Into the Outdoors

HOW WOLVES CHANGE THE LANDSCAPE

8th-12th Grade Discussion Guide

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SCIENCE CATEGORIES
Science Wildlife & Conservation, Environmental & Ecosystem Science

TIMEFRAME
5-7 lessons

MATERIALS
Laptops, poster paper and other poster supplies

KEYWORDS
Apex Predator, Eradicate, Ecosystem, Vegetation

LEARNING OBJECTIVES

Students will be able to:

• Understand how wolves directly affect ecosystems.

• Speak to the causal relationships between humans, wildlife and ecosystems.

• Take the knowledge from one genre of text and adapt it to another genre of text.

ACTIVITY SUMMARY

Students will examine the role of wolves in an ecosystem. Students will begin by watching a short film which outlines the effects of wolves on Yellowstone National Park. Following this introductory activity students will be assigned to small groups; each responsible for a different topic related to wolves. Students will begin their research by engaging in a virtual interactive exhibit and then develop posters on their findings.

Individually, students will develop a genre text of their choice which captures the facts they have learned regarding wolves and ecosystems. They will carefully consider their key audience and present their final text. Finally, students will reflect on the causal relationship between humans, wildlife and ecosystems.

BACKGROUND INFORMATION

As predators, wolves are crucial to the ecosystems they live in. They have even been known to change the physical landscape of the land they inhabit! This segment of the episode uncovers what happened in Yellowstone National Park as wolves were reintroduced into their historical range. When Yellowstone was first established wolves were persecuted; they were poisoned, trapped and shot on sight. By 1826, wolves were completely eradicated from the park. In 1995 wolves were reintroduced into the park by bringing in a population from Canada.

Wolves are considered an apex predator and when this type of predator is removed from an ecosystem there is a ripple effect on the composition of other species. In the case of Yellowstone National Park, other species, like elk, had grown so large that they were suppressing the growth of certain plants, like the Aspen Tree. With the introduction of wolves, the elk population shrunk and vegetation that had been on the decline rebounded. So, wolves don't only affect the population of other animals, but vegetation as well. This story is a reminder that while apex predators have been persecuted in the past, they have a place in our natural environment.

VOCABULARY

APEX PREDATOR: A predator at the top of a food chain that is not preyed upon by any other animal.

ERADICATE: Destroy completely; put an end to.

ECOSYSTEM: A biological community of interacting organisms and their physical environment.

VEGETATION: Plants considered collectively, especially those found in a particular area or habitat.

LEARNING PROCEDURE

INTRODUCTION:

Instructor states, "Today we are going to explore why wolves are important to ecosystems."

Show the short film, How Wolves Change Rivers

After viewing the film, ask students to provide some examples of how wolves affected the Yellowstone ecosystem.

ACTIVITY 1:

Poster Session

Divide students into groups of four to five students. Each group will be responsible for a specific segment of the topic The Hidden Lives of Wolves.   Have students move into groups, provide each group with poster making materials. Explain that each group will use their prior knowledge along with their new knowledge to create a poster or other visual with key points that each person in the group will use to teach others in the class. Be clear that each person has to understand the text and images on the poster in order to present the information effectively. Assign groups one of three topics: Wolves 101, Explore the Wolf, and Ecosystems. Groups should start their research by exploring their topic on the interactive exhibit, The Hidden Lives of Wolves. Encourage students to bring in other research as they see fit.

Students complete the assignment or study, and their posters. Have student groups post the work around the room or in the hallway.

Regroup students so each new group has at least one member from the previously established groups. Give specific directions: at which poster each group will start, that they will rotate through all the posters in their groups, and how much time they will have at each poster. Explain that the speaker at each poster is the person(s) who participated in its creation. Specify the kinds of information the speaker should present to the group—a summary, a synthesis, or an important question. Explain what the listeners' jobs are as they rotate from poster to poster: to ask their presenters a certain number of questions and record the answers on their scorecards. The total number of questions expected is for the entire rotation, not for a single presenter (e.g. Listeners must ask three questions TOTAL throughout the rotation). Groups rotate, listen to the presenter, and ask questions as specified on their scorecards.

ACTIVITY 2:

Instructor states, "Think back to the short film we watched, How Wolves Change Rivers. We've learned a lot about how Wolves affect Ecosystems. Incorporating as many facts regarding the wolves' role in ecosystems, develop a new text, similar to the film, that is engaging and informative. As a student you may choose any genre of text to portray the information and you may choose to retell the story of Yellowstone in a new format or create a fictional place while still conveying the facts."

Consider supplying a rubric or co-creating one with students. Some considerations will be how many facts need to be included in the new text. You may also want to provide a list of potential genres of texts to students. Below are a few examples.

Potential Genres:
- Play script
- Children's book
- Poem
- Song
- Reality TV Show
- Fantasy
- Fairy Tale

Once students have completed their text, ask them to consider their key audience. Tell them that they are responsible for reaching out and sharing their text with this audience. For example, if a student writes a children's book, they may reach out to an elementary school classroom to share the story.

CONCLUSION

Teacher states: "What are some other examples of causal relationships humans have with wildlife and the environment?"

EXTENDING THE LESSON

Example:

- Write a poem, play or other type of narrative piece that showcases the facts students learned about wolves and changing ecosystems.

- Develop interview questions for a biologist who works with wolves.

- Complete a Venn Diagram comparing Yellowstone's ecosystem with and without wolves.

- Create a game that you could teach elementary students that would showcase what happens when an apex predator is removed from an ecosystem.

Related Links

GLIFWC: https://glifwc.org/

Informative, cultural information regarding ma'iingan and the Ojibwe. https://northernwilds.com/culture-prophecy-bind-ojibwe-people-wolves/#:~:text=Ojibwe%20language%20speakers%20know%20the,social%20groups%20and%20hunting%20afield

Importance of wolves in our ecosystem: https://www.livingwithwolves.org/about-wolves/why-wolves-matter/

Wolf & moose study on Isle Royale: https://isleroyalewolf.org/overview/overview/at_a_glance.html

How wolves change rivers: https://www.youtube.com/watch?v=ysa5OBhXz-Q

The following National Common Core Standards can be met teaching;

HOW WOLVES CHANGE THE LANDSCAPE

8TH GRADE

CCSS.ELA-LITERACY.RI.8.1   Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

CCSS.ELA-LITERACY.RI.8.2   Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.

CCSS.ELA-LITERACY.W.8.2   Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.W.8.4   Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-LITERACY.SL.8.1   Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.8.1.A   Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

CCSS.ELA-LITERACY.SL.8.1.B   Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

CCSS.ELA-LITERACY.SL.8.1.C   Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

CCSS.ELA-LITERACY.SL.8.1.D   Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

CCSS.ELA-LITERACY.SL.8.2   Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.

CCSS.ELA-LITERACY.SL.8.5   Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

9-10TH GRADE

CCSS.ELA-LITERACY.RI.9-10.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

CCSS.ELA-LITERACY.RI.9-10.2 Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.7. Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.

CCSS.ELA-LITERACY.W.9-10.2 Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

CCSS.ELA-LITERACY.W.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.1.A Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

CCSS.ELA-LITERACY.SL.9-10.1.B Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.

CCSS.ELA-LITERACY.SL.9-10.1.C Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

CCSS.ELA-LITERACY.SL.9-10.1.D Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.8.1.A Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

CCSS.ELA-LITERACY.SL.8.1.B Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

CCSS.ELA-LITERACY.SL.8.1.C	Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
CCSS.ELA-LITERACY.SL.8.1.D	Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
CCSS.ELA-LITERACY.SL.8.2	Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
CCSS.ELA-LITERACY.SL.8.5	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

11-12TH GRADE

CCSS.ELA-LITERACY.RI.11-12.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
CCSS.ELA-LITERACY.RI.11-12.2	Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
CCSS.ELA-LITERACY.W.11-12.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
CCSS.ELA-LITERACY.W.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
CCSS.ELA-LITERACY.SL.11-12.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-LITERACY.SL.11-12.1.A	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
CCSS.ELA-LITERACY.SL.11-12.1.B	Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.
CCSS.ELA-LITERACY.SL.11-12.1.C	Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
CCSS.ELA-LITERACY.SL.11-12.1.D	Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
CCSS.ELA-LITERACY.SL.11-12.2	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

Science Standards

Grades 6-8

MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Performance Expectation

Grade: Middle School (6-8)

MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

Performance Expectation

Grade: Middle School (6-8)

MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics

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

Performance Expectation

Grade: Middle School (6-8)

MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics

Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*

Performance Expectation

Grade: Middle School (6-8)

MS-ESS3-3 Earth and Human Activity

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

Performance Expectation

MS-ESS3-4 Earth and Human Activity

Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Performance Expectation

Grade: Middle School (6-8)

9-12 Grades High School

HS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

Performance Expectation

Grade: High School (9-12)

HS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

Performance Expectation

Grade: High School (9-12)

HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics

Evaluate the 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.

Performance Expectation

Grade: Middle School (6-8)