

RESOURCE LIBRARY | ACTIVITY : 50 MINS

# Tracking Animal Migration

Students are organized into project groups and assigned a focal animal for their unit project. As a class, students navigate through an animation to learn about tracking elk migration in Yellowstone National Park. Students then research different methods for tracking animal migration using a variety of resources to get comfortable interacting with and interpreting animal migration maps.

## GRADES

6, 7, 8

## SUBJECTS

*Biology, Ecology, Conservation, Geography, Geographic Information Systems (GIS)*

## CONTENTS

1 Resource, 4 Links, 1 Video

## OVERVIEW

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For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/tracking-animal-migration/>

## In collaboration with

# DIRECTIONS

This activity is part of the Detours and Distractions: How Humans Impact Migration Patterns unit.

## 1. Assign student groups to a focal animal for their unit project.

- Group students together based on their interest in one of the following animals, as recorded on their *Choose Your Migrating Animal* exit ticket completed during the Why and How Animals Migrate activity:

- Humpback whale (*Megaptera novaeangliae*)
  - Reindeer (caribou) (*Rangifer tarandus*)
  - Arctic tern (*Sterna paradisaea*)
  - Adélie penguin (*Pygoscelis adeliae*)
  - Pronghorn (*Antilocapra americana*)
  - Leatherback sea turtle (*Dermochelys coriacea*)
  - Chinook salmon (*Oncorhynchus tshawytscha*)
  - White-throated sparrow (*Zonotrichia albicollis*)
  - Globe skimmer dragonfly (*Pantala flavescens*)
  - Sandhill Crane (*Antigone canadensis*)
  - Canada goose (*Branta canadensis*)
  - Painted lady butterfly (*Vanessa cardui*)
- Explain that over the course of the remainder of the unit, each group will create a paper map highlighting their animal's migration route, research how its migration is impacted by humans, identify how its migration affects its ecosystem(s), and develop solutions to the human impacts.

## 2. Introduce animal tracking and explain the activity's objective.

- Elicit students' background understanding of animal tracking. Ask:
  - *How do you think we know where animals go during migration?* (Possible responses: we can follow them, we can track them, drones.) Emphasize that scientists and explorers use a wide variety of methods to track and study animals to understand their migrations.

- Direct project groups to read the [What is Animal Tracking?](#) page from Movebank, a free online database of animal tracking data, in order to identify three interesting facts about animal tracking. Then, in a class discussion, have groups share out interesting facts while recording them in a visible place for all to see.
- Explain the purpose of today's activity is to:
  - Introduce students to the Greater Yellowstone Ecosystem, which students will focus on more deeply in a later activity.
  - Explore a variety of resources and learn about how different animals are tracked.
  - Get comfortable interacting with and interpreting [animal migration](#) maps, which students will be making for their unit project.

**3. Bring students back together to guide the class through the [Follow the Elk's Perilous Journey](#) animation to investigate how elk in [Yellowstone National Park](#) are tracked during their migration.**

- Create two lists on the board that are titled "Animal Migration Tracking Methods" and "Animal Migration Maps." Encourage students to identify the different tracking methods and maps they encounter throughout the activity. As they are addressed during the discussion, record student contributions to the lists on the board.
- As you scroll through the animation, choose students to read text portions aloud as appropriate. As you engage with the content, emphasize the following:
  - North American Elk Range: Call attention to the difference between the historic and current elk ranges. Mention that students will be creating a similar multilayered map for their unit project showing the typical migration route and the human interrupted migration route for their project animal.
  - Greater Yellowstone Superherd: Ask students to paraphrase the elk's [migration pattern](#).
  - Winter: Click the arrow to start the animation. Explain that the movement of the dots represents [average](#) elk herd movement in March. Ask students:
    - *What tracking [method](#) is mentioned here?* (GPS collar)
    - *What does this map depict?* (Elk herd movements in their winter feeding grounds)
- If needed, prompt students to add the tracking method, the map title, and description to the class list.

- Spring Migration: Click the arrow to start the animation. Explain that the movement of the dots represents average elk herd movement between April and August. Ask students:
  - *What does this map depict?* (spring migration, herds moving into the park)
  - If needed, prompt students to add the map title and description to the class list.
- Pulse of the Park: Click the arrow to start the animation. Explain that the movement of the dots represents average elk herd movement between August and January. Ask students:
  - *What does this map depict?* (fall migration, herds moving out of the park when snow begins to fall)
  - If needed, prompt students to add the map title and description to the class list.
- Nine Elk Herds: If needed, prompt students to add the map type (migratory routes for nine elk herds) to the class list.
- Who Owns This Land?: Call attention to the different groups of people that own land that the elk migrate through. Ask students:
  - *What are some impacts to the elk's migration that might arise on these different kinds of land?* (Possible answers: Elk might be hunted if they are on private land, tribal land, or in the wilderness; elk may be impacted by crossing roads, ranching, fencing, and projects that are ongoing on state or local government land.)
- A Single Elk: Explain that the next few maps are a narrowed version of the maps we have already seen that focus on one elk's (Elk 22) migration journey.
- Winter Range: Click the arrow to start the animation. Explain that the movement of the dot represents one elk's movement (Elk 22) between March and May, the winter range.
- Hazardous Return: Call attention to the large number of elk killed by hunters.

#### 4. Deepen understanding of migration mapping through group research.

- Highlight that students have learned some tracking and mapping techniques for elk migration. Prompt students to consider how well these methods might work for other migrating animals (e.g., their focal animal, small birds, insects, amphibians, aquatic animals, urban wildlife). Do they expect similar or different approaches—and why?

- Explain that project groups will now research different types of animal migration maps, which will prepare them to think more strategically about their culminating project map.
- As groups explore the following resources, encourage group members to work together and discuss the strengths and weaknesses of the strategies they learn about, and to add as many methods to the “Animal Migration Tracking Methods” list and as many map names to the “Animal Migration Map” list as they can. If project groups choose to divide the resources between their members, assign at least two of the following to each student or pair to ensure every resource is investigated at least once.

- [Butterfly Surveillance video](#)
- [Tales of a Tail-Feather video](#)
- [Long-distance Ocean Travels maps](#)
- [Global Tagging of Pelagic Predators](#)
- [Tracking Animal Migrations GeoStory](#)

- As groups work, prompt thinking with questions like these to remind students to keep their unit project in mind:
  - *What tracking methods are most appropriate for animals of different sizes?*
  - *Which type of map is best suited to track animal migration by air, land, and sea?*

##### **5. Remind students of the possible opportunities for further action.**

- Consider again ideas for students to take additional action after the unit concludes, to continue momentum toward helping end negative human impacts on animal migration and extend the impacts of their project work into the local or global community.
- Gauge student interest and feasibility of conducting different courses of action.
  - Identify local migratory organisms. Create a backyard “pit stop” for the most vulnerable—such as a bat box or specific native flowering plants.
  - Author a class letter to Congress, local government, or a local business to encourage an animal migration solution (e.g., building a wildlife crossing bridge). Students can submit copies of their maps and presentations as evidence.
  - Download the [Animal Tracker app](#) or [eBird app](#) and follow and add to scientific knowledge about migrating animals through student citizen science field work.

## Tip

**Step 1:** Alternatively, instead of assigning groups based on interest, students can be assigned an animal, or pre-assigned groups can randomly draw an animal.

## Modification

**Step 3:** Instead of creating the class lists on the board, they can be created in an easily accessible online location.

## Modification

**Step 4:** If there aren't enough devices for each group, the *Long-Distance Ocean Travel maps* and resources from the other sites can be printed out to be investigated by groups or can be displayed on the classroom computer.

## Informal Assessment

Use student entries on the “Animal Migration Tracking Methods” and “Animal Migration Maps” lists to informally assess their ability to describe animal migration route maps and identify different methods used by humans to track animal migration. Use student responses during class and group discussions to gauge their understanding of how animal migration is tracked.

## Extending the Learning

- Read the [Species Range](#) encyclopedic entry.

## OBJECTIVES

## Subjects & Disciplines

### Biology

- [Ecology](#)
- Conservation

### Geography

- [Geographic Information Systems \(GIS\)](#)

## Learning Objectives

Students will:

- Identify different methods used by humans to track animal migration.
- Explore a variety of resources to learn more about tracking animal migration.

## Teaching Approach

- Project-based learning

## Teaching Methods

- Discussions
- Multimedia instruction
- Research

## Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
  - Life and Career Skills
    - Initiative and Self-Direction
- Critical Thinking Skills
  - Analyzing
  - Remembering
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information
  - Answering Geographic Questions
- Science and Engineering Practices
  - Asking questions (for science) and defining problems (for engineering)

- Obtaining, evaluating, and communicating information

# National Standards, Principles, and Practices

## COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.RST.6-8.4:**

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

- **CCSS.ELA-LITERACY.SL.7.1:**

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

- **CCSS.ELA-LITERACY.SL.7.2:**

Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.

## NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 1:**

Patterns

- **Crosscutting Concept 2:**

Cause and effect: Mechanism and prediction

- **MS. Ecosystems: Interactions, Energy, and Dynamics:**

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

- **MS-LS2: Ecosystems: Interactions, Energy, and Dynamics:**

MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem

- **Performance Expectations: MS-LS2-2:**

MS-LS2-2: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

- **Science and Engineering Practice 1:**

Asking questions and defining problems



- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information

## **Preparation**

### **What You'll Need**

#### **MATERIALS YOU PROVIDE**

- Dry erase markers
- Markers
- Whiteboard, chalkboard, or chart paper

#### **REQUIRED TECHNOLOGY**

- Internet Access: Required
- Tech Setup: 1 computer per classroom, 1 computer per pair, Monitor/screen

#### **PHYSICAL SPACE**

- Classroom

#### **SETUP**

Using the exit ticket from the *Why and How Animals Migrate* activity, create groups of three to four students based on the focal animal they would like to study.

#### **GROUPING**

- Large-group instruction
- Small-group learning

#### **RESOURCES PROVIDED: WEBSITES**

- Tagging of Pelagic Predator

#### **RESOURCES PROVIDED: UNDEFINED**

- Butterfly Surveillance

## RESOURCES PROVIDED: MAPS

- Long-distance Ocean Travels

## RESOURCES PROVIDED: INTERACTIVES

- National Geographic: Follow the Elk's Perilous Journey
- National Geographic: Tracking Animal Migrations

## RESOURCES PROVIDED: ARTICLES & PROFILES

- Movebank.org: What is Animal Tracking?

## BACKGROUND & VOCABULARY

### Background Information

Scientists have been tracking animal migration for more than a century, and methods have evolved with the times. What once simply entailed tracking animal footprints has turned into using GPS tags or collars, radio transmitters, geolocators, camera traps, drones, and physical tags. Tracking animal migration is important to understand more about the animals themselves, and how humans are impacting the movement of animals. The most common way that animal migration tracking data is displayed visually is in the form of a map. This makes the data accessible to a wide audience, shows how the migration routes relate to the landscape features, and can be very impactful in showing changes in animal migration patterns due to human impact.

### Prior Knowledge

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### Recommended Prior Activities

- [Collision! Human Impacts on Animal Migration](#)
- [Why and How Animals Migrate](#)

### Vocabulary

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>animal migration</b>	<i>noun</i>	process where a community of animals leaves a habitat for part of the year or part of their lives, and moves to habitats that are more hospitable.
<b>average</b>	<i>noun</i>	ordinary.
<b>detour</b>	<i>noun</i>	unplanned or temporary path.
<b>distract</b>	<i>verb</i>	to divert or draw attention away from something.
<b>ecosystem</b>	<i>noun</i>	community and interactions of living and nonliving things in an area.
<b>feeding ground</b>	<i>noun</i>	region where organisms go to eat.
<b>focal</b>	<i>adjective</i>	central and important.
<b>hazardous</b>	<i>noun</i>	involving the possibility of risk, loss, or harm
<b>impact</b>	<i>verb</i>	to influence or have an effect on something.
<b>map</b>	<i>noun</i>	symbolic representation of selected characteristics of a place, usually drawn on a flat surface.
<b>method</b>	<i>noun</i>	way of doing something.
<b>migration pattern</b>	<i>noun</i>	predictable movements, in time and space, of a group of animals or people.
<b>pelagic</b>	<i>adjective</i>	having to do with the open ocean.
<b>perilous</b>	<i>adjective</i>	dangerous.
<b>solution</b>	<i>noun</i>	an answer to a problem.
<b>species range</b>	<i>noun</i>	native, geographic area in which an organism can be found. Range also refers to the geographic distribution of a particular species.
<b>surveillance</b>	<i>noun</i>	observation of a person, community, or situation.
<b>tracking</b>	<i>noun</i>	process in which scientists and resource managers use technology to tag animals and map their movements.
<b>Yellowstone National Park</b>	<i>noun</i>	large national park in the U.S. states of Wyoming, Idaho, and Montana.

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## For Further Exploration

### Articles & Profiles

- [Springer: Animal Migration Tracking Methods](#)

## Books

- [Mariner Books: The Homing Instinct: Meaning & Mystery in Animal Migration.](#)
- [W. W. Norton & Company: Where the Animals Go](#)

## Interactives

- [National Geographic: Animals in Motion Quiz, Part 1](#)
- [National Geographic: Follow the Elk's Perilous Journey](#)

## Websites

- [National Geographic: Resource Library: Animal Migration](#)



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