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Field Trip to the Sagebrush Ecosystem

Unit: 5th Grade Ecology Unit: A Sagebrush Expedition Lesson: Field Trip to the Sagebrush Ecosystem

Overview: The goal of taking a field trip into the sagebrush ecosystem is to observe and apply the scientific concepts and skills that have been learned throughout the unit thus far. Students will be given the opportunity to practice steps of the science circle through making observations as they explore the landscape, asking questions of what they are observing, and practice making hypotheses using evidence to back up their claims. Students will have the opportunity to practice some of the scientific skills they have learned such as taking soil cores and ribbon tests and they will apply concepts such as the landscape equation through the creation of a landscape quilt. Students will also learn new skills such as plant and bird identification as they travel the land of the sagebrush.

Learner Outcomes

Students will be able to...

- Create a landscape quilt using knowledge of the landscape equation. (Landscape = Abiotic + Biotic + Culture).
- Practice and learn scientific skills such as taking a soil core, performing a soil ribbon test, learning how to use field guides and binoculars to identify plant and bird species.

Getting Ready

Materials:

Soil core, measuring tape, binoculars, plant and bird field guides, naturalist journals and pencils, scavenger hunt print out, clip boards, white board and markers. Bring food, water, and first aid kit into the field

Preparation:

Arrange location of field trip, incorporate a local expert if possible, gather materials, and print out scavenger hunt activity.

Location:

Sagebrush Habitat

Length of Time:

1 Lesson
Approximately 90 minutes to 2 hours

NGSS Standard(s) Addressed: 5th grade Life Science 2: Ecosystems: Interactions, Energy, and Dynamics

- **Disciplinary Core Ideas: LS2. A:** Interdependent Relationships in Ecosystems
- **Cross Cutting Concepts: 5-LS2-1:** Systems and System Models: A system can be described in terms of its components and their interactions.
- **Science and Engineering Practices: 5-LS2-1:** Developing and Using Models to describe phenomena.
- **Connections to Nature of Science: 5-LS2-1:** Science, Models, Laws, Mechanisms, and Theories explain Natural Phenomena. Science explanations describe the mechanisms for natural events

Place-Based Principle(s) Addressed:

- Fostering love of one's place
- Learning takes place in the school yard, local community or local environment.
- Learning is personally relevant to students.
- Engaging students in investigation, inquiry, and problem solving.

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

Transfer Goals: *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...*

- Create a landscape quilt using knowledge of the landscape equation. (Landscape = Abiotic + Biotic + Culture).
- Practice and learn scientific skills such as taking a soil core, performing a soil ribbon test, learning how to use field guides and binoculars to identify plant and bird species.

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

- Use words from the landscape equation (abiotic, non-living, biotic, living, culture, humans) while in the field through words, pointing or drawings to demonstrate understanding.

Key Vocabulary Words:

- Ecosystem
- Sagebrush
- Binoculars
- Scientific skills and practices

Materials:

- Soil cores
- Measuring tape
- Binoculars
- Plant and bird field guides
- Naturalist journals and pencils
- Scavenger hunt print out
- Lunches and snacks
- Water
- First aid kit
- White board and markers (Useful for writing and drawing out what is being said. This can be extremely useful for ELL students)

Set-up:

- Arrange location of field trip
- Incorporate a local expert if possible
- Gather materials
- Print out scavenger hunt activity.

Background Information:

Information about Courtney Duchardt's Research:

Suggested Procedure:

Landscape Quilt Activity: (S1)

- On a field trip to the sagebrush have students draw the landscape they observe before them.
 - Divide a piece of paper in their journal into four quadrants.
 - In one quadrant they will draw any abiotic components they see.
 - In the second quadrant they will draw any biotic components they see or hear
 - In the third quadrant they will draw any human made cultural components they see and hear
 - In the fourth quadrant they will draw the whole landscape with all three components present.
 - Have them share their landscape drawings with a peer. They can compare and contrast.
- *Students could do multiple landscape quilts throughout unit if there is time so that they can compare and contrast the different locations they visit such as outside of school, near their home, and on the field trips.*

A graded assignment based on completion of the following:

- *One square labeled Abiotic or Non-living with at least one drawing of what student sees around them as an example*
 - *(Soil, rocks, clouds, water, etc.)*
- *One square labeled Biotic or Living with at least one drawing of what student sees around them as an example*
 - *(Sagebrush shrub, bird, mouse, Indian paintbrush flower, etc.)*
 - *This example could be an example of something biotic that a student heard, such as an eagle or coyote)*
- *One square labeled Culture or Human influences with at least one drawing of what student sees around them as an example.*
 - *(Fence post, road, trail, telephone wire, etc.)*
 - *This example can be an example of something the student heard such as an airplane or truck)*
- *One square that has a drawing of the whole landscape surrounding them that includes all three factors.*

Scavenger Hunt:

- In small groups of 3 students will be given the task to complete a scavenger hunt in this ecosystem.
- Emphasis should be put on this being a time to explore and use their observation skills. They will need to access knowledge they have learned so far to complete some of these tasks.
- Hand out scavenger hunt task sheet (*attached below*) and let them go, making sure to give clear guidelines of how far. (Suggestion: you must be able to see me at all times)
 - This is a good time to talk about safety hazards in this environment such as water if there is a river nearby, roads, getting lost, and cactus.

Scientific Skills and Practices:

- Students will split into two groups. Group 1 will start with University of Wyoming research scientist Courtney Duchardt and Group 2 will start with instructor. Explain to students they will be learning and practicing new scientific skills and practices through learning how to identify birds and plants in the field using binoculars, field guides and transects.

Group 1 (Bird Identification):

- Students will learn how to properly use binoculars. They will learn how to adjust the vision for their eyesight.
- They will then be introduced to a bird field guide and a few of the basic things you can find in it, such as common and scientific names of birds, how they book is organized, and range maps.
 - Important to explain that field guides can be complicated and it is ok if they do not master them today. The goal is to familiarize students with what this field guide looks like and how it can be helpful.

- Courtney will explain a little about how she uses these tools in the field to help her with her Research.
 - *See above for more information*
- Students will work in pairs to practice looking and identifying birds.
- Have students write and/or draw any birds they see and if they can identify what bird it was.
 - *Important to place and a low proficiency ELL student with a high proficiency or native speaker to help with this activity. It is ok for these students to draw what they see rather than write. However, if they identify the bird they can practice writing its name using the field guide.*

Group 2 (Line Transect Method):

- Students will learn and practice identifying and counting shrubs and plants by using a line transect.
- Instructor will demonstrate how to create a line transect:
 - Using a measuring tape or rope that is pre-measured, instructor will run a transect line (maybe around 30ft).
 - All plant and shrub species that touch this line will be counted.
 - Ex. There are 10 shrubs that touch the transect line and 18 plants
 - Students will first focus on the difference between shrubs and plants
- In pairs, have students, try this on their own.
 - They will spread out to different locations and roll out the measuring tape and rope.
 - Working together students will count and record in their journals how many shrubs touch their transect line and how many plants.
- If time allows have students look at a shrub identification guide for the sagebrush ecosystem.
- Have students do another line transect and have them record the number of shrubs and plants again. This time encourage them to try and identify the shrub species that touch their line transect.
 - *This step can be given to groups who finish faster than others.*
- Come back together as a group and ask groups to share their results of the number of shrubs versus the number of plants found on their line transects. Write these results on a whiteboard for everyone to see.
 - Pose the following: “taking an average of the results found, were there more shrub species or plants? Why do you think this is?”
 - *Potential student responses:*
 - *There were more plant species because in general they were smaller than the shrub species*
 - *There were more shrub species like sagebrush because they do really well in this environment.*

Have groups switch and go to the group they were not just in

Other Activities if time allows:

Abiotic Simon Says: Approximately 5-10min

- Introduce that students will be reviewing the components of the landscape equation that they learned previously. (Abiotic= nonliving, Biotic= living, Culture= human influences) Explain to class that the focus for today’s lesson will be on some of the abiotic components found in the sagebrush landscape.
- Students will be asked to perform the action called out by the instructor only if the action involves something abiotic. **(F1)** For example, if the instructor calls out “Simon says...pick up soil,” the student must pick up soil or a picture of soil. If the instructor calls out “Simon says...touch a tree,” any student who moves towards a tree or picture of a tree is out for that round, because the tree is not abiotic, it is biotic.
- Repeat the step above using various living, non-living, and human related objects until you feel that students are able to demonstrate their understanding between these three factors.
 - *Possible Abiotic Simon Says Call Outs:*
 - *Abiotic Simon Says...*
 - *Pick up soil (abiotic)*

- *Find a rock (abiotic)*
- *Point to piece of scat (abiotic)*
- *Point to the sun (abiotic)*
- *Breathe in the air (abiotic)*
- *Hug a tree (biotic)*
- *Pat a friend's back (biotic)*
- *Flap your arm's like a bird (biotic)*
- *Touch something human made (culture)*
- *Hike down a human made path (culture)*

Sit spot Reflection:

- A sit spot is a way for students to settle in and enjoy the natural world around them. It is time for them to reflect on things they have learned and skills and practices they have performed.
- Explain to students they will be having a **silent** reflection time.
- Students will be asked to find a quiet spot where they can sit or stand and observe what is around them. They will also be given a prompt to reflect upon in their journals. ***This can be one of their graded reflections for the naturalist journals.***
 - Students need to be a comfortable distance from the instructor where they can hear when they are called back. (Suggestion: calling them back with an own or crow sound)
 - Students cannot be near a peer. This is a solo activity!
- Suggested Journal Prompts:
 - Pretend you are an animal that lives in the sagebrush ecosystem, write or draw a short story about your life here. Think about what you would eat, where you would live, who would you be friends with?
 - These would be fun to share at some point.
 - *ELL students can draw or write bulleted thoughts for this activity.*
 - How does this place inspire your curiosity and imagination?
 - Reflect on one of your favorite experience you had outside. Write or draw about who you were with and what you were doing. Explain why it is your favorite.

Sagebrush Field Trip Scavenger Hunt

(Groups of 2-3)

<p>Find a sagebrush and give it a smell. Draw a face that is smiling if you like the smell and frowning if you do not like the smell. Write one word to describe the smell.</p>	<p>Hunt for signs of animal life and record what you found below using words and pictures.</p>
<p>Find a plant that is flowering. Draw this flower below. Record what color it is. Ask around to find out the plant's name.</p>	<p>Find something that a bird might be able to eat. Describe or draw it below.</p>
<p>Take a sample of soil and perform a ribbon test using a bit of water. Record your results below. Which soil particles do you think are in this soil (sand, silt, clay).</p>	<p>Draw a simple food web with at least 3 things that you spot in the landscape.</p>
<p>Find the instructor who has paint chips. Take a paint chip and using your observation skills</p>	<p>Fistful of Sounds Close your eyes and practice listening for a minute!</p>

find something that matches the color. Draw what you found below.

Count how many different sounds you hear and record below.

Can you find an insect? If so sketch it below!

Explore and record something really cool that you found!