

# Wolf/Moose Ecology on Isle Royale – Conducting Scientific Field Research (Teachers Notes)

**Grade Level:** 4<sup>th</sup> grade

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Film to be used: The Return of the Wolves long version with segments (segment 2)

[Download Full Video](#) | [Download Segment 2 Only](#)

Additional Material: Embedded video links; 5 worksheets starting with MWSCI\_1-5, plus MWSCI\_Teacher background paper and vocabulary

*Next Generation Science Standards*

Connections to Nature of Science

- Science investigations use a variety of methods, tools, and techniques.
- Science is a way of knowing that is used by many people.

<p><i>Essential Vocabulary</i></p> <ul style="list-style-type: none"> <li>• Prey</li> <li>• Predator</li> <li>• Ecosystem</li> <li>• Observation</li> <li>• Inference</li> </ul>	<p><b>Lesson Overview:</b></p> <p>Students will become field researchers, using the ongoing wolf-moose study on Isle Royale National Park as a model.</p> <p>Students will practice and refine skills of observation and inference; and use inquiry to propose a scientific question.</p> <p>The entire series of activities will take four to five class periods.</p>
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<p><i>Engage</i></p>	<p><b>A Track Mystery</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Gather evidence through careful observation</li> <li>• Use observations to make inferences</li> </ul> <p><b>Duration:</b> 20 minutes (plus optional extension)</p> <p><b>Materials:</b> <a href="#">MWSCI_1_Track_Mystery</a></p> <p>Present the track mystery either by drawing it on the board, projecting it, or in another format.</p> <p>Share definitions of observation and inference. Have each student jot down at least three observations. Remind students that observations should be limited to</p>
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	<p>things that they can <u>see</u>. Compare observations with a partner. Get together as a class and create a T-chart on the board. Record observations and check for understanding.</p> <table border="1" data-bbox="430 325 1412 577"> <thead> <tr> <th data-bbox="430 325 922 388">Observations</th> <th data-bbox="922 325 1412 388">Inferences</th> </tr> </thead> <tbody> <tr> <td data-bbox="430 388 922 577"></td> <td data-bbox="922 388 1412 577"></td> </tr> </tbody> </table> <p>Then have student pairs make inferences—explanations based on what they have observed. When making inferences, encourage students to use the scientific language of uncertainty, such as <i>Maybe...</i>, <i>I wonder if...</i>, or <i>It looks like it might be...</i></p> <p>Have students share inferences as a class and ask follow-up questions to get students looking more closely, thinking more deeply, and considering different possible explanations.</p> <p>Tell students they have taken the first step to becoming scientists. Science is about being curious and making careful observations.</p> <p><i>Extension:</i> Using track field guides have each student create their own track mystery scene on paper. Pair up and have students make observations and inferences about their partner’s “mystery”</p>	Observations	Inferences		
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<p><i>Explore</i></p>	<p><b>Meeting Isle Royale Scientists</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Assess suitability of a location for research</li> <li>• Summarize field research data collection methods</li> </ul> <p><b>Duration:</b> 30 – 40 minutes</p> <p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>• large map or globe</li> <li>• <a href="#">MWSCI_2_Isle_Royale_and_Great_Lakes_Map</a></li> <li>• <a href="#">MWSCI_3_Wildlife_Biologist</a> worksheets</li> <li>• projector for video</li> </ul> <p>Help students locate Isle Royale on map or globe. Then take a closer look at its context using the <a href="#">MWSCI_2_Isle_Royale_and_Great_Lakes_Map</a>. Scientists from all over the world come to study here.</p> <p>Brainstorm reasons why Isle Royale National Park might be a great place to study animals. Use a quick think-pair-share strategy to discuss thoughts. After initial discussion, share out ideas. Add to the discussion by modelling the big predators and prey in the Yellowstone ecosystem on a white board. Have students use arrows to show the relationships between predator and prey species. Then show</p>				

	<p>the big predator and prey in the Isle Royale ecosystem. At which park would it be easier to study the relationship between wolves and moose?</p> <p>For more than 60 years scientists have been studying wolves, moose, and the environment at Isle Royale. Prepare for watching Part 2 of the video Return of the Wolves “Lessons from the Wilderness (approximately 11 minutes) by informing students that they will be “travelling” to Isle Royale and will “meet” wildlife biologists who are studying wolves and moose.</p> <p>Distribute <a href="#">MWSCI_3_Wildlife_Biologist</a> sheets to each student and have them fill in their initial ideas prior to watching the movie, and then to write down their observations during and/or after watching the movie.</p> <p>Team students back up and discuss observations. What surprised you most? Would you want to be a researcher on Isle Royale? Why or why not?</p>
<p><i>Explain</i></p>	<p><b>Bone Detectives</b></p> <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Make and record careful observations</li> <li>• Analyze and make inferences about moose health by examining bones.</li> </ul> <p><b>Duration:</b> 30 – 40 minutes</p> <p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">MWSCI_4_Bone_Detectives</a> worksheets (2-sided)</li> <li>• Skulls of various animals (optional)</li> <li>• Projector for video</li> </ul> <p>If you have access to animal skulls, have students observe tooth shape (dentition determines diet) and eye placement (eyes on the side, animal hides, eyes in front, animal hunts) and discuss as a group what these bones might tell you about an animal’s lifestyle.</p> <p>On Isle Royale, scientists look at LOTS of moose bones. Bones can often provide evidence about the health of an animal.</p> <p>Review observation VS inference. Remind students to use the scientific language of uncertainty, such as <i>Maybe...</i>, <i>I wonder if...</i>, or <i>It looks like it might be...</i>for their inferences. Have students work in pairs on the <a href="#">MWSCI_4_Bone_Detectives</a> worksheet. Photos are from bones found on Isle Royale.</p> <p>While the teams are working, go around to assess understanding and assist if they need a hint. Discuss the bones as a class group. Use background information to enhance student discoveries.</p>

	<p>Many older moose on Isle Royale have problems with their bones. If there are a lot of older moose, could that make a difference to other animals? What if most of the moose are young and healthy?</p> <p>Looking at bones is one way to learn about moose. Are there other ways that scientists could study moose? Brainstorm a list of ideas based on what students observed in the movie and their own ideas.</p> <p>Introduce the short (4 ½ min) video <a href="#">Outside Science-Studying Moose</a> A group of student scientists are studying moose on Isle Royale by measuring the plants they eat. It shares young people’s perspectives about becoming a field researcher.</p>
<p><i>Elaborate</i></p>	<p><b>Becoming Isle Royale Scientists:</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Generate a research question and design a research plan</li> </ul> <p><b>Duration:</b> 40 – 50 minutes</p> <p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">MWSCI_5_Field_Research_Team</a> worksheet (1 per team)</li> <li>• Posterboard and art supplies</li> </ul> <p><i>Role Play:</i> Students are going to become scientists studying moose and wolves on Isle Royale. Each research team will have 3-4 members. Half of the teams will study in the summer, and the other half will study during the winter.</p> <p><i>Inquiry:</i> Have each team come up with questions that they would like to answer with regards to wolves and/or moose on Isle Royale. From their ideas, choose one question that the team wants to pursue. Once they have decided on their question they should report to the teacher. Then have students start discussing their research plan—how their team might answer this question.</p> <p><i>Brainstorm:</i> The summer researcher teams get a canoe and a tent. The winter researcher teams get a cabin and a ski plane. Have the students create a list of other items they will need to conduct their research. Each group may bring up to 20 additional items.</p> <p><i>Research Convention:</i> Have each group create an illustrated poster that should include</p> <ul style="list-style-type: none"> <li>• Research question</li> <li>• Research Plan</li> <li>• Needed equipment</li> </ul> <p>Then hold the research convention. Display the posters around the room. Have two students from each team remain at their poster to answer questions, while other students view and ask questions about other teams’ research. Make sure to switch roles, so everyone can participate.</p>

<i>Evaluate</i>	<p><b>Becoming Backyard Scientists</b></p> <p>Isle Royale may be the perfect place to study wolves and moose and learn more about their lives, but a backyard might be the perfect place to study squirrels, ants, dragonflies, or frogs.</p> <p>Have students observe wildlife in their backyard or a neighborhood park each day for one week.</p> <p>Keep a journal of discoveries (species, evidence of wildlife, etc.). Journal should be multi-media and could include writing, drawings and photographs. It must include specific observations and inquiry questions.</p> <p>At the end of the week, bring in journals and share favorite observations and questions using an inside-out circle strategy. (Have ½ students form a circle and face outwards. Have other ½ of students form a circle around them.) Share with the student they are facing. Then teacher calls for outside students to move three people left, or inside students move two people right, etc. Students share with new partner.</p>