

Return of the wolves: Isle Royale National Park
“Lessons from the wilderness”
Student Viewing Guide
Teacher Version

This viewing guide is intended to be used before, during, and after each of the three sections of the video. The prompts are designed to help students interact with the information in the video. When combined with the three Return of the Wolves lessons for high school students, this activity helps students meet these [Next Generation Science Standards](#) performance expectations:

[HS-L2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.](#)

[HS-L2-6 Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.](#)

[HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.](#)

[HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.](#)

***Please note that links may connect you with an English speaking site. Please use your web-browsers translation services to translate. ***

- A student glossary and list of sources/resources for teachers are provided.
- Optional lessons with three-dimensional NGSS-aligned activities are provided to follow **each** of the three sections of the video **Return of the wolves: Isle Royale National Park, “Lessons from the wilderness”**.

Guidance, support, and suggestions for implementing this student viewing guide:

Part 1 of the video

1. Before starting the video, give students the viewing guide. Show the first 1:54 of the video and stop when the title appears. Ask students to complete the See, Think, Wonder visible thinking organizer.
2. Before starting the rest of Part 1 of the video, organize students into groups of four (table groups or other.) In each group, one student should be responsible for taking notes on one of the parts of the Isle Royale ecosystem: abiotic, moose, beaver, and wolves. You may need to help students define “abiotic” parts of the ecosystem first.
3. After viewing Part 1, students work in their groups to share what they recorded for their ecosystem component with others in their group, using a [Jigsaw](#) approach.
4. Conduct a whole class discussion to come to consensus on the important points for the parts that the abiotic factors, the moose, the wolves, and beaver play in the Isle Royale ecosystem. Help students describe a food chain that involves plants, beaver and moose, and wolves, and the transfer of energy from the sun through the other organisms to the wolves.
 - a. Ask students to consider why Isle Royale is a good predator-prey “laboratory.”
 - b. Ask students to consider why moose are called “landscape lawnmowers.”
5. Consider teaching Return of the Wolves, Lesson 1 for high school, to explore using stability and change in predator/prey relationships to determine limiting factors and carrying capacity.

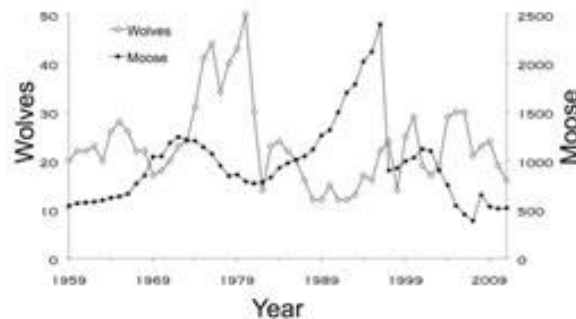
Part 2 of the video

1. Before watching Part 2, ask students to predict answers to the four questions in the table.
2. Students record their own answers to all four questions as they watch the video.
3. Following Part 2 of the video, students should meet with two or three other students to compare answers and add to or revise their own answers. This can be accomplished using Clock Buddies or similar routine.

Clock Buddies Description: This strategy is used for quick partner work. Students get a copy of a clock (with hours 1-12 on it). Students set up appointments with their classmates for three specified times, writing their appointment's name next to the time on their clock face. Students need to make sure that they are writing each other down at the same time (for example if Walt and Shelley want to set up an appointment for 2 o'clock, Shelley writes her name on Walt's 2:00 space, and Walt writes his name on Shelley's 2:00 space.)

Students are then directed to meet with their first appointment, where they compare notes. Several minutes later, when the teacher asks them to switch, they meet with their second appointment, and so on. The teacher decides how many switches are beneficial - usually two or three.

4. Conduct a whole class discussion to come to consensus about the importance of wolves as an apex predator, and about the research methods employed to count wolves and moose.
5. Ask students to describe what they heard in the video about the pattern or cycle of wolf/moose population changes. Consider showing them a graph similar to this one from the [Wolves and Moose of Isle Royale website](#), and ask for their observations regarding the pattern.



6. Consider teaching Return of the Wolves, Lesson 2 for high school to explore stability and change in Lake Superior ice coverage, and how less ice coverage could lead to a trophic cascade effect on the island's community.

Part 3 of the video

1. In this final section, students will collect evidence regarding the decision of the National Park Service to relocate wolves to Isle Royale in 2019.
2. You may consider showing this section of the video twice for students to get all the information they need, or ask them to share with partners to fill in the effects of climate change on the wolves, moose, and forest.
3. Then, working with a partner, students complete the graphic organizer by filling in the reasoning connecting less ice coverage to the “island effect” as a limiting factor, to lack of genetic diversity for the wolves.
4. Finally, students work with a partner or small group to make a claim, supported with evidence and reasoning, on whether the NPS made the right choice to introduce new wolves to Isle Royale.
5. Consider teaching Return of the Wolves Lesson 3 for high school students to more deeply engage in evaluating that decision.

Below is the student version of the viewing guide for reference. Answers are not provided, in order to prevent student web access to answer keys.

Return of the Wolves Student Viewing Guide: High School

Introduction:

You’re about to begin watching a video on the ecosystem of Isle Royale National Park.

As we start, we’ll watch the first two minutes of the video as an introduction. After the first two minutes, record your thoughts in the *Notice, Think, Wonder* organizer below.

What did I notice?	What does this make me think about?	What do I wonder?

Part 1 (Jigsaw)

As you watch and listen to Part 1 of the video (about 15 minutes long), jot down interesting facts about your assigned part of the ecosystem. Later, we'll compare notes with others in class to fill in all the information.

Ecosystem Component	Notes
Abiotic (Non-Living) Parts of the Ecosystem	
Moose	

Beaver

Wolves

After meeting with your group and sharing notes, answer these questions:

<p>What are the attributes that make Isle Royale a good laboratory for predator/prey studies?</p>	
<p>In the video, one of the NPS rangers describes moose as “landscape mowers.”</p> <p>Predict the effects of an increased moose population on the island’s trees.</p>	

Part 2 (Clock partners)

Before watching Part 2, make predictions for each of the questions. As you watch the video, you may fill in the last column. After Part 2, you'll meet with your partners to compare your observations.

Question:	My Prediction:	What I learned from the video:
Wolves are an apex predator. What happens to the ecosystem of Isle Royale when there are very few apex predators ?		
What are some key questions researchers want to learn about wolves (now that they've been reintroduced)?		

<p>What are some key questions researchers want to know about the moose?</p>		
<p>How might an increase in moose and beaver populations change the biodiversity (number of different species) on the island?</p>		

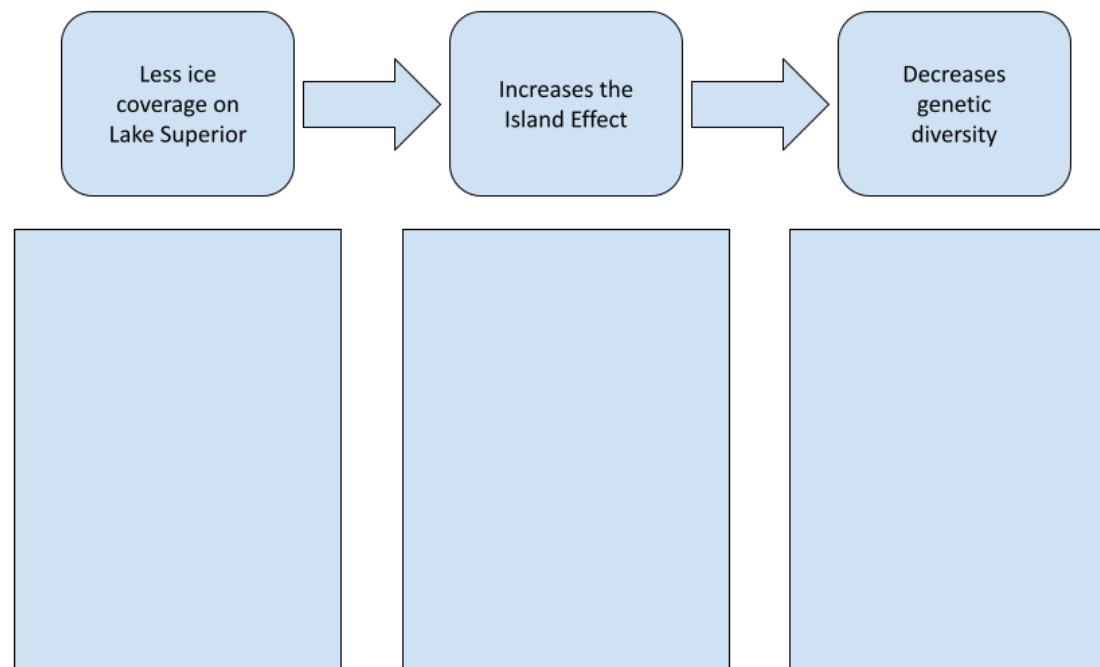
Part 3

In this last part of the video, the researchers and park service leaders discuss their decision to bring new wolves onto the island, starting in 2019. The decision was not made lightly, and there was a lot of discussion amongst scientists for many years before any action was taken. Some people advocated to “let nature take its course,” while others argued that it was more important to maintain the ecosystem by intentionally interfering with it.

- You will be collecting evidence to support (or refute) the National Park Service’s decision to bring new wolves to Isle Royale.

How will climate change affect the island’s:		
Forests	Moose	Wolves

Work with a partner or small group to add evidence and explanations in the boxes of this model, to show how a warming climate may be related to the Isle Royale wolf population collapse in the past ten years. Use your Student Viewing Guide notes and your Student Glossary to help.



Work with your partner or small group to make a claim and support it.

As we work to slow climate change, is it appropriate for humans to interfere in the Isle Royale ecosystem by introducing wolves?

Support your position with evidence and reasoning from the video and viewing guide.