

Harbor porpoises of Puget Sound Video: Lesson Plan

Grade levels 6-8



Overview

Through this engaging video about real-life, local scientists and their research on harbor porpoises, students will learn about the natural history, behaviors and ecology of this species and their ecosystem dynamics. Students will better understand the need for research to inform conservation and be able use the knowledge gained to interpret and explain ecological relationships and their importance in an ecosystem.

Activity time:

Prior to activity: Students complete pre-quiz, teacher reviews terms if needed.

Day 1: Introduction and background info by Drew Collins (5-10 min), students watch video and complete video worksheet (25-30 min), discussion/questions with Drew Collins (5-10 min); 50 min total.

Day 2: Students work in groups to discuss their answers from Day 1 and use them to complete the digging deeper questions (50 min). Post-quiz can be given on Day 2 or day after.

Objectives

After this activity, students will be able to:

1. Understand how scientists collect data on marine mammals and why this is important for conservation of a species and/or ecosystem.
2. Describe the natural history and behaviors of harbor porpoises and how that relates to their ecology.
3. Collaborate with other students and take the knowledge gained about harbor porpoises to explain real and hypothetical ecological interactions between marine species, humans and the physical environment and the consequences of these interactions.

Materials

- Online access, ability to watch videos online and display on a projector screen or wall
- Harbor porpoises of Puget Sound video (online)
- Salish Sea map (see below)
- Pre/Post quizzes
- Video worksheet
- Digging deeper questions – group work

Please be sure to send back the pre/post quiz scores (and answers to post-quiz questions 11 and 12) to Drew Collins. Names should not be included, just raw scores and answers. This is collected to help us improve the curricula and for data required for grant applications to be able to distribute the activity more freely

Terms to review for students

- **Salish Sea:** one of the world's largest and biologically rich inland seas encompassing Puget Sound, the San Juan Islands and the waters off of Vancouver, BC. Essentially all inland waters of Washington State and Canada. Facts: 7, 470km of coastline, 419 islands, maximum depth 650m, total population 8 million, 37 species of mammals, 172 species of birds, 253 species of fish, and more than 3,000 species of invertebrates; 113 species are listed as threatened, endangered, or are candidates for listing.
- **Ecosystem:** a biological community of interacting organisms and their physical environment.
- **Harbor porpoise:** *Phocoena phocoena*, the world's 2nd smallest cetacean (a whale, dolphin or porpoise): 5-5.5ft, average 150 pounds.
- **Gull:** a long-winged web-footed seabird with a raucous call, typically having white plumage with a gray or black mantle, but color can vary. Note the term Seagull is not correct, all species in this group are called gulls.
- **Foraging:** the search for food or provisions.
- **Mating:** the action of animals coming together to breed; copulation.
- **Ecology:** the relation of organisms to one another and to their physical surroundings.
- **Behavior:** the way in which an organism acts in response to a particular situation or stimulus.
- **Anthropogenic:** relating to human activity (usually related to negative impacts like pollution)
- **Tide:** the alternate rising and falling of the sea, usually twice in each lunar day at a particular place, due to the attraction of the moon and sun.
- **Current:** a body of water or air moving in definite direction, especially through a surrounding body of water or air in which there is less movement.
- **Echolocation:** the location of objects by reflected sound, in particular that used by animals such as dolphins and bats.
- **Biodiversity:** the variety of life in the world or in a particular habitat or ecosystem.

Teacher prep

1. If needed, watch videos about Pacific Mammal Research, harbor porpoises and the research they conduct on their YouTube channel (https://www.youtube.com/channel/UC_qjICaQW9QZ-MbiQ89baA); included there are short (3-4min) educational videos and background information on PacMam and their research. For a full one hour presentation on the research watch a presentation from the Ways of Whales 2019 workshop: <https://www.youtube.com/watch?v=Czsirbh1Ew8&t=43s>.
2. Coordinate with Drew Collins to schedule a date/time to present the video to the class.
3. Prior to the presentation review the definitions and Salish Sea map to be able to go over those as necessary, depending on student's level of knowledge. Have students complete the pre-quiz.
4. Print out 1 pre-quiz, 1 post-quiz, 1 video worksheet per student, and 1 digging deeper worksheet per group of 2-3 students (all in the quizzes and assignments pdf).
5. Watch (and share with students before or after presentation) educational videos on Pacific Mammal Research's YouTube channel: https://www.youtube.com/channel/UC_qjICaQW9QZ-MbiQ89baA

Day 1

1. Hand out the video worksheet to each student.
2. 10-15min introduction/background about the video by Drew Collins.
3. Students watch 25-30 min video and answer the questions on the worksheet. Made in Puget Sound: Harbor Porpoises of Puget Sound (made need log in/password information from Drew Collins): https://www.madeinpugetsound.org/harbor_porpoises.html
4. 10-15min wrap up discussion and questions about the video with Drew Collins.

Day 2

1. Break up students into groups of 2-3.
2. 5-10 min - have students review their answers on the video worksheet with their group, discussing their answers and what they learned from the video. Have them list the top 3-4 concepts they learned from the video. At the end have students share these concepts with the class, as the teacher writes on the board the different concepts listed.
3. 35 min – in groups, have students answer the digging deeper questions. They will use their knowledge from the video and each other to explain larger concepts and ecosystem connections. ALTERNATLY: split class into three groups – have each group answer one question, and then present their answers to the class (either as part of this 35 min, or during the 5-10 min wrap up (step 4).
4. 5-10min have a wrap up discussion having students explain what they learned about harbor porpoises, conducting research, and how to use this knowledge to inform conservation.
5. Have students complete the post-quiz (if time on Day 2), or during the next class (5-10 min).

Extensions

You can have students answer questions 1 and 2 of the digging deeper portion during Day 2 (pushing them to be more detailed with their answers than they would be if they were doing all 3 questions). Another project can be made out of question 3, where they make up their own research topic and describe how they would conduct their research and why it is important. When done separately they can dive deeper into how they would do the research, creating a more detailed plan than they could in the Day 2 activity (this could include making sample data sheets, instructions, explaining data analyses). The end product would either be a written report and/or a presentation to the class. A presentation is a good way for students to get used to speaking in front of groups, which is a necessary skill as a research scientist.

This can be an in class or take home assignment done individually or in groups. This is a good group activity as it gets students to discuss what the best ways to do a particular task is, or answer certain questions, and shows them that others may have a way of looking at things differently than they do that can enhance the project (but also that sometimes working with others can be difficult, and how to work through it). It also reinforces the importance of collaboration and working together in science. These collaborative/working together aspects of the assignment can be brought up by the teacher in an in class discussion (perhaps wrapping up the project – what worked/didn't/what was hard), or as part of the student's assignment.

Assessment

Students will be assessed by their answers on the pre/post quizzes, the video worksheet and the digging deeper questions and/or project/presentations. During discussions evaluate how well the students better understand role of research to inform conservation and how they can use the knowledge gained to interpret and explain ecological relationships and their importance in an ecosystem, with harbor porpoises or other species.

References

- Seadoc Society: <https://www.seadocsociety.org/about-the-salish-sea>
- Made in Puget Sound: Harbor Porpoises of Puget Sound (made need log in/password information from Drew Collins): https://www.madeinpugetsound.org/harbor_porpoises.html
- Pacific Mammal Research: <http://pacmam.org/wp/education/>
- Pacific Mammal Research Ways of whales workshop YouTube presentation: <https://www.youtube.com/watch?v=Czsirbh1Ew8&t=43s>
- Pacific Mammal Research YouTube channel: https://www.youtube.com/channel/UC_qjCaQW9QZ-MbiQ89baA

Next Generation Science Standards covered: middle school

MS-LS1

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

MS-LS2 (all covered)

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.

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

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

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

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*



Salish Sea map by Norm Maher. Courtesy of the SeaDoc Society.