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## Lesson 9: Humans in the Sagebrush Landscape

### Unit: 5<sup>th</sup> Grade Ecology Unit: A Sagebrush Expedition Lesson: Humans in the Sagebrush Landscape

**Overview:** Lesson 9 examines the various impacts that humans have on the sagebrush ecosystem. Through observations and explorations student will gain a better understanding of both the positive and negative impacts that humans can have on a landscape and how humans are an interconnected part of the natural world. Students will explore the idea of stewardship and how this effects the awareness of local issues.

**Main Take Away:** Understand the role that humans play in the sagebrush landscape through exploring a local issue and working together to create a potential solution.

Learner Outcomes	Getting Ready
<p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> <li>Understand how humans can have both positive and negative impacts on the sagebrush ecosystem.</li> <li>Make connections to the landscape equation.</li> <li>Create a potential solution to a local issue involving the sagebrush ecosystem and student's community in small groups.</li> </ul>	<p><b>Materials:</b> Information about different stakeholders involved in a local issue involving the sagebrush ecosystem.</p> <p><b>Preparation:</b> Find out about a local community issue dealing with the sagebrush ecosystem and find out information about the different stakeholders involved. Create and print off stakeholder sheets for students to study.</p> <p><b>Location:</b> In the classroom</p> <p><b>Length of Time:</b> 1-2 Lessons Approximately 60-75 minutes each</p>
<p><b>NGSS Standard(s) Addressed:</b> 5th grade Earth and Human Activity</p> <ul style="list-style-type: none"> <li><b>Performance Expectations: 5-ESS3-1.</b> Students who demonstrate understanding can: obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.</li> <li><b>Disciplinary Core Ideas: ESS3.C:</b> Human Impacts on Earth Systems: Human activities in agriculture, industry, and everyday life have had major effects on land, vegetation, streams, oceans, air and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.</li> <li><b>Science and Engineering Practices: 5-ESS3-1:</b> Obtaining, evaluating, and communicating information: obtain and combine information from books and/or other reliable media to explain phenomena or solutions to design a problem.</li> <li><b>Connections to Nature of Science: 5-LS2-1:</b></li> </ul>	<p><b>Place-Based Principle(s) Addressed:</b></p> <ul style="list-style-type: none"> <li>Learning is personally relevant to students</li> <li>Focusing on local issues and using local experts</li> </ul>

Scientific addresses questions about the natural and material world: science findings are limited to questions that can be answered with empirical evidence.

**Unit Connections**  
**(How specific lesson connects to overall goals and objectives of the unit)**

**Transfer Goals for Lesson: *Students will be able to independently use their learning to understand that...***

- TG1- Science is a process that helps us gain a collective understanding of how the world works, it is a lifelong process, it is applicable every day, and accessible to everyone.
- TG2- Humans are an interconnected part of the natural world and can have both positive and negative impacts.
- TG3- Cultivating a sense of place, through intentional interactions, inspires curiosity about one's community and helps to develop a conservation ethic.

**Unit Essential Question: *Students will keep considering...***

- **What is special about my community and what can I learn from it?**
- **How can my actions, as a human, impact my community?**

**Specific Lesson Content Objectives: *students will be able to...***

- Understand how humans can have both positive and negative impacts on the sagebrush ecosystem.
- Make connections to the landscape equation.
- Create a potential solution to a local issue involving the sagebrush ecosystem and student's community in small groups.

**Specific Lesson Language Objectives: *Students will be able to...***

- Orally contribute to discussion of human impacts in the sagebrush landscape (speaking level will vary depending on speaking proficiency level of individual student).

**Key Vocabulary Words:**

- Human impact
- Positive and negative impacts
- Awareness

**Background Information for the Teacher:**

Students will examine the impacts that humans have had on the sagebrush ecosystem. Through these observations and explorations student will gain a better understanding of both the positive and negative impacts that humans can have on a landscape and how humans are an interconnected part of the natural world. They will also explore the idea of stewardship and the effects that awareness of local issues can bring.

**This Lesson should be based around a local community issue that involves the sagebrush ecosystem. Below is an example. This example may not be applicable to all communities but gives an idea of how to meet the objectives of this lesson plan.**

**Wind Farm Issue:**

A wind farm company is interested in putting wind turbines in the area outside of Baggs, Wyoming. They have chosen this location due to the large amounts of open space and high winds that occur. They have brought a proposal to the mayor of Baggs that asks to have the space needed to construct 150 wind turbines.

The mayor brings this proposal to a local town meeting to see what the community of Baggs thinks of having wind turbines nearby. The mayor receives both positive and negative feedback and is looking for help in problem solving to create a potential solution to this issue.

**Stakeholders Involved:**

1. Wind Turbine Company
2. Sheep Ranchers
3. Conservation Biologists
4. Local community members of Baggs

**Building Background for Students: (ELL principle)****Activate Prior Experiences:**

The teacher will explain that students will do the following:

1. Share their thoughts on how their community might deal with local issues.
2. Share stories and experiences they have had dealing with issues or problems in their own lives.
3. Make connections to the local issue presented to them and things they have learned throughout this unit.

**Link to New Learning from Prior Learning:**

The teacher will explain to students that they will:

1. Engage in a popcorn review session on what they learned the previous lesson.
2. Make connections between what they have learned and the local issue presented to them.
3. Participate in think-pair-share throughout the activities of this lesson.
4. Work together to create a potential solution to this open-ended issue using their knowledge, understandings, and evidence to back up their ideas.

**Vocabulary:**

The teacher will:

1. Take time to make sure students understand any new vocabulary.
2. Encourage students to ask peers questions when they do not understand something.

**Common Student Misconceptions/Student Challenges:**

- Humans only have negative impacts on the sagebrush ecosystem.
- Renewable resources, such as turbines, are always positive.
- Students are not capable of being involved in community issues and potential solutions to problems.

**Materials:**

- Information about different stakeholders involved in a local issue involving the sagebrush ecosystem.

**Set-up:**

- Find out about a local community issue dealing with the sagebrush ecosystem.
- Find out information about the different stakeholders involved.
- Create and print off stakeholder sheets for students to study.

Lesson Agenda	Suggested Procedure	ELL Rationale
<p><b>Review:</b> Approximately 10min</p> <p><b>Popcorn Review</b></p>	<p><b>Popcorn Review:</b></p> <ul style="list-style-type: none"> <li>• Students will be asked to review what they learned about being a conservation biologist from the previous lesson. They will also be asked to review what an umbrella species is.               <ul style="list-style-type: none"> <li>o This can be done in a popcorn manner where students continue to add thoughts.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Review and repetition increase comprehensibility and help link prior learnings to new learnings.</li> </ul>

<p><b>Engage:</b> Approximately 15-20min</p> <p><b>Present Community Issue</b></p> <p><b>Discussion Etiquette</b></p> <p><b>Brainstorm</b></p>	<p><b>Present community issue:</b></p> <ul style="list-style-type: none"> <li>• Explain to students that today they are going to explore a local issue. They will step into the shoes of a variety of stakeholders in order to work together to create a potential solution. <ul style="list-style-type: none"> <li>o Discuss how this is a real issue and what they will do today is very similar to what might occur at a town meeting.</li> <li>o Ask students to think-pair-share how issues may be addressed in their local community. <b>(D1)</b></li> </ul> </li> </ul> <p><b>Wind Farm Issue:</b> A wind farm company is interested in putting wind turbines in the area outside of Baggs, Wyoming. They have chosen this location due to the large amounts of open space and high winds that occur. They have brought a proposal to the mayor of Baggs that asks to have the space needed to construct 150 wind turbines.</p> <p>The mayor brings this proposal to a local town meeting to see what the community of Baggs thinks of having wind turbines nearby. The mayor receives both positive and negative feedback and is looking for help in problem solving to create a potential solution to this issue.</p> <ul style="list-style-type: none"> <li>• Ask students if they have any questions about the issue, including vocabulary clarification.</li> </ul> <p><b>Discussion Etiquette:</b></p> <ul style="list-style-type: none"> <li>• Before getting started create a brainstorm/concept map on the board of what a good discussion would look like. <ul style="list-style-type: none"> <li>o Encourage students to think about that this is not meant to be an argument but a discussion of they can create a solution working together.</li> </ul> </li> <li>• Create a list of rules and proper etiquette that everyone agrees to follow.</li> <li>• Examples: <ul style="list-style-type: none"> <li>o Give each member a chance to speak.</li> <li>o Be a good listener while someone else is speaking.</li> <li>o Make sure to back what you are saying with evidence.</li> <li>o Be open-minded.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Think-pair-share increases interaction.</li> <li>• Discussion among peers and class will help increase comprehensibility about the local issue presented to them.</li> <li>• Questions about what students know about how communities deal with local issues will help access prior knowledge.</li> <li>• Brainstorm of discussion etiquette will help increase interaction as students work together to create guidelines.</li> </ul>
<p><b>Explore:</b> Approximately 15 min</p> <p><b>Stepping into the shoes of a Stakeholder</b></p>	<p><b>Become a Stakeholder:</b></p> <ul style="list-style-type: none"> <li>• Explain to students that they are going to be divided into four groups. Each student's job is to step into the shoes of one of the four stakeholders. <ul style="list-style-type: none"> <li>o This is similar to when they took on the role of a conservation biologist.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Hands-on exploration in small groups will increase comprehensibility and interaction.</li> </ul>

	<ul style="list-style-type: none"> <li>• Each student needs to learn about their stakeholder for the next activity where they will be mixed or “jig-sawed” so that each group contains all of the different stakeholders. <ul style="list-style-type: none"> <li>◦ Inform students that even if they do not agree with the stakeholder they were given, their goal for this activity is to pretend or role-play.</li> </ul> </li> <li>• Students will be divided into four groups and each group will receive information about one of the four stakeholders.</li> <li>• Students will be given about 15min to study their stakeholder and ask peers and teacher questions.</li> </ul> <p><b>Stakeholders:</b></p> <ol style="list-style-type: none"> <li>1. Wind Turbine Company</li> <li>2. Sheep Ranchers</li> <li>3. Conservation Biologists</li> <li>4. Local community members of Baggs</li> </ol>	<ul style="list-style-type: none"> <li>• Synthesizing information about each stakeholder will increase higher order thinking.</li> </ul>
<p><b>Explain:</b> Approximately 30 min</p> <p><b>Jigsaw Activity</b> Approximately 20min</p> <p><b>Presentations of Potential Solutions</b> Approximately 10min</p>	<p><b>Jigsaw Activity:</b></p> <ul style="list-style-type: none"> <li>• Students will be split again into four groups but this time each group will contain all four stakeholders.</li> <li>• Explain to students that they are at a town meeting in their local community and their job is to work together to create a potential solution to this wind turbine issue. <ul style="list-style-type: none"> <li>◦ Remind students to review the discussion etiquette on the board and be respectful of their peers during this activity.</li> </ul> </li> <li>• Inform students that they will be presenting these solutions to the entire town meeting and therefore should take notes in their naturalist journals. All students need to participate in the presentation.</li> </ul> <p><b>Present Potential Solution:</b></p> <ul style="list-style-type: none"> <li>• Each group will present their solution to the entire town meeting (class).</li> <li>• Take notes on the board of each solution to later see which parts were similar among the groups and which parts were different.</li> <li>• After presentations ask students to think of how we could now create one solution.</li> <li>• Have a class discussion about the similarities and differences among the four groups in order to compromise on a final solution. <b>(F1)</b></li> </ul> <p><b>Follow-up:</b></p> <ul style="list-style-type: none"> <li>• Ask students to reflect on this experience in their journals for a few minutes. Then have them share with a partner sitting next to them.</li> <li>• Ask a few students to share out their reflections.</li> <li>• Ask the following: “Why do you think this activity was important?” “What are your thoughts on creating solutions and problem solving?” <b>(F2)</b></li> </ul>	<ul style="list-style-type: none"> <li>• Role-play increases comprehensibility and interaction.</li> <li>• Applying knowledge about given stakeholder and accessing prior knowledge and experiences will increase higher order thinking.</li> <li>• Creating solutions and problem solving together will increase higher order thinking and interaction.</li> <li>• Presenting solution increases interaction and higher order thinking as students must generalize their learnings and ideas to communicate their understanding of</li> </ul>

		<p>the problem and solution.</p> <ul style="list-style-type: none"> <li>• Follow-up questions and time to reflect on activity will increase comprehensibility and higher order thinking.</li> </ul>
<p><b>Elaborate:</b> Second class period or as homework</p> <p><b>Write-up of Potential Solution</b></p> <p><b>Sharing</b></p>	<p><b>Write up of Potential Solution:</b></p> <ul style="list-style-type: none"> <li>• Discuss with students that this activity is something that really occurs in communities. When local issues arise stakeholders and community members often gather to discuss potential solutions.</li> <li>• Emphasize that their ideas and thoughts are valuable and they should share these with their communities.</li> <li>• Have groups work together to write up their potential solution to this issue.</li> <li>• Once written have students sign it and send it to their local mayor or community official. <ul style="list-style-type: none"> <li>○ This can be a powerful activity to show students that they are also a valuable part of their community. <b>(S1)</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Working together to write up their potential solutions will increase interaction and comprehensibility.</li> <li>• Students with lower proficiency levels can participate by communicating ideas and thoughts as other peers do the writing.</li> </ul>
<p><b>Evaluations and Assessment Check ins:</b> D: Diagnostic assessment F: Formative assessment S: Summative assessment</p>	<p><b>(D1):</b> This think-pair-share activity will help access students’ prior knowledge about how issues are dealt with in their local community. It will give them the opportunity to share stories, experiences, and thoughts.</p> <p><b>(F1):</b> Presenting their potential solutions is a great assessment on how they worked together, synthesized the information they were given, and whether or not they were able to connect to things they have learned throughout the unit.</p> <p><b>(F2):</b> Follow-up questions give the students the opportunity to generalize their knowledge and share and expand upon their knowledge and learnings.</p> <p><b>(S1):</b> Having students write up their potential solutions to this local community issue is a great assessment on students’ understandings and ability to work together in a group.</p>	<ul style="list-style-type: none"> <li>• Assessments are geared to include all students according to their proficiency levels to give them the opportunity to express their ideas and understandings.</li> </ul>
<p><b>References:</b></p> <ul style="list-style-type: none"> <li>• Researching a local issue specific to your community and involving the sagebrush ecosystem.</li> </ul>		

## Stakeholders in Wind Turbine Proposal

### Wind Turbine Company:

- Interested in expanding their range of wind turbines to more part of Wyoming.
- Building wind turbines allows them to make more money.
- The construction of wind turbines gives jobs to workers.
- Helps reach the mission of creating energy that is less harmful to the planet by emitting less carbon dioxide into the atmosphere.
- They feel Baggs is a good location due to its open spaces and high winds.

### Sheep Ranchers:

- Need open spaces for their sheep to feed and roam.
- Have been a part of this community for centuries.
- One of the main incomes for the community.
- Supplies resources such as meat and wool.
- Provides jobs to the sheep herders.
- Concerned about the wind turbines depending on how many are built. As long as their sheep still have enough space to roam and graze ranchers feel the wind turbines may not be a huge problem.

### Conservation Biologist:

- In general, like the idea of using renewable resources. Understand that wind turbines will help in the need to reduce carbon dioxide into the atmosphere.
- Worry about bird populations as there is the potential for birds to fly into the turbines and be killed.
- Concerned about the effect the turbines might have on the sagebrush ecosystem because the construction of turbines will fragment the landscape with the building of roads and areas for the wind turbines.
- Concerned about what this fragmenting might do to the sage grouse population in the area.

### Local Community Member:

- Positive feelings about the increase in jobs the turbines can bring to their community.
- Like the idea that the energy gained from the wind turbines can help reduce their personal cost of energy use.
- Concerned about how they will change the look of the surrounding landscapes.
- Wondering how they might affect other community member such as people who work for the oil companies and ranchers.
- Wondering how the wind turbines might affect the local deer, pronghorn, and elk populations as they rely on these animals for food for their families.