

THE ARCTIC

OUR LAST GREAT WILDERNESS



Classroom Lesson

Caribou and Migration

Lesson Overview

Caribou and Migration

During the documentary film, [The Arctic: Our Last Great Wilderness](#), we joined the caribou of the Porcupine herd as they migrated through a year. The caribou move to find food, escape bugs, and to find a safe place to have babies.

Use the activities that follow to understand more about migration and the impact of surroundings on movement of a species.



Caribou and Migration

Background Information

The caribou of the Porcupine herd migrate long distances every year; from summer in the Arctic Wildlife Refuge where abundant food and safe calving grounds are found to winter grounds that are rich in lichen and are further south in Alaska. The timing of the spring migration depends on the snow melt in the foothills and on the plains of the calving grounds. During the summer, the insect population drives the caribou from field to field and in the fall, the caribou migrate due to the colder weather.

Human structures like roads, oil refineries, and shipping ports affect the routes of the migrating caribou. How far caribou migrate depends on the size of the herd. The larger the herd the more territory the herd needs and the farther the caribou migrate.

Though the Arctic is a great breeding and feeding ground in summer, climate change and human development is affecting the Arctic Wildlife Refuge. Humans are drilling oil and gas in the Arctic and may sell the land to the highest bidder. Though these resources are monetarily valuable, obtaining them disturbs the pristine area for the migrating wildlife. Also, the topography of the Arctic is changing as sea level rises and polar ice melts.

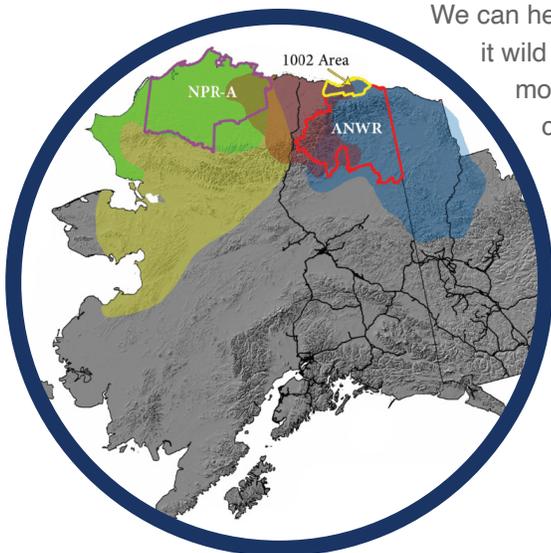
We can help save the Arctic by advocating to keep it wild and reducing our carbon footprint. Learn more about this special place and ways you can help guarantee its protection at

www.protectthearctic.org



About the Porcupine Caribou Herd

The herd migrates to and from the Arctic Wildlife Refuge on a yearly migration. The herd was named for the major river that runs through. Though the movement of the herd are unpredictable, they do frequent areas in the Yukon, Northwest Territories, and Alaska throughout the year. The herd numbers around 195,000 members and can travel up to 3,000 miles during their migration.



Lesson Overview

Population Study of the Caribou Herd

Standards

K-ESS3-1 Earth and Human Activity
MS-LS2-1 Ecosystems: Interactions,
Energy, and Dynamics
Performance Expectation



Grade Level 3-8

DURATION: 30 minutes

Materials

Calculator

Picture of caribou on plain with grids

Lesson Overview

The size of a caribou herd helps define the health of the Arctic ecosystem. When monitoring the herds, scientists are concerned with herd movement, predator prey interactions, and the size of the herd.

Scientists monitor the size of the herd by taking aerial photographs of the herd on the calving grounds. New technology allows the photos to be taken over a wider area, and even when the skies are overcast, which allows for a better count and disturbs the caribou less.



The past grid system was counted by hand so that scientists could be sure to count the animals only once. Now, the photos are analyzed by a computer program that interprets the photos. When hand counted, scientists could count every box or count 10 boxes and take an average then multiply by the total boxes on that photo. 📍

Did you know?
The larger the herd size, the longer the distance that herd will migrate. Population size studies help scientists predict where the herd will travel.



Lesson Overview

Population Study of the Caribou Herd

Procedure

1. Have the students count the number of caribou in 1 square of the grid.
2. Repeat the count in 2 other squares.
3. To find an estimate of the total population, multiply the number of caribou in one square by the total squares.
 - Estimate of population = one grid x total number of grids
 - Ex: Estimate = $23 \times 25 = 575$ caribou in the picture

Ask your students
Does averaging make a
difference in the end count?
Why not count every box?
Will the numbers be accurate
with more or less
boxes counted?

4. Discuss why the squares are the same or different and why scientists might make estimates.
5. For older students have them count 5 to 10 squares and then calculate an average.
 - Average = $(sq1 + sq2 + sq3 + sq4 + sq5) / \text{number of units}$
 - Example $(17 + 23 + 33 + 24 + 19) / 5 = 23.2$
 - $23.2 \times 25 = 580$ caribou
6. Use the average to calculate the total number of caribou pictured.



Caribou Herd on Grid



Caribou Herd on Grid



Caribou Herd on Grid



Lesson Overview

Porcupine Caribou Migration Game



Standards

MS-ESS3-4 Earth and Human Activity

HS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

3. Interdependent Relationships in Ecosystems:

Environmental Impacts on Organisms

2-LS4-1 Biological Evolution: Unity and Diversity

Procedure

1. Print the game board, game pieces and caribou token. Cut the game pieces and use as cards to draw when the game board indicates.
2. If you do not have access to a printer, represent each space with small pieces of paper.
3. Cut out your caribou token and decorate. Place on start and have everyone roll or spin; the highest number will go first.
4. Roll or spin and move your piece that many spaces. If you land on a game piece follow the directions on the card. If you don't land on a game piece, your turn stops.

Grade Level K-5

DURATION: 45 minutes

Materials

- Game pieces
- Random number generator (dice, spinner, phone)
- Caribou token
- Extra paper
- At home version game board (optional)

At-Home Version

- Print the game board and the small game cards. Use your random number generator to move that many spaces. If you land on a question mark, choose a card and follow those directions.
- If you want to print less, use a game board from the closet and designate spaces to draw cards.



Ask your students

What challenges is your herd encountering?

What would happen if your herd does not make it to the Arctic Wildlife Refuge?

What types of conditions are best for your herd?

How could humans help protect the herd?

Lesson Materials

Caribou Migration Game Pieces



Humans are drilling in the area and your herd cannot pass

Lose a turn



The calves are coming
Move 1 space forward towards the Arctic Wildlife Refuge



The calving grounds you migrated to are covered by snow! Changing global temperatures are causing the winter to stay longer than usual and the snow is melting later

Go back 3 spaces to a safe field



This area is filled with wolves!

Roll again once and move backward to avoid them!



You have successfully reached the calving grounds and given birth to a new calf!

Lose a turn as you care for your young in this safe place



The mosquitos are biting the herd

Move forward 2 spaces to avoid the bugs

Lesson Materials

Caribou Migration Game Pieces



Obstacle:
a new highway built
by people is blocking
your migration path!

Roll the dice and go
backwards to find a
better route



The land is filled with
birds who are nesting
Move back 2 spaces to
avoid the birds



The days are turning
into night much faster
in this area

Roll the dice once and
move forward to start
towards the winter
grounds



Snow is falling

Move forward 3
spaces to hurry
towards the rutting
grounds



The herd encounters
a bear!

Roll the dice and move
that many spaces
backwards



The grounds you are
in are running low
on food, meaning it
is time to migrate
somewhere else

Roll the dice once and
move forward

Lesson Materials

Caribou Migration Game Pieces



As you make your way to the winter grounds through the mountains you encounter a blizzard

Lose a turn as you weather the storm



You have successfully reached the winter grounds! This area is warmer and has more food than the place you came from. You can enjoy the winter season here

Take an extra turn to explore the area



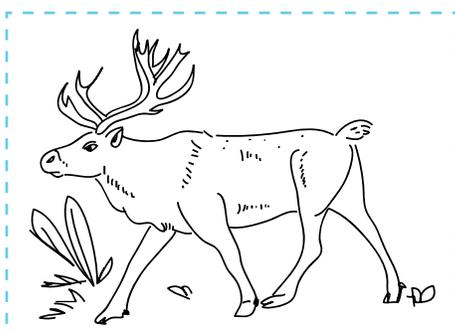
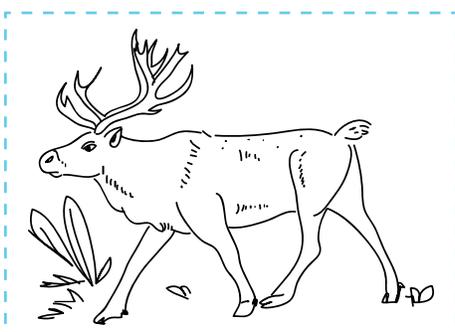
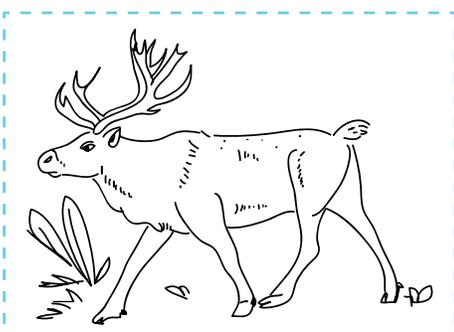
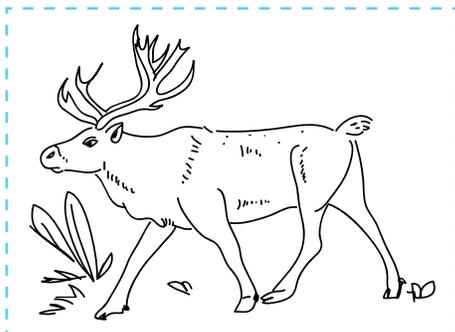
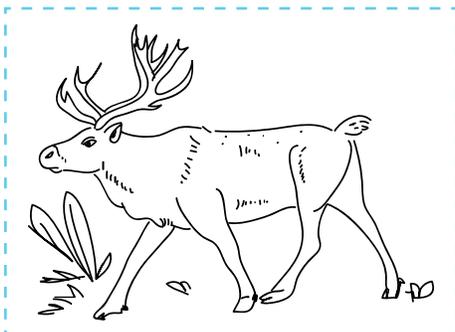
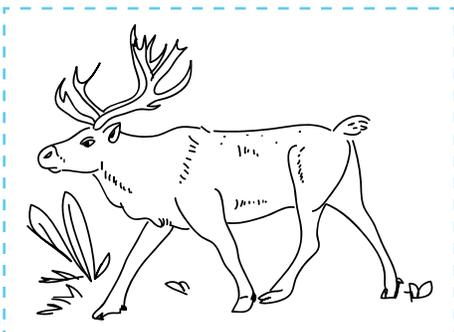
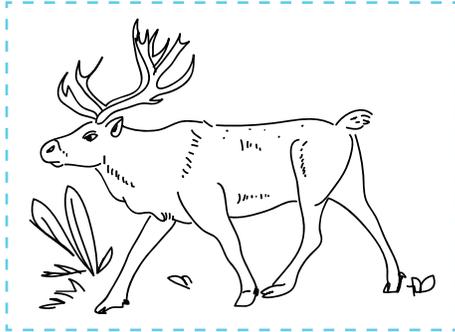
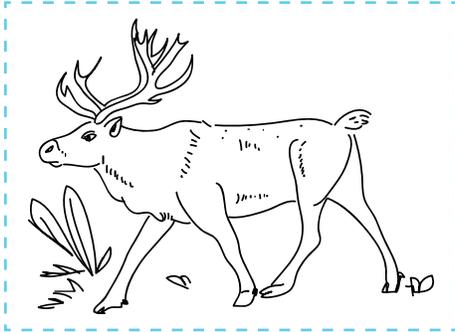
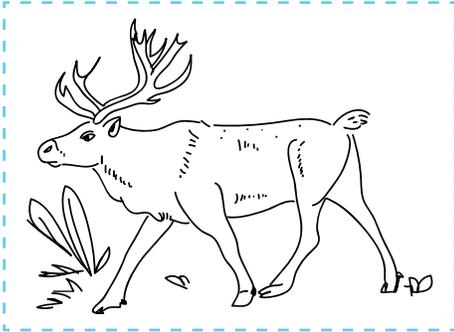
Congratulations

You have migrated!

Proceed to the finish line.

Lesson Materials

Caribou Migration Game Pieces



Caribou Migration Game Board

