Biodiversity Right Outside

A Whiskeytown Lesson Plan

- Use with the **Whiskeytown** module.
- Appropriate for grades **5 and up**.

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Biodiversity Right Outside

Biodiversity is the abundance and variety of life-forms (animals, plants, fungi, and microorganisms) at all levels of organization (ecosystems, species, and genes). In this activity students will learn about biodiversity, the importance of biodiversity to ecosystems, and will conduct their own biodiversity study.

Grade: 5 and up
Length: 60 minutes

Objectives

Students will understand that biodiversity is an important, but complex, part of any habitat or ecosystem. Students will learn that biodiversity studies can take place anywhere.

Materials

- Pencils
- Data sheet or blank sheet
- Clipboards
- Compass (1 per group)
- Rulers
- Flagging tape or string (1 51' section per group)
- Stake or large nail (2 per group) ... tape if conducted indoors
- Large piece of butcher or flip-chart paper (1 per group)
- *Views of the National Parks* (1 DVD or Web connection per group)
- Biodiversity at Whiskeytown worksheets

Preparation

Introduction

- Decide whether the students will go through the *Views* Whiskeytown information in groups or as an entire class.

- If in groups, set up each computer with a copy of *Views*.

The Line Transects

- Outdoors

    - Choose an area that is at least 50 feet long and 50 feet wide that contains a variety of plant and animal species.

    - Using a compass, pre-determine an appropriate direction for the transect lines.

    - Place a line of flagging tape or string along the ground to mark the starting line, and mark/stake starting points that are ten feet apart. These will be the starting points for each group.

- Indoors (bad weather/wrong season alternative)

    - Pre-determine the transect lines and mark their location with tape or string.

    - Place a variety of plant and animal specimens along each line. If you do not have at least 8-10 different species of both plants and animals, include photographs or other visual representations.

    - Utilize desks, walls, and other obstacles that fall along a transect line. If possible, place plants, animals, and photographs at heights appropriate to each species to make the activity more authentic.

Back in the Classroom

- Set aside an area for each group to work.

- Place the large sheet of paper and the markers/colored pencils at each spot.

The Activity

Introduction to Biodiversity

- Engage
    - Ask the students what they think the advantages are of having diverse animal and plant life within a habitat.
    - Ask the students what they think provide for more diversity within a habitat.
    - Ask the students how they would go about identifying all of the species that live in a habitat, like a local park.
- Explore
    - Explain a few reasons why having a diverse population in an ecosystem can be beneficial to the species that live there. For example:
        - A greater variety of plants provide nutrients to a greater variety of insects. An abundance of insects can in turn provide food for small mammals and birds.
        - Species diversity also ensures that if a disease or other threat strikes one species, such as the Rocky Mountain Pine Beetle that is devastating pine trees all over Colorado, other plant species will hopefully survive.
    - Ask the students why scientists measure the variety of species found in different ecosystems.
    - Divide the class into groups of five, or however many transect lines will be available.
    - Each group will explore the *Biodiversity at Whiskeytown* story in the *Views of the National Parks* program.
    - Have each group complete the *Biodiversity at Whiskeytown* worksheet.
        - Students will be given 20 minutes to review the Whiskeytown information and complete the worksheet.
    - Review how biodiversity is a measure of the variety of life in a specific habitat. True biodiversity studies identify all the organisms that live together in an ecosystem.
        - Talk about how scientists at Whiskeytown learned about the hundreds of plant and animal species by conducting field surveys.

♦ Explain that they will be conducting one type of biodiversity study called a line-transect study.

♦ In this study they will identify any and all organisms, or signs of organisms, that they find along their area of study (or line transect).

The Line Transects

♦ Experiment

♦ Supply each group with:

- One(1) 51' section of flagging tape or string
- One(1)compass
- Five(5) clipboards
- Five(5) data sheets of blank sheets
- One(1) stake or large nail
- Five(5) rulers

♦ Take everyone outside to the starting line that has already been prepared.

♦ Have each group select a stake along the starting line.

♦ Each group will secure the starting end of their tape or string to their selected stake.

♦ Next, students will use a compass to set their transect line based on the pre-determined direction chosen by the instructor.

♦ To set the transect line:

♦ One group member will stand at the starting line and orient the compass in the direction dictated by the instructor. Holding on to the end of the tape/string, this student will walk in the designated direction until they reach the end of the line. They will then stake the end of the tape/sting into the ground.

♦ Another group member will walk along the transect line measuring and marking 10 foot increments on the line.

♦ Each student in the group will choose a 10'x2' section along the transect line to study.

♦ Explain to the students that the survey area is 50 feet long, 2 feet wide (1 foot on each side of the transect line) and as high as the sky! Anything that jumps, flies, or crawls across the line is counted!

- The students will then complete their line-transect study by identifying and counting all the organisms found along their section of the line.
    - Each group will be responsible for recording all populations within their study areas. If students do not know the name of a species, or cannot find it in the field guides, have them sketch the organism and briefly describe it.
    - Students will identify species by name, or by size, shape, or color.
    - Name, describe, or sketch the species they find.
- Students will be given 30 minutes to complete their field surveys.

Back in the Classroom

- Elaborate
    - When the students return to the classroom, give each group:
        - 1 large piece of paper
        - Markers and/or colored pencils
    - Instruct the students to combine all of their data onto a single transect line for their group.
    - Have the groups work together to create symbols representing each species found along their transect line. Make sure that they include a legend somewhere on their paper that illustrates what each symbol stands for.
    - When they are done, display each group's transect line on the wall or board in the order they were outside.
    - Give the students a couple minutes to observe all the transect lines.
- Evaluate
    - Lead the students in a brief discussion about what they observed along their transect lines, and what they observed about all the transect lines.
    - Compare and contrast the areas studied:
        - Which study area had the greatest diversity of life?
        - Which study area had the highest population number?

- Which study areas were similar?
- Why were some study areas more diverse than others?
- Ask the students if they observed any similarities among the different transect lines.
- Were there any obvious differences?
- What species did they expect to see that might not have been noticed?
    - Why might they not have been noticed?

- Ask the students why they did a line-transect study instead of surveying the entire habitat.
    - It would take way to long to survey the habitat!
    - Line-transect studies use only a small section of any large natural area, yet they produce an accurate representative sampling of the biotic and abiotic parts of a community.

- Have the students hypothesize how each of their study areas might change over the course of the school year.
    - How could they vary from season to season?
    - What could affect the species found in the study areas?

- What type of biodiversity did they just study?
    - How does it differ from the other types?
    - What could scientists use this data for?

Whiskeytown Worksheet

Name:_____
Date:_____

Welcome

♦ Welcome to Whiskeytown

1. Where is Whiskeytown located?

Biodiversity

♦ Exploring Whiskeytown's Biodiversity

2. What are the communities that are found within Whiskeytown?

3. List the number of species scientists have found in Whiskeytown?

____ Plants
____ Mammals
____ Birds
____ Reptiles and Amphibians

4. What do you think these numbers might tell us?

5. Which communities might you find more of certain species?

6. How do you think scientists can up with these numbers?

♦ Biodiversity Basics

7. Check the following that would be considered a part of biodiversity

____ Pine tree
____ Swarm of mosquitos
____ Mountain peak
____ Stream
____ People
____ June beetles
____ Grizzly bear
____ Mushroom
____ Wind
____ Flock of birds
____ A mountain lion track
____ A salmon egg
____ A rattlesnake
____ Rain
____ Beach sand
____ A dead tree

8. What are the three types of biodiversity?

9. Please give examples of each of the three types.

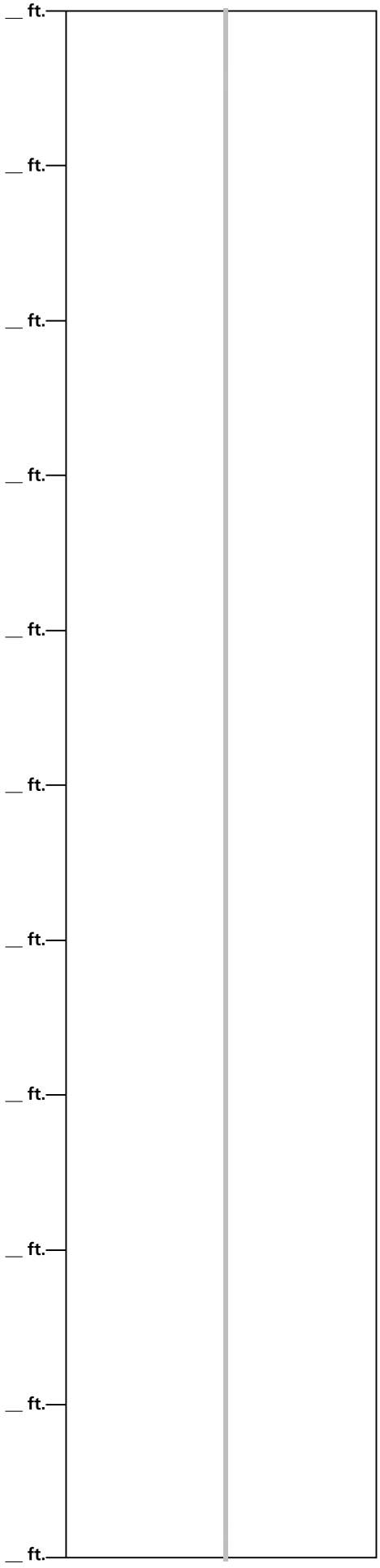
10. What are the four patterns scientists can examine within species diversity?

11. Please give examples of each of the four types.

Biodiversity Right Outside
Transect Data Sheet

Name: _____
Date: _____
Group: _____
Weather conditions:

Observation tips
- Plant identification:
  Seeds, flowers, cones, needles, leaves
- Animal evidence:
  Tracks, scat, fur, feathers, nests, burrows
- Listen and look!



Descriptive Key

Plants

Lichen

Mosses

Fungi

Mammals

Birds

Insects

Amphibians

Reptiles

Fish