vision to find food under the snow. Arctic foxes use their sharp hearing to locate prey, even in the dark. Birds like snowy owls adapt by hunting at dusk or using what little light there is from the moon and stars.

Other animals choose a different strategy: hibernation. Brown bears, for example, sleep through the darkest months, conserving energy until spring arrives. Meanwhile, smaller creatures like lemmings stay active by tunneling under the snow to find warmth and food.

The Science of Darkness

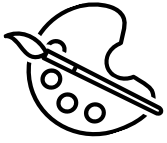
Even though the Polar Night is dark, the sky is far from boring. The moon shines brightly, casting a soft glow over the snow. On clear nights, you can see countless stars, and if you're lucky, the Northern Lights might dance across the sky. This extended darkness also gives scientists a chance to study how the lack of sunlight affects humans, animals, and plants.

The Polar Night may seem mysterious, but it's an important part of life in the Arctic. From cozy firesides to the incredible adaptations of animals, the darkness brings unique challenges and magical moments to those who live under its spell.



In this activity, you will reflect on what life might be like during the Polar Night, when the Arctic stays dark for weeks or months at a time. You'll write about your thoughts and ideas and then draw a Polar Night scene, showing how people or animals adapt to the darkness.

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



POLAR NIGHT SCENE SKETCH



ADAPTING TO THE POLAR NIGHT

What You Are Going to Do

In this activity, you will be assigned a task , however you will have to complete the task in low light, just like animals and people do during the Arctic's Polar Night. After your task is complete, you will search for items using only a flashlight or lantern. Use this journal to record your observations and reflections.

Challenge 1: Arctic Tasks

- What task did you complete?
- What made the task harder in low light?
- What strategy or tool helped you the most?

Challenge 2: Polar Night Search

- What objects did you find?
- Where were they hidden, and how did you find them?
- What challenges did you face while searching?



SILENT HUNTERS OF THE ARCTIC: THE SNOWY OWL

A Master of Camouflage

The snowy owl is perfectly designed to blend into its Arctic home. With its white feathers, this bird looks just like the snow and ice that cover the tundra. This camouflage helps it stay hidden from predators and allows it to sneak up on its prey. During the summer, when the snow melts, younger snowy owls with darker markings are better at blending in with the rocky ground.

The Art of Silent Flight

Have you ever wondered how a bird can hunt without being heard? Snowy owls are experts in silent flight. Their soft, fringed feathers muffle the sound of their wings, allowing them to glide silently through the air. This gives them a big advantage when hunting small animals like lemmings, birds, and fish. By the time their prey notices them, it's too late!

Built for the Cold

Life in the Arctic isn't easy, but snowy owls are built for the challenge. Their thick feathers act like a warm winter coat, covering not just their bodies but even their legs and feet. These feathers help keep the cold out, and their yellow eyes allow them to see clearly, even during the dim Arctic winter. Snowy owls spend a lot of time perched on the ground or low trees, scanning the landscape for food.

Masters of the Arctic Food Chain

Snowy owls play an important role in the Arctic ecosystem. They are apex predators, which means they are at the top of the food chain. Their favorite food is lemmings, and they eat a lot of them—up to 1,600 a year! When lemmings are plentiful, snowy owls raise more chicks to take advantage of the extra food. But when food is scarce, snowy owls adapt by migrating south to find new hunting grounds.

Fun Fact: Did You Know?

Snowy owls don't "hoot" like other owls! Instead, they make a variety of sounds, including whistles, barks, and even loud screeches. They are also one of the heaviest owls, weighing up to 6 pounds (about as much as a small dog).

Snowy owls are a symbol of survival and strength in one of the harshest environments on Earth. Their ability to adapt to the Arctic's challenges makes them one of nature's most impressive creatures!



SNOW OWL: SILENT FLIGHT

Draw a snowy owl and label key features such as its feathers, talons, and eyes.

1.



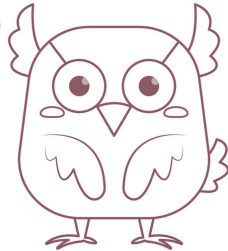
2.



3.



4.



5.





SNOWY OWL ADAPTATIONS

What to do:

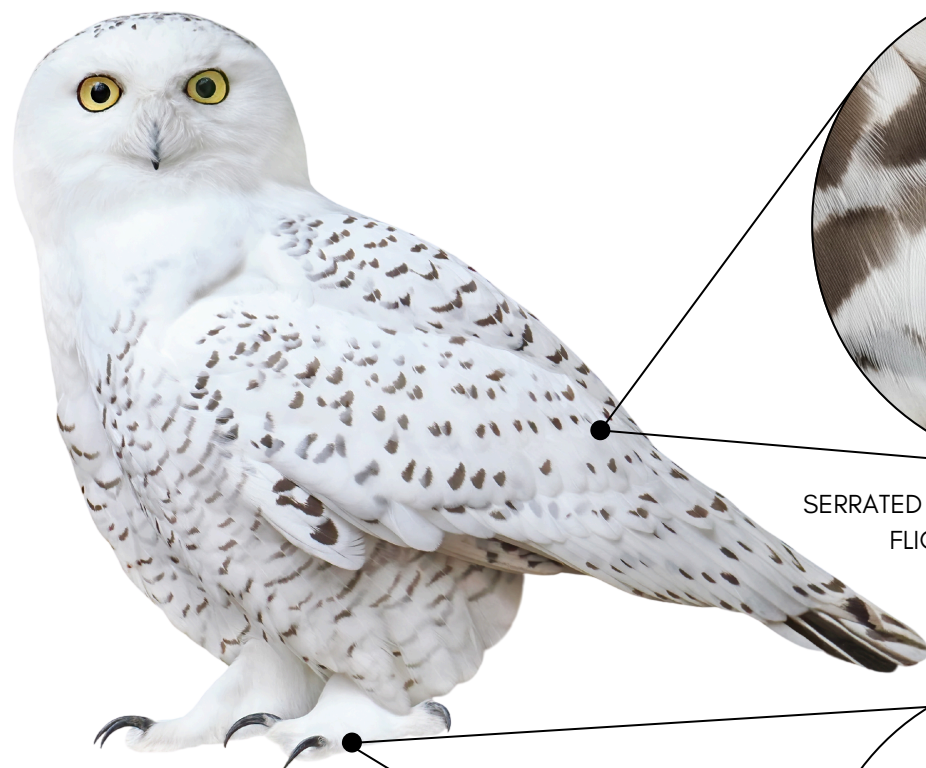
Using the resources available, complete the following table by exploring how the unique adaptations of snowy owls help them survive in the extreme northern environment.

Adaptation	How it helps the Snowy Owl
Camouflage (white feathers)	
Sharp talons	
Silent flight	
Thick feathers	
Yellow eyes	

Which adaptation do you think is the most important for their survival, and why?



SNOWY OWL FEATHERS



SERRATED COMB-LIKE FEATHERS STABILIZE FLIGHT AND REDUCE SOUND



SOFT, VELVETY FEATHERS ON WINGS AND LEGS ABSORB SOUND FREQUENCIES

Serrated, comb-like feathers:

These are a key feature of snowy owls and many other owls. The serrated edges on their primary feathers break up air turbulence, reducing noise during flight. This adaptation is crucial for silent hunting, as it helps snowy owls approach prey undetected.

Soft, velvety feathers:

Snowy owls have soft feathers covering their entire bodies, including their wings and legs. These feathers not only insulate against the Arctic cold but also absorb sound frequencies, further enhancing their silent flight.





EXPERIMENT DESIGN: TESTING FLIGHT ADAPTATIONS

What Are You Going to Do?

In this activity, you'll design and carry out your own scientific experiment to test a flight-related adaptation.

A scientific experiment helps us answer a question by testing one thing at a time, called a variable. If you change too many things at once, it's hard to know what caused the result! You'll ask a question, make a prediction (hypothesis), choose one variable to test, and write clear steps so others could repeat your experiment.

1. The Question:

Write a question your experiment will answer. Your question should focus on something related to flight adaptations.

Examples:

- "How does wing shape affect flight speed?"
- "How does feather texture affect how much noise is made during flight?"

My question:

2. Hypothesis

What do you think will happen? This is your prediction. Use "I think..." or "I predict..." to explain what you expect to see.



3. Identify Your Variable

A variable is the one thing you will change to test your question. Everything else stays the same so your test is fair.

Examples of variables:

- Wing shape (e.g., curved vs. straight)
- Body size (e.g., large vs. small objects)
- Feather texture (e.g., smooth vs. fringed)
- The variable I will test is:

4. Write Your Experiment Steps

- Write out the steps of your experiment. Be clear so someone else could follow your instructions.

5. Observations and Results

- What did you observe? Write down or draw your results here:



FINDING YOUR WAY IN THE ARCTIC

Finding Your Way in a Frozen World

Imagine being surrounded by miles of snow and ice with no clear paths or landmarks. How would you find your way? In the Arctic, where the ground is covered in white and the sun might not rise for months, navigating can be tricky. Yet, for centuries, explorers and Indigenous communities like the Sámi people have found clever ways to travel through this frozen world.

Traditional Tools of the Arctic

Before GPS or even compasses, people relied on nature to guide them. The Sámi people of Lapland used their deep knowledge of the land, observing things like the shape of hills, the flow of rivers, and the position of stars in the sky. They also noticed patterns in snowdrifts, which can show the direction of the wind.

Inuit communities in other parts of the Arctic used similar methods, relying on everything from animal tracks to the Northern Lights for direction. These skills, passed down through generations, helped them navigate safely even during the dark polar nights.

The Magic of the Compass

The invention of the magnetic compass changed exploration forever. A compass works because Earth has a magnetic field, with poles that pull the needle to point north. This simple tool became an essential item for Arctic explorers, helping them stay on course even when everything around them looked the same.

But compasses aren't perfect! Did you know that the Northern Lights, or aurora borealis, can interfere with a compass? The lights are caused by particles from the sun interacting with Earth's magnetic field, creating the beautiful colors we see. However, this same activity can confuse a compass, making it harder to find true north.

Modern Tools and Technology

Today, explorers use advanced tools like GPS devices and satellite maps. These technologies can pinpoint exact locations, even in the Arctic's most remote regions. But old-fashioned skills are still important. Batteries can freeze, and technology can fail in extreme cold, so knowing how to read the land and use tools like a compass remains essential.

The Adventure of Arctic Navigation

Navigating the Arctic isn't just about getting from one place to another—it's an adventure! Whether using the stars, a simple compass, or high-tech gadgets, explorers must adapt to the challenges of snow, ice, and freezing temperatures. By combining traditional knowledge with modern tools, they continue to conquer one of the world's toughest terrains.



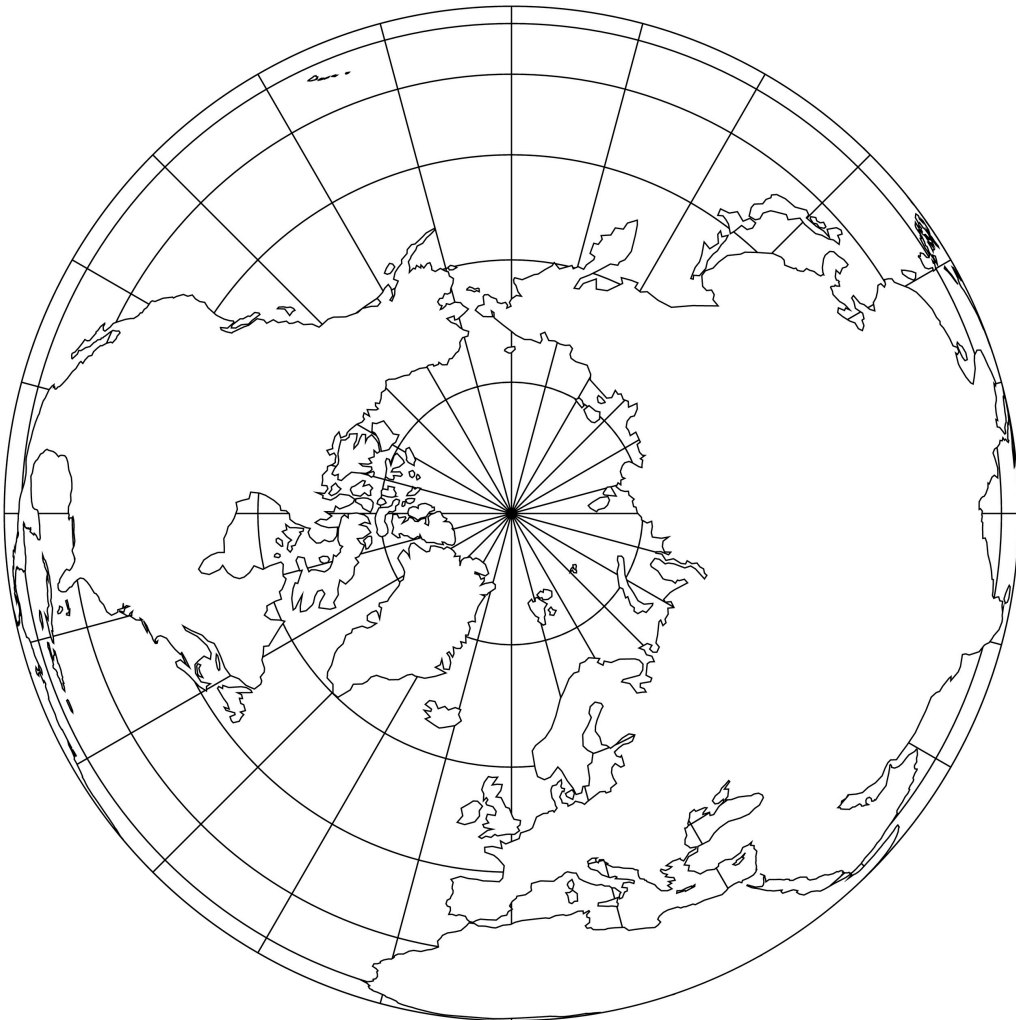
FINDING YOUR WAY IN THE ARCTIC

What You Are Going to Do

Using the map provided, locate and label important landmarks and features of the Arctic. Then, draw animals, icebergs, and other details directly on the map. Use the reading passage and your creativity to make your map come to life!

Part 1: Draw and Label Your Arctic Map

1. Use a globe or map to help you locate, draw and label the following on the map below:
 - a. Arctic Circle
 - b. Lapland
 - c. Greenland
 - d. The North Pole
2. Draw and label where you might find icebergs floating in the Arctic Ocean.
3. **Challenge:** Add and label at least two animal migration routes (e.g., reindeer, seals).



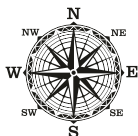
**Part 2: Research and Answer**

Use the reading passage to answer the following questions:

1. How do the Sámi people use natural markers to navigate in the Arctic?
2. What are some advantages of using GPS in the Arctic?
3. Why is it important to know both traditional and modern methods of navigation?

Part 3: Reflection

1. Imagine you are an Arctic explorer. Which navigation tool would you use and why?
2. If you were designing a new tool for Arctic navigation, what would it be? Draw or describe your idea below.



NATURE'S GUIDE: FINDING DIRECTIONS OUTSIDE

Did you know you can use nature and the earth to figure out which way to go? Even without a map or compass, the world around you has clues to help you find directions. In Lapland, people often rely on landmarks like mountains or trees to guide them, but depending on where you live, one of these methods might work best for you! Let's learn some fun ways to tell North, South, East, and West!

1. The Sun

The sun rises in the East and sets in the West. If you face the sunrise, East is in front of you, West is behind you, North is to your left, and South is to your right.

2. Moss on Trees

Moss loves shade and damp spots, so it often grows on the North side of trees. Look at the tree trunks and see where the moss is growing to find North.

3. The Stars

At night, you can use the stars to find your way—if you know where to look!

- In the Northern Hemisphere: You can find the North Star, called Polaris, which always points North. Look for the Big Dipper—a group of stars shaped like a scoop. The last two stars of the scoop point right to Polaris.
- In the Southern Hemisphere: Polaris isn't visible, but you can use the Southern Cross constellation to find South. Imagine drawing a line down from the long part of the cross to find the South Pole.

4. Wind and Weather

In some places, the wind often blows in the same direction. For example, in parts of the Arctic, the wind may come from the North. Pay attention to how the wind feels on your face!

5. Shadows

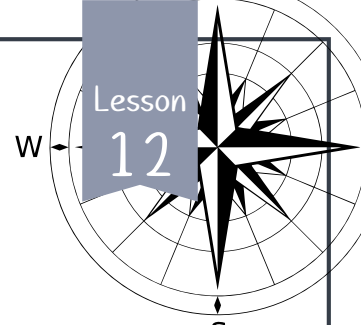
During the day, shadows can show you directions. Put a stick in the ground and mark where its shadow falls. Wait a little while and mark where the shadow moves. The first mark shows West, and the second mark shows East.

6. Snow and Ice

In cold places, snow and ice can melt faster on the South side of rocks and trees because that side gets more sunlight. If you see snow melting unevenly, it might help you find South!



BUILD A COMPASS



What You Are Going to Do

In this activity, you will create a simple magnetic compass to learn how explorers navigate snowy environments. After building your compass, you'll test its accuracy and think about how compasses work, even in the Arctic. For an extra challenge, you can design and test a waterproof case for your compass!

Part 1: Building Your Compass

1. Magnetizing the Needle

Write down what you observed when you rubbed the needle with the magnet:

2. Assembling the Compass

How did you put the compass together? Write or draw the steps here:(Draw your setup below!)

Part 2: Testing Your Compass

1. Did the needle point north after you assembled your compass?

- ☐ Yes
- ☐ No

2. What happened when you moved the bowl around? Did the needle still point in the same direction?

Discussion Questions

1. Why do compasses work, even in the Arctic?

2. What challenges might arise when relying on a compass in extreme conditions?

Challenge: The Northern Lights can sometimes interfere with a compass's magnetism. Can you figure out a way to disrupt your homemade compass so it no longer points to true north?



EXTENSION: DESIGN A WATERPROOF COMPASS CASE

Lesson
12

Your challenge is to design and build a waterproof case for your compass that can withstand Arctic conditions. Use creativity and engineering skills to ensure the compass stays dry and functional, even when exposed to snow, ice, or water!

Materials I will use:

Imagine: What are your ideas for building your case?

Plan: Write or draw your design for a waterproof compass case.

Test & Improve: What happened when you tested your waterproof case?

Did it keep the compass dry? Yes. ☐ No. ☐

Reflect: What did you learn from the activity? What worked? What did not work?

