



Harbor Seals in Glacier Bay National Park

Middle School Scientists Curriculum

Investigation 1: Flipper Feet

Overview:

Students begin this investigation by watching the seven minute video *Harbor Seals in Glacier Bay*. Jamie Womble, a seal researcher at Glacier Bay, interacts with local students to answer questions about harbor seals and various ways to study them. Students compare their answers to the researcher questions and their reactions to the video. As researchers, students observe the similarities and differences between seals and sea lions and create a **Venn Diagram** to graph these features.

Background Information:

Pinnipeds, also known as fin-footed mammals, are a group of carnivorous marine mammals that include three families of mammals: seals, sea lions, and walrus. Two species of pinnipeds live in Glacier Bay: harbor seals and Steller sea lions. Since they are both pinnipeds, these two animals have many similarities, but they also have key differences. With a little observation it is easy to distinguish between the two species.

Harbor seals are considered a “true seal” along with monk seals, leopard seals, and ribbon seals. True seals are found in marine and freshwater habitats in the Atlantic and Pacific regions. These seals have no external ear flaps (**pinnae**) and are sometimes called “earless seals.” True seals have short necks and short flippers. Their short flippers cannot be pulled under their body, making land movement difficult. Though seals are graceful and agile under the water, they are awkward on land and usually move in an undulating, caterpillar-like manner. Underwater propulsion comes from moving their hind flippers in a back and forth motion and using their front flippers for steering. Males and females are generally similar in size and shape. Pups grow quickly and are usually weaned within several weeks.

Class Time Required	1 class period (50 minutes)
Materials Needed:	• Student journals • Images of harbor seals & Steller sea lions • <u>Video and Vocabulary Sheet</u> (1 per student) • <u>Venn Diagram Sheet</u> (1 per group)
Teacher Preparation:	30 minutes to read background information, investigation, and preview video
Student Knowledge:	Basic understanding of pinniped biology, differences and similarities of seals and sea lions
Vocabulary:	pinnae, pinniped, Venn Diagram
National Content Standards	• NS.5-8.1 Science as Inquiry • NS.5-8.3 Life Science • NS.5-8.7 History and Nature of Science

Investigation 1: Flipper Feet

Steller sea lions, along with California sea lions and Northern fur seals, are known as “eared seals” for the presence of external ear pinnae. Sea lions have a more limited range than seals and are found only in marine swim underwater, sea lions flap their front flippers up and down, as if they were flying and use their hind flippers for steering. Sea lions are often vocal, emitting roars, barks, and growls. Adult sea lions are dimorphic: with male sea lions twice as big as a female with a thickened neck and a pronounced skull crest. A dominant male sea lion will form rookeries and mate with many female sea lions and defend his rookery from other males. Pups are born in the rookeries and many stay with their mothers for more than a year.

Focus Questions:

What characteristics distinguish seals from sea lions?

How can careful observation lead to a better understanding of an animal?

How are seals and sea lions similar and different?



Engagement:

(15 minutes)

Pass out the Video and Vocabulary Sheet to each student and give them a few minutes to answer the questions prior to watching the video. Show students the video *Harbor Seals in Glacier Bay*. The video highlights current research in Glacier Bay National Park as researcher Jamie Womble interacts with local middle school students. The interaction is question and answer format, allowing time to stop and start the video to solicit answers from students. As they are watching, the students should write down the researcher’s answers to the questions. In conclusion, review what the students already knew about seals, what they learned, and how scientists study seals.

Investigation:

(30 minutes)



1. This is an exercise in observation. In the video, students are introduced to some of the differences between seals and sea lions. Through a simulated nature sketching activity, students will hone their powers of observation and learn about seals and sea lions.
2. Introduce students to the group of animals known as pinnipeds. What are the characteristics of pinnipeds? What other animals do they think belong to this group? Do the students know anything else about seals and sea lions?
3. Each student should choose one image of a seal or sea lion. This folder have multiple images of harbor seals and Steller sea lions. Make these images available for your students by either printing the images or allowing students to see them on computers. Students may also search for images on the internet, but they should be aware that many images are mislabeled. If they do search the internet for images, students could identify the images as harbor seals or Steller sea lions.

Investigation 1: Flipper Feet

4. Once a student has selected an image, they can begin to draw the image in their science journal or on a piece of paper. These should be careful, detailed drawings, not just quick sketches. Many of the images have more than one animal so students may draw all of them and focus on the whole scene or they may choose to look carefully at one or two animals. Remind the students to draw what they see, not what they expect to see. Have them look carefully at color, flippers, body shape and posture, nose shape, etc...
5. Words can be used in their drawings as well. If colored pencils aren't available, students should use words to describe the colors. They may also note where the animal is located or any other features of interest.

For more information on nature journaling, see the following references and websites:

http://www.smithsonianeducation.org/educators/lesson_plans/journals/index.html

http://www.sierraclub.org/education/nature_journal.asp

Leslie, Clare Walker and Charles E. Roth. *Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You*. Storey Publishing, 2003.

Explanation:

(10 minutes)

Draw a Venn diagram on the board and label one circle Seals and the other circle Sea Lions. In the video, Jamie Womble listed numerous differences between these two groups. Ask the students to help list the differences of these two groups and write them in the appropriate circle on the diagram. Now that the students had time to observe a seal or sea lion, have them write the similarities of seals and sea lions on the Venn diagram. This could be an individual project for students by passing out the Venn diagram sheet.

Extension:

Take a look at other marine mammals that share the marine environment with pinnipeds. Have students expand the Venn diagram to include these other animals. What are some characteristics of marine mammals that enable them to survive in the marine environment?

References/Resources:

<http://www.nps.gov/glba/naturescience/harbor-seals-in-glacier-bay.htm>

<http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/>

<http://seagrant.uaf.edu/marine-ed/mm/fieldguide/pinnipeds.html>

http://www.smithsonianeducation.org/educators/lesson_plans/journals/index.html

http://www.sierraclub.org/education/nature_journal.asp

Leslie, Clare Walker and Charles E. Roth. *Keeping a Nature Journal: Discover a Whole New Way of Seeing the World Around You*. Storey Publishing, 2003.

Investigation 1: Flipper Feet

National Science Standards Addressed

Grades 5-8

NS.5-8.1 Science as Inquiry

Understanding about Scientific Inquiry (5-8):

- Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.

NS.5-8.3 Life Science

Regulation and Behavior (5-8):

- All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

Diversity and Adaptations of Organisms (5-8):

- Millions of species of animals, plants, and microorganisms are alive today. Although different species might look dissimilar, the unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes, and the evidence of common ancestry.

NS.5-8.7 History and Nature of Science

Science as a Human Endeavor (5-8):

- Women and men of various social and ethnic backgrounds – and with diverse interests, talents, qualities, and motivations – engage in the activities of science, engineering, and related fields.

Science requires different abilities, depending on such factors as the field of study and type of inquiry.

Nature of Science (5-8):

- Scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models.



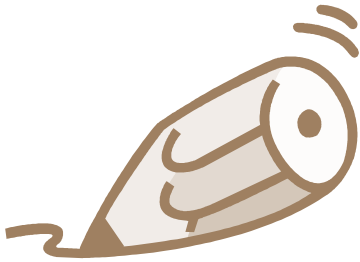
Harbor Seals in Glacier Bay National Park

Video and Vocabulary Sheet

Video Questions

Before watching the video try to answer these questions. Watch the video and take notes on the answers given by the researchers. Compare your answers.

1. How can you tell the difference between seals and sea lions?
2. What are the main predators of harbor seals?
3. How do biologists study seals in Glacier Bay?
4. Why do you think seal numbers have been declining in Glacier Bay?
5. Why is it important to study seals in Glacier Bay?



Harbor Seals in Glacier Bay National Park

Video and Vocabulary Sheet

Vocabulary

Observe	to watch carefully especially with attention to details or behavior
Pinna	a projecting body part (such as a fin, wing, or ear) pinnae pl.
Pinniped	A suborder of aquatic carnivorous animals such as seals and sea lions with all four limbs modified into flippers
Venn diagram	Diagram of overlapping circles that show relationships between two collections of sets



Investigation 1: Flipper Feet

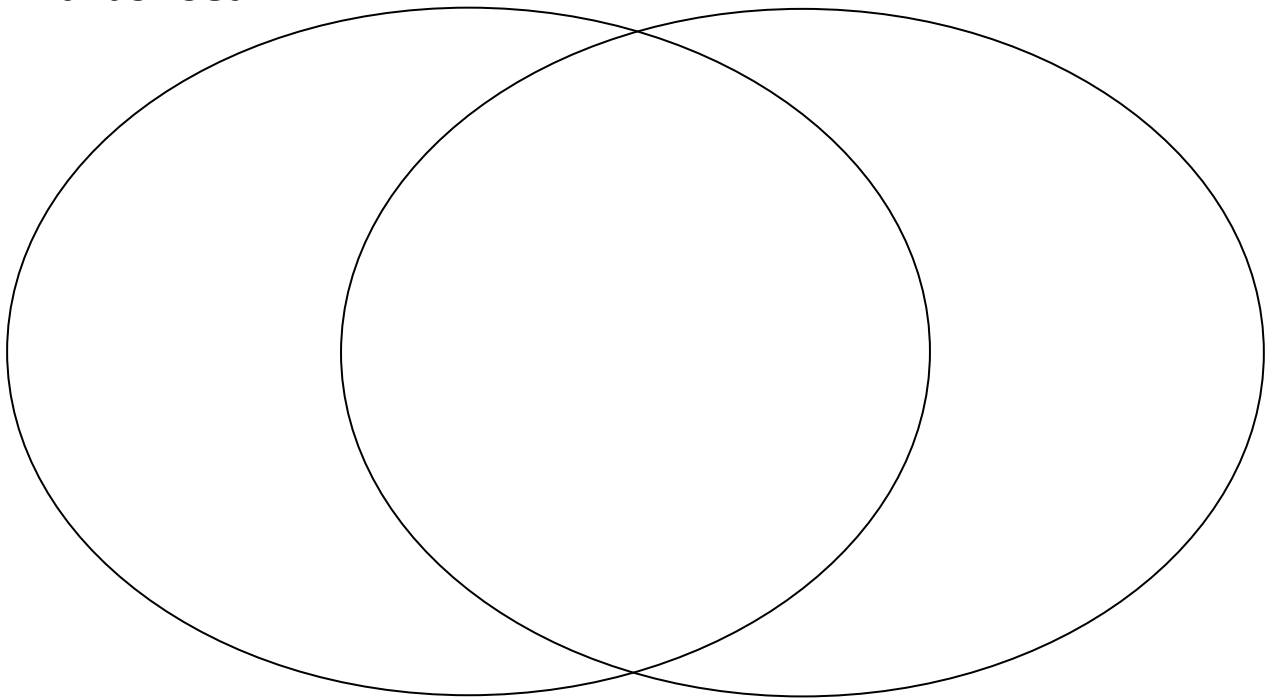
Venn Diagram

Directions:

Use the information on the Harbor Seal video and looking at photographs, fill out the differences and similarities between harbor seals and Steller sea lions.

Harbor Seal

Steller Sea Lion



What observations can you make about the similarities between harbor seals and Steller sea lions?

What adaptations do they both possess that enable them to survive in an aquatic habitat?
