

ACTIVITY: THE CASE OF THE MYSTERIOUS WETLANDS

EXTENSION OF: Wetland Habitat lessons

GRADE LEVEL: Grade 5

PROGRAM INDICATOR

The student will study the living and non-living characteristics of a wetland habitat and their importance to the environment.

STUDENT OUTCOMES:

The student will:

1. Cooperate with others to “piece together” the characteristics of a wetland
2. Use the transect method of data collection to explore the wetland and observe its living and non-living components
3. Construct visual profiles of the wetland transect to represent the general components of a wetland environment
4. Generate connections between the observations made in the wetland and the function of wetlands.

BRIEF DESCRIPTION:

In this activity, students will pretend to assist Sherlock Holmes in solving the mystery: What is a wetland? The students will work together to piece together a puzzle about wetland characteristics and functions. As a further exploration, students will work in groups to create wetland profiles and descriptions from data they observed while transecting the wetland area. An activity in creating wetland metaphors is also included as an option.

CLASSROOM READINESS:

1. Introduce vocabulary:
wetland transect marsh hydric soils
2. Discuss the characteristics of a wetland habitat including common plants, animals, climate, and topography.
3. Complete the Fifth Grade Unified Science Unit, “Aquatic Biomes”.
4. Review a map of the Chesapeake Bay and locate wetland areas.

Materials:

marsh boardwalk	Super Sleuth Cards	Super Sleuth Puzzle
marsh guidebook	laminated profile chart	markers
magnifying glasses	soil corers	meter stick or trundle
flags/stakes		
Supplement A Wetland Transect Data Sheet		
Supplement B Wetland Profile		
Wetland Metaphor Bag (optional)		

PROCEDURE:

ENGAGE

Activity A: Wetland Characteristics

The activity leader will begin the lesson by reading the “Super Sleuth Card #1” to the students. This card informs the students that they have been hired by the great Sherlock Holmes to unravel the mystery of the wetlands: What exactly is a wetland? The “Super Sleuth Cards” will instruct the students on which activity to do and will provide a structured and easy to follow progression for the lesson

1. After reading the first card, the activity instructor will retrieve the “Super Sleuth Puzzle” and instruct the students to sit in a circle.
2. The students will then attempt to “piece together” the first clue about the wetland. Working as a group, the students will complete a puzzle that reveals a wetland scene and lists its characteristics.
3. Once the puzzle is complete, the activity leader will have the students take turns reading the information on the puzzle.

Instructor’s Note: The leader should emphasize to the students that they should look for these characteristics when they are in the wetland.

EXPLORE

Activity B: Wetland Transect

1. The activity leader will read “Super Sleuth Card #2” to the students. This informs the students that they must now “go out into the field” and examine the wetland for more clues about its environment.
2. Now, the activity leader will introduce the idea of transecting an area. Begin the discussion with the definition of a transect line.

Instructor’s Note:

A transect is a marked line along which scientific sampling or surveying is undertaken. Scientists commonly use transects as a method of gathering data about a particular area. Along the marked line, scientists note different types of plants and animals or changes in habitats at various measured intervals. By using a smaller area to make observations scientists can then generalize and estimate the entire area.

For example:

What if a botanist wants to know how many lily pads were in a lake? Instead of counting them all, he or she may count the number of lilies in a meter-wide strip. He can then estimate the number of lily pads in the pond by multiplying by the area.

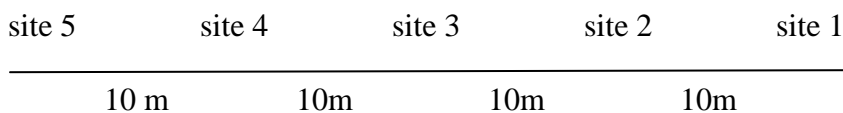
What if a zoologist studying coral reefs wants to know the diversity of coral species on a reef? They may sample along a transect line to survey the animals present.

3. At the marsh boardwalk, the students should be broken up into small groups of three or four. Each group should have a magnifying glass, a soil corer, a meter stick or trundle wheel, a marsh guidebook, flags, and the worksheets.

- The activity instructor will take the students to the beginning of their transect line located 40 meters from the forest edge down the marsh boardwalk (or approximately at the second corner of the boardwalk where the water is visible). One group of students will work along the left side of the boardwalk while another group will be on the right.

Instructor's Note: If more than two transect lines are needed, the other side of the boardwalk may be used (mostly likely two will be enough). If more are needed, prior to the activity, start about 5 meters upland and measure 40 meters towards the marsh boardwalk.

- At the water's edge, the activity leader will inform the students that this is the starting point of the transect line (site 1). Each group should imagine a one-meter bubble around them and record observations on their data sheets (Supplement A). Students should use their magnifying glasses and marsh guidebooks to identify as many types of plants and animals as possible. Students should not only look for the actual animals, but signs of animals (scat, prints). Each group should use a corer to examine the soil at this site and also record their findings. (*Soil samples should only be taken at sites 1, 4, and 5*).
- After the groups have surveyed their area, the activity instructor will explain that each group will make additional observations at four more sites. The students will use their meter stick or trundle wheel and measure 10 meters from the starting point. The instructor will flag the measured distance.
- Once the groups have moved 10 meters towards the upland, the activity leader will instruct the students to repeat the observation exercise. Additionally, students should be encouraged to note any changes in climate, topography, or frequency of plants and animal species.
- The students will continue this procedure until they have recorded observations for all 5 sites.



EXPLAIN

Activity C: Putting It All Together

- After gathering the students together, the instructor will read “Super Sleuth Card #3” to the students. This informs the group that they must now piece together the clues they have found and create a profile of the wetland area.
- The activity instructor will instruct the students to use their data charts to sketch a visual profile of their transect line on their profile sheet (Supplement B).

Instructor Note: The activity instructor should emphasize that students should show specific changes from the wetland to the upland area, as well as specific plants and animals found at each site.

Adaptive strategy: The activity instructor will provide a model of a transect profile.

Language Arts Connection: Students should not only visually draw their profile, but also try to summarize the changes in plants, animals, and soil composition that they observed.

3. After each student has completed their individual profiles, the transect groups will collectively complete a large profile of the area on the laminated charts provided. The profile should include visual drawings as well as labels for specific wildlife or phrases describing any changes observed?

Instructor's Note: The activity instructor should facilitate the compilation of data through asking leading questions:

- What did most groups see at the first site?
- Were there any specific plants and animals you could identify? If so where were they located?
- What did you notice about the soil as you moved closer to the upland?
- Where do you think hydric (saturated) soil would be located? dry and forest type soil? sandy and partially saturated soil?
- What changes in the plants did you see as you moved further upland? (they were less aquatic, roots weren't floating, maybe fewer).
- What changes in the animals did you see as you moved further upland? (they were less aquatic, bigger, less insects).

Language Arts Connection: The students should construct some general statements about the changes the class collectively witnessed as they moved from the wetland to the upland.

Activity D: Wrap Up

1. The students will attempt to solve the mystery by formulating conclusions between their observations and profile and the functions and characteristics of a wetland.

Instructor's Note: The activity instructor should assist the students in forming conclusions by asking leading questions-

- Based on what you about the characteristics of a wetland, between which sites does a wetland region appear to exist? (about 1-3 or 4) a forest region? (5) an intermediate zone? (about 4-5).
- What specific observations helped you to determine where the wetland was located? (hydric soil, aquatic plants, lots of insects, lots of water, exposed roots).
- Wetlands are vital parts of our planet because they help the environment. Based on your knowledge, how does the diverse and numerous amounts of plants and animals help the animals of the Chesapeake Bay watershed? (provides a resting place for migratory birds, provides food and shelter for animals, provides a safe haven for younger animals to avoid predators)
- When we examined the soil of the wetlands what did it feel like and what did it seem to be composed of? (wet, muddy, decomposed plants, organic matter) How would this thick and rich soil help the overall health of the wetland? (the soil filters out toxins and dead and decomposing wildlife, provides nutrients for plants, acts as a buffer to help stop erosion)

- What does the excess amount of water found in the wetland suggest about how the wetland helps with the overall health of the Chesapeake Bay? (the excess water can be used as a steady source of water during drought, run-off and excess water from the Bay are contained in the wetlands to minimize flooding)

****After the final activity, either the wrap-up or wetland metaphors, the activity instructor will read the “Super Sleuth Card #5” to the students. This informs them that they have successfully solved the mystery and are now detectives.

CLASSROOM FOLLOW-UP

Extend

Language Arts Connection/Optional Activity: Wetland Metaphors

****This activity may be used if time is available at the end of the lesson or as a rainy day activity****

1. The activity instructor will read “Super Sleuth Card #4” to the students. This informs them that they will need to identify some newly surfaced clues and decide how they fit into the wetland. Students will describe the function and importance of the wetlands by comparing a wetland to a “clue” in the “Wetland Metaphor Bag”.
2. The activity leader will pull one item out from the bag and prompt the students to describe how that item is like a wetland.

Instructor’s Note: The instructor should lead the students by showing an item and asking what it is commonly used for.

Adaptive Strategy: The activity instructor will model a metaphor to compare how it relates to a wetland.

Ex- A pillow is a wetland because it provides a resting place for migratory birds

3. Students will go through each item in the bag and create metaphors for each item
Instructor’s Note: The items in the bag are as follows:
 - sponge absorbs excess water caused by runoff, retains moisture
 - pillow resting place for migratory birds
 - spoon mixes nutrients and oxygen into the water
 - picture of a mother and child provides a nursery for young wildlife
 - filters strains debris and impurities from the water
 - cereal provides nutrient-rich food for wildlife and humans
 - soap helps clean the environment
 - brick protects the shore from erosion (forms a “wall”)

Evaluate

1. Journal Write: Students will explain why it is important to share data. They will explain why using transect lines is beneficial for a scientist who is studying a large area.

2. Assign each student a wetland animal or plant to research. The students can research their organism and collectively make a wetland field guide of the plants and animals.
3. Have students visit another type of wetland and have them make comparisons between the two wetland areas.
4. Students will research local efforts to improve the wetlands by contacting local organizations or reading the newspaper and magazines.

Teacher Resources:

Books:

The Chesapeake Bay Wetlands: The Vital Link Between The Watershed and the Bay. US Environmental Protection Agency, March 1997.

Kesselheim, Alan S. and Britt Eckhardt Slattery. WOW! The Wonders of Wetlands. Environmental Concern Inc., St. Michael's MD. The Watercourse, Bozeman MT. 1995.

“Wetland in a Pan” and “Wet ‘n’ Wild” lessons

Niering, William A. Wetlands. Alfred A. Knopf, Inc. 1985

Slattery, Britt Eckhardt. Bay BC’s. Chesapeake Bay Estuary Program US Fish and Wildlife Service and Department of Education and Interpretation National Aquarium in Baltimore.

“Wetland Food Web Mobile” and “Wet Words” activities

Supplementary Materials:

Bay Journal: Alliance for the Chesapeake Bay.

“Chesapeake Bay: Introduction to an Ecosystem”. US Environmental Protection Agency Publication. September, 1997.

“Wading into Wetlands”. National Wildlife Week Education’s Guide. April 21-27, 1996.

Web Sites:

www.bayjournal.net (Bay Journal online)

www.chesapeake.net (Chesapeake Bay Program)

SUPER SLEUTH CARDS

SUPER SLEUTH CARD #1

For the past few months, the world famous detective Sherlock Holmes, and his loyal sidekick Watson, have been diligently working to unravel the mystery of the wetlands of the Chesapeake Bay watershed. Presently, their efforts to learn more about this mystifying environment have proved fruitless. Desperately, Detective Holmes has asked for a few brave and cunning sleuths to assist him with this important case. Your teacher has decided that you are just the future detectives Holmes and Watson need.

Only one clue has been uncovered thus far. While searching the wetland, Detective Holmes uncovered a mysterious puzzle that may provide clues to cracking this case. Your first assignment as super sleuths is to piece together this clue. Who knows, with a little luck, you may crack this case wide open and discover what a wetland actually is? Glory and promotions await you. The game is afoot!

SUPER SLEUTH CARD #2

Detective Holmes was very pleased with your ace detective work in piecing together the characteristics of the wetlands; however, this case is far from being solved. Detective Holmes has decided to promote you all to field agents. Your new assignment is both dangerous and requires close observation.

You must venture out into the wild wetlands and closely examine the area for more clues about the environment. Don't forget your equipment and above all, be careful. Even Holmes himself does not know what lies out there.

SUPER SLEUTH CARD #3

What a successful search for clues! Holmes and Watson are anxious to see how you put everything together to solve this case. Now you must gather your clues and try to describe a wetland environment and all its secrets. Remember that you must present your findings in an organized fashion like any top-notch detective would. Good luck!

SUPER SLEUTH CARD #4 *OPTIONAL OR RAINY DAY*

Uh-oh! Some additional clues have shown up. Holmes and Watson found a mysterious bag that contains some strange objects while surveying the wetland. It's up to you to try to understand how these clues will help you to determine the characteristics of a wetland and solve this mystery. Just when you thought you had this case cracked!

SUPER SLEUTH CARD #5

Congratulations! You have all been promoted to detectives! Sherlock Holmes and Watson are very happy with your investigative skills and environmental knowledge. It appears that you have been the key to solving this mystery. Holmes must be right:

"It's elementary school students, my dear Watson, elementary school students." (HaHa!)

INFORMATION FOR PUZZLE

- ATMOSPHERE EQUILIBRIUM
The plants and soil of the wetland help break down nitrogen, carbon, and sulfur to clean the air
- HABITAT
The wetlands provide a resting-place for 80% of migratory birds. They also provide a home for a variety of plants and animals.
- TRANSITION ZONE
Wetlands are a transition zone between land and water. They possess solid ground, but this land is extremely saturated with water.
- TREMENDOUS BIOLOGICAL PRODUCTION
Due to the diversity of the wetland, plants are abundant and continuously producing food and oxygen. This allows the wetland to be a plentiful home for many hungry animals
- FLOATING PLANTS
Many wetland plants, like the lily pad, appear to float on the water with their roots extended below the surface.
- SHALLOW OR EXPOSED PLANT ROOTS
- 6% of the world is covered with wetland.
- 9.5% of Maryland is covered with wetland.
- Every year the United States loses 300,000 to 500,000 acres of wetlands. That's like losing an area the size of Delaware every three years
- HYDROPHYTIC PLANTS
The wetland is home to thousands of plants that thrive in excess water.
- HIGH WATER TABLE
Most wetland areas contain a high level of standing water. Wetlands curb river volume during floods or periods of heavy rain by serving as a basin for excess water and run-off.
- HYDRIC SOIL
Wetland soil is saturated with water. This is commonly known as "spongy soil". The soil may appear muddy and thick due to its low oxygen levels and the decaying organic matter that makes up a large part of wetland soil.
- COASTAL PROTECTION
The water in the wetland is usually standing or slow moving. When the water from the bay hits the wetland, the extreme plant growth slows down the current. This prevents fast moving water to smash into the shore and erode the land. Additionally, the standing water allows sediment to settle out, thus improving water quality.
- Wetland areas are sometimes home to endangered plant and animal species. At Arlington Echo, the wetland is the home of the endangered Atlantic White Cedar.

Wetland Transect Data Sheet

SITE NUMBER	DISTANCE FROM STARTING POINT (m)	PLANT LIFE (number of plants and specific types)	ANIMALS (number of animals and evidence of certain animals)	SOIL DESCRIPTION (texture, color, saturation, and composition)
1				
2				/
3				/
4				
5				

CHANGES OBSERVED WHILE MOVING FROM WETLAND TO FOREST:

Wetland Profile

