

Adopt-a-Habitat

Students work in small groups to record observations of a coastal habitat and make connections between its plants, animals, soil, water and topography. Students identify a potential natural restoration need within this habitat.

OBJECTIVES

Discuss how people can help their community	List relationships that exist within the habitat	Identify a potential natural restoration need within the habitat	Discuss the significance of the coastal ecosystem to the Great Lakes
Observe and collect data on litter, water and soil quality, and physical characteristics of the coastal habitat	Analyze data for trends and patterns	Create solutions based on identifiable concerns	

SUBJECT

Ecology

PREREQUISITE

#6: Coastal Habitat Research
#7: The Great Race for Survival
#8: Food Web Invasion

VOCABULARY

coastal habitat
commensalism
groundwater
mutualism
outlet
parasitism
symbiosis

MATERIALS

glass jars with lids
quart-sized sealable bags
journals
pencils
field guides
clipboards
pond nets
chaperones
hand lenses
appropriate attire, footwear, etc.

TIME/DURATION



Multiple days

SETTING

Outdoors

This Great Lakes in My World 9-12 activity is aligned to the Common Core State Standards (as available). This alignment is available on your Great Lakes in My World 9-12 USB flash drive in the “Standards” folder and on-line at <http://www.greatlakes.org/GLiMWstandards>.

BACKGROUND

Students will be observing aspects of a coastal habitat or various coastal habitats. The class can visit any of the following coastal habitats: prairies, dunes and swales, beaches, wetlands, rivers, swamps, lakes, bogs/fens, marshes, ravines, savannas or forests.

Observation is the basis of science. Students must learn to be keen observers of their natural surroundings in order to formulate questions and make connections. Through observation, students will identify problems or issues within a natural coastal habitat. Students may identify a method for alleviating this problem and visit or “adopt” the habitat through repeated visits.

Citizen science refers to projects in which volunteers research real-world problems and collect scientific data. Service learning integrates community service into a curriculum, and connects schools with agencies and neighborhoods. These experiences build an understanding of a community, enrich learning and help youth develop personally, socially and academically. Service learning incorporates such steps as: research, investigation, analysis, action, reflection and celebration. The Alliance for the Great Lakes’ Adopt-a-Beach™ program and curriculum is an easy and fun way for groups to connect with Great Lakes’ habitats. Adopters generally commit to two to five visits per year. During the visits, adopters use special forms to collect data on three different aspects of their habitat.

PROCEDURE

PART ONE: OBSERVATION SKILLS

Note: This part of the activity can also be done at school before the field trip.

1. Ask each student to take five minutes to walk around and look for a rock that fits into their hand to bring back to the group. If this part of the activity is done in the classroom, another object, such as a pencil, could be used in place of a rock.
2. Have students sit in a circle on the ground. (This can be done in two groups.) Give them time to make some observations about their rocks and record them in their journals.
3. Have students place their rocks into the center of the circle, and then close their eyes (or turn around). When their eyes are closed, mix up the pile of rocks.
4. After mixing up the pile of rocks, have everyone face the center of the circle. Ask for a volunteer to look through the pile and find their rock. The student should tell the class two defining features that make their rock different from all of the others. Allow for a few more volunteers.
5. Ask students what sorts of things about their rocks might be important to observe and record. How detailed do observations need to be? What about observations of the coastal habitat? The more detailed the students' observations and journal entries are, the more information they will have to refer to later. As time goes by, it will be more difficult to recall details unless they have been recorded.

PART TWO: SMALL-GROUP OBSERVATION AT A COASTAL HABITAT

6. Explain that students will be making focused observations about the coastal habitat and recording them in their journals. Like the rock activity, it is important that their observations are detailed. They may make notes, ask questions, sketch the ecosystem, and/or create charts to include the necessary content. They should follow the directions on the student pages.
7. Divide students into four groups with chaperones for each group (two abiotic groups: physical environment and soil; two biotic groups: plants and animals). You may have students rotate through each of these stations, or spend time at only one station, depending on the time available. If they are not rotating through all of the stations, they only need to answer journal questions for their own group, but should read through or discuss the questions for other groups.

8. If students do not rotate through all of the stations, form new groups made up of one student from each original group, a technique also known as "jigsaw." Students should each spend three to five minutes sharing their journal responses with the new group members.

9. At some point during the day, all students should take some time to sketch the coastal habitat.

PART THREE: ADOPT THE HABITAT

10. The class continues to collect data on topography, flora, fauna and physical characteristics (water quality, soil quality, topography) during at least one additional visit. They then use the data to create positive change in the coastal habitat.
11. Pre-Visit Reflection: Have the students answer the first set of journal questions.
12. Go to your adopted coastal habitat and collect data as you did during Part Two.
13. Once back from each visit to the coastal habitat, have students answer the second set of journal questions. Provide one copy of this page for each visit. Discuss as a class.
14. Tally all data, review the data as a class and analyze the data during the course of your visits, looking for trends and issues in your coastal habitat. Graph the data in order to gain a greater understanding of issues.
15. Discussion: Ask the students to think of creative ways to display their data, through graphs, posters and presentations. Based on the analysis of the data collected, what information is most important to share? What groups or individuals would be interested in learning more about this data? How would it be best to reach this audience?
16. Discussion: What are some of the problems this habitat has? What ideas do the students have for solving these problems?

WRAP-UP

17. Students work either individually or in pairs to find connections between the parts of a habitat, and record them in the student pages.
18. They are looking for ways in which their biotic or abiotic components interact or depend on each other for survival. For example, plants need soil to root in, and the roots in turn hold the soil in place; animals eat each other to gain nutrients and energy. The goal is to find as many connections as possible. A connection might be a predator-prey relationship, or other ways in which organisms depend on each other.
19. Once the connections have been made, students present their findings to the class. Students should explain how the connections benefit the habitat for which they chose to examine. Ask the students to think about how this is related to the Great Lakes. For example, the elements of a wetland work together to provide habitat for organisms, to hold and release water into the Great Lakes, and to filter water before it reaches the Great Lakes.
20. Student describes the overall health of the coastal habitat in which they chose. How could they share this information with others?
21. Student reflects on experience and lists two new things that they have learned about the coastal habitat they studied and provide any additional questions they may still have.

EXTENSION

- A. Have students share their knowledge, experiences and data with others in the school or community.
- B. Stage a celebration that includes others who will appreciate learning about your adopted coastal habitat and what students have done for it.
- C. Students adopt a coastal habitat within the Great Lakes Basin and visit it two to five times to collect data and make observations. Students complete a project to further improve their coastal habitat. Projects might include educating others within the school about keeping our Great Lakes coastal habitats healthy; trying to get additional receptacles for waste in order to decrease the litter in a coastal habitat; or adding, or having educational signage added to, a habitat. Use this as an opportunity to teach students about selecting projects carefully. Many projects are larger than students realize, and would not succeed because of this. Teach students to select a manageable project at which they can succeed.

ASSESSMENT

See rubric on page 152.

RESOURCES

Please see Resource List for additional information related to wetlands, watersheds and more.

Adopt-a-Habitat

VOCABULARY

coastal habitat
 commensalism
 groundwater
 mutualism
 outlet
 parasitism
 symbiosis

BACKGROUND

Observation is the basis of science. Students must learn to be keen observers of their natural surroundings in order to formulate questions and make connections. Through observation, students will identify problems or issues within a natural coastal habitat. They may identify a method for alleviating a problem and visit or “adopt” the habitat through repeated visits. At the end of this lesson and using your previous knowledge, students should be able to identify and classify various habitats.

INTRODUCTORY QUESTIONS

Answer these questions BEFORE your first visit to a coastal habitat.

1. How often do you visit habitats in nature? What types of coastal habitats do you visit?

2. When you visit a habitat, what do you do there?

3. What do you like best about coastal habitats and the Great Lakes?

4. What factors determine the health of a coastal habitat?

5. When was the last precipitation event (rain, snow, hail) and how might this impact the habitat?

6. What litter did you find in the habitat? How do you think it arrived in this environment?

7. What ideas do you have for creating positive change in this habitat?

8. What are you looking forward to as part of Adopt-a-Habitat?

ANSWER THESE QUESTIONS AFTER EACH VISIT TO A COASTAL HABITAT.

9. Sketch the habitat here.

10. What did you like best about your visit to a coastal habitat?

11. What surprised you about the visit to the coastal habitat?

12. What did you learn from the data you collected?

13. List at least two questions that you have about the habitat and/or its inhabitants.

14. Based on your data, what ideas do you have for creating positive change within this habitat?

PHYSICAL ENVIRONMENT OBSERVATIONS

Date: _____ Time: _____ Location: _____

15. Weather (cloud cover, wind, approximate temperature, precipitation, humidity).

16. What are the major landforms? For example, hills, valleys, ridges, plains.

17. What is the approximate size of the habitat? Estimate the length and width in meters.

18. Is the habitat exposed to the sun? How much so?

19. How is the habitat connected to the local Great Lake?

20. What is its source of water (if any)? Does it have an inlet?

21. If there is water in the habitat, do you think it seeps into the groundwater? How might you be able to tell? Does the habitat have an outlet?

22. What surrounds the habitat?

23. Other observations:

WILDLIFE (FAUNA) OBSERVATIONS

24. Choose one animal to sketch. Look for animals on land, in the sky, and in the water. Remember that insects are animals. If you cannot see an animal, look for signs of animals, such as tracks, feathers, fur, burrows, shells, chewed twigs or scat (animal droppings).

25. Write a description of the animal you've selected, or of signs of the animal.

26. Now, focus on a small animal, such as an insect. Observe it for several minutes before answering these questions:

- a. Where is the animal? _____
- b. What is it doing? _____
- c. Is it in the water or on land? Why? _____
- d. Can you tell or guess what it eats? _____
- e. What role might this animal play in the food chain or food web of this ecosystem? _____
- f. Is the animal interacting with another animal? If so, how? _____
- g. Is the animal interacting with any plants? If so, how? _____
- h. Do you think that this animal could be found in the Great Lakes? Why or why not? _____

PLANT (FLORA) OBSERVATIONS

27. Record the common plants and their locations. If a field guide is available, try to identify them. Describe several plants:

28. Do you think that this plant could be found in the Great Lakes? Why or why not?

29. Draw the plant and fill in the information. Label important characteristics on the drawing.

TYPE (circle one)

Woody/Herbaceous

BRANCHING

Opposite • Alternate

FLOWERS

Yes • No

Number of Petals _____

Color _____

SEEDS

Fruit • Nut • Parachute

Hitchhiker • Other

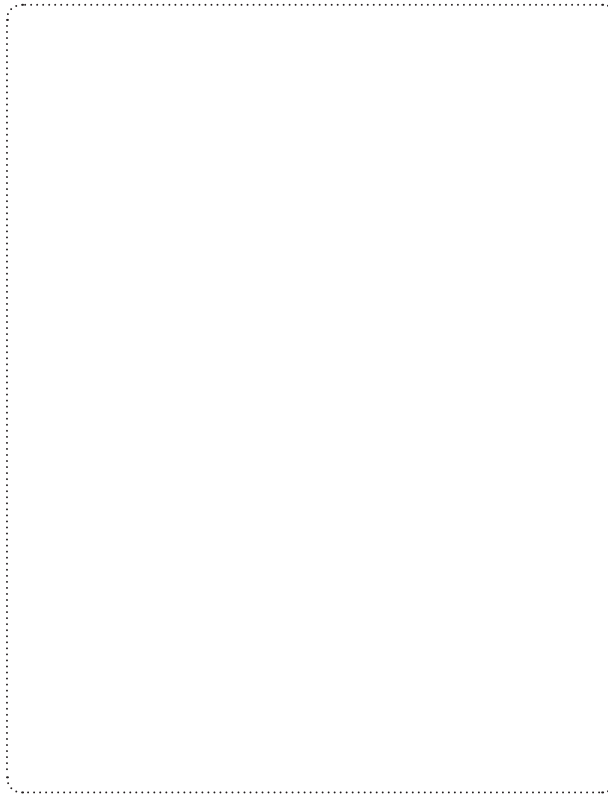
LEAVES

Color _____

Shape _____

Height _____

OTHER INFORMATION _____



SUNLIGHT

Sunny • Shady

SOIL

Wet • Medium • Dry

Clayey • Sandy • Mixed

LOCATION

Underwater • Emerging from the water • At the edge of the water • On land

ABUNDANCE

High Number • Medium

Very Few

OTHER PLANTS NEARBY

SOIL OBSERVATIONS

Conduct some tests to learn about the soil. Test one sample from the interior or wetter area, and one from the edge of the habitat.

30. Fill a jar three-quarters of the way to the top with water. Add a handful of soil to the jar. Secure the lid and shake. Let the jar stand undisturbed for 15 minutes. The soil will separate into its parts, which could include sand on the bottom, then silt above it, then clay, and then organic material, which would float on top. Note: All of these parts may not necessarily be present. Repeat this with soil from the edge of the wetland.

31. While waiting for the soil to separate, conduct another test to determine the soil type. Pick up some wet soil. Roll it between your palms into a worm shape. Try to bend the worm into a circle. If the circle cracks or falls apart, the soil contains more sand than clay; if it stays smooth, it contains more clay than sand.

32. Draw the jars of soil and label the layers of sand, silt, clay and organic material.

33. How do the soil samples compare?

34. What is the breakdown of soils in the jar (amounts of sand, silt, clay and organic material)

35. What makes up most of the soil in each of these areas?

36. If you can, compare the soil from the bottom of your Great Lake with the soil from the habitat. How do they compare? Why do you think this is the case?

SYNTHESIS OF OBSERVATIONS

37. What is the significance of the following parts of this habitat?

Landforms _____

Location _____

Sunlight/Shade _____

Soil Type _____

Animals _____

Plants _____

38. What water sources are located inside, or along the edge of, this habitat? How did/does water get into the habitat?

39. How does the water leave the habitat and where does it go?

40. Based on your observations, what makes this habitat an important place?

ANSWER THESE QUESTIONS AFTER AT LEAST TWO VISITS.

41. What are your favorite ideas for ways to create positive change in this habitat?

42. Choose one idea you would like to carry out. Write it here.

43. What resources (time, money, etc.) are needed for this project?

44. What challenges might you face while working on this project?

45. How will you overcome these challenges?

46. List the first steps you think the class should take.

WRAP-UP

47. Here are examples of connections between abiotic and biotic factors. How many more can your group find?

FACTOR A	FACTOR B	RELATIONSHIP
Dragon Fly	Mosquito	Predator-prey relationship
Cattail	Soil	Plants need soil to root in
Frog	Water	Animals need water to drink and help them lay eggs
Roundworm	Crustacean	Parasitism

48. Describe the overall health of the coastal habitat. How could you share this information with others?

49. What two new things have you learned about the habitat you studied? What additional questions do you have about the Great Lakes coastal habitats?

RUBRIC

ELEMENTS	☆☆☆☆	☆☆☆	☆☆	☆
OBSERVATIONAL SKILLS: Student participates in group activity by finding an object (i.e. rock or pencil) and noting all characteristics of the object on the student pages. Student identifies his/her object when mixed up with other student's using only observations written in journal pages.	Addresses all of the components	Missing one of the components	Missing two components	Missing three or more components
JOURNAL QUESTIONS: Student answers all introductory questions found on student pages prior to visiting a coastal habitat. Student reads through the lab prior to attending coastal habitat to ensure s/he knows what type of observations to make.	Addresses all of the components	Missing one of the components	Missing two components	Missing three or more components
FIELD WORK: Student makes observations of his/her "station" and answers all questions on the student pages. Using each other as resources and their observations, students sketch the coastal habitat to get a visual representation. Student repeats this process once more after visiting the habitat once more for comparison.	Addresses all of the components	Missing one of the components	Missing two components	Missing three or more components
ANALYSIS: Student tallies up all data and looks for any trends or issues that they noticed between the two separate visits. Student may use Microsoft Excel as a tool to aid in any statistical analysis if available.	Addresses all of the components	Missing one of the components	Missing two components	Missing three or more components
GRAPHING: Student uses the data to make a visual representation of their findings (i.e. graphs, posters and/or presentations). Student describes their results, highlighting trends and explaining their conclusions as to why they think the results were as they were. Graphs include key features (title, key, cardinal directions or north arrow, scale and legend).	Addresses all of the components	Missing one of the components	Missing two components	Missing three or more components