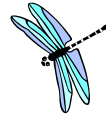


MARSH STUDY



ASSATEAGUE ISLAND NATIONAL SEASHORE

Grades 4-6
Pre and Post Visit Activities



INTRODUCTION



Thank you for selecting Assateague Island as a school visit location. What better way for students to learn about their environment than by experiencing a living classroom? You can make this visit an even more memorable one by creating a sense of anticipation. Try some of the pre and post visit activities in this packet to spark your students imaginations in preparation for their field trip.

Students arriving with prior knowledge of the resource will be better prepared to explore and retain what they learn during the program. Post visit activities can help students evaluate the experience and incorporate new information and ideas into relevant classroom discussion.

Please hold on to this set of materials so it can be used again next year.

Staff at Assateague Island National Seashore hope your school visit will be productive. Please fill out the attached evaluation. We are interested in your comments.

“Sandcerely”

Liz Davis
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Maryland Voluntary State Curriculum

Marsh Muckers

Grade 4

Assateague Island National Seashore Program

Science Content Standards

1. Skills and Processes – Students will demonstrate the thinking and acting inherent in the practice of science.

A. Scientific Inquiry. 1. Access and process information from readings, investigations, and/or oral communications.

B. Critical Thinking. 1. Describe and compare similarities and differences among objects and scientific concepts.

C. Applications of Science. 1. Apply scientific concepts to make decisions about a relevant science issue.

D. Technology. 1. Recognize and explain how the changes made to models can apply to real objects, events, and situations.

2. Earth/Space Science – Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

E. Interactions of Hydrosphere and Atmosphere. 1. Recognize and explain the relationship of the sun to the water cycle.

3. Life Science – Students will use scientific skills and processes to explain the dynamic nature of living things.

C. Evolution. 1. Recognize and explain that organisms and groups of organisms that are best suited to an environment survive and reproduce.

6. Environmental Science – Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

B. Interdependence of Organisms. 1. Recognize and explain that Earth's surface features and environmental conditions limit what types of organisms can survive.

D. Environmental Issues. 1. Recognize and describe that people depend on, change, and are affected by the environment.

(Selected standards may vary and will be represented in pre/post visit materials and education programming)

Maryland Voluntary State Curriculum

Life of the Salt Marsh

Grade 5

Assateague Island National Seashore Program

Science Content Standards

1. Skills and Processes – Students will demonstrate the thinking and acting inherent in the practice of science.

A. Scientific Inquiry. 1. Access and process information from readings, investigations, and/or oral communications.

B. Critical Thinking. 1. Describe and compare similarities and differences among objects and scientific concepts.

C. Applications of Science. 1. Apply scientific concepts to make decisions about a relevant science issue.

D. Technology. 1. Recognize and explain how the changes made to models can apply to real objects, events, and situations.

2. Earth/Space Science – Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

A. Materials and Processes That Shape A Planet. 1. Recognize and explain the processes that shape and reshape Earth's surface.

3. Life Science – Students will use scientific skills and processes to explain the dynamic nature of living things.

A. Cellular. 1. Recognize and explain that all organisms are made up of one or more cells.

D. Biochemistry. 2. Recognize and explain that some source of energy is needed for all organisms to grow, survive, and reproduce.

E. Ecology. 1. Recognize and explain that individuals and groups of organisms interact with each other and their environment.

6. Environmental Science – Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

C. Natural Resources and Human Needs. 1. Recognize and explain how renewable and nonrenewable natural resources are used by humans to meet basic needs.

D. Environmental Issues. 1. Recognize and explain that decisions influencing the use of natural resources may have benefits, drawbacks, unexpected consequences, and tradeoffs.

(Selected standards may vary and will be represented in pre/post visit materials and education programming)

Maryland Voluntary State Curriculum

Life of the Salt Marsh Grade 6

Assateague Island National Seashore Program

Science Content Standards

1. Skills and Processes – Students will demonstrate the thinking and acting inherent in the practice of science.

A. Scientific Inquiry. 1. Access and process information from readings, investigations, and/or oral communications.

B. Critical Thinking. 1. Describe and compare similarities and differences among objects and scientific concepts.

C. Applications of Science. 1. Apply scientific concepts to defend a position relative to an issue.

D. Technology. 1. Recognize and explain that models vary in their effectiveness and may need to be changed for different purposes.

2. Earth/Space Science – Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

A. Materials and Processes That Shape A Planet. 1. Identify and describe that some changes in Earth's surface occur rapidly while other changes occur very slowly.

3. Life Science – Students will use scientific skills and processes to explain the dynamic nature of living things.

E. Ecology. 1. Identify and describe that within ecosystems, organisms have different roles and functions.

6. Environmental Science – Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

B. Interdependence of Organisms. 1. Recognize and describe how biotic and abiotic factors influence an environment.

C. Natural Resources and Human Needs. 1. Recognize and compare how different parts of the world have varying amounts and types of natural resources and how the use of those resources impacts environmental quality.

D. Environmental Issues. 1. Recognize and explain that human-caused changes have consequences for the immediate environment as well as for other places and future times.

(Selected standards may vary and will be represented in pre/post visit materials and education programming)

Maryland Voluntary State Curriculum

Life of the Salt Marsh Grade 7

Assateague Island National Seashore Program

Science Content Standards

1. Skills and Processes – Students will demonstrate the thinking and acting inherent in the practice of science.

A. Scientific Inquiry. 1. Access and process information from readings, investigations, and/or oral communications.

B. Critical Thinking. 1. Describe and compare similarities and differences among objects and scientific concepts.

C. Applications of Science. 1. Apply scientific concepts to defend a position relative to an issue.

D. Technology. 1. Recognize and explain that models vary in their effectiveness and may need to be changed for different purposes.

2. Earth/Space Science – Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

A. Materials and Processes That Shape A Planet. 2. Recognize and explain that physical weathering, chemical weathering and erosion cause changes to Earth materials.

B. Earth History. 2. Recognize and explain how fossils provide evidence of Earth's changing environmental history.

6. Environmental Science – Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

A. Flow of Matter and Energy. 1. Recognize and explain how matter is transformed between the physical environment and organisms.

C. Natural Resources and Human Needs. 1. Recognize and explain the impact of a changing human population on the use of natural resources and on environmental quality.

D. Environmental Issues. 1. Recognize and describe that environmental changes can have local, regional, and global consequences.

(Selected standards may vary and will be represented in pre/post visit materials and education programming)

Maryland Voluntary State Curriculum

Life of the Salt Marsh

Grade 8

Assateague Island National Seashore Program

Science Content Standards

1. Skills and Processes – Students will demonstrate the thinking and acting inherent in the practice of science.

A. Scientific Inquiry. 1. Access and process information from readings, investigations, and/or oral communications.

B. Critical Thinking. 1. Describe and compare similarities and differences among objects and scientific concepts.

C. Applications of Science. 1. Apply scientific concepts to defend a position relative to an issue.

D. Technology. 1. Recognize and explain that models vary in their effectiveness and may need to be changed for different purposes.

2. Earth/Space Science – Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

D. Astronomy. 1. Identify and explain celestial phenomena using the regular and predictable motion of objects in the solar system.

E. Interactions of Hydrosphere and Atmosphere. 1. Describe the properties and structure of the hydrosphere and atmosphere.

6. Environmental Science – Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

D. Environmental Issues. 1. Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.

(Selected standards may vary and will be represented in pre/post visit materials and education programming)

VIRGINIA STANDARDS OF LEARNING

Programs presented by National Park Service Staff In the Chincoteague National Wildlife Refuge

Wetland Studies Grades 4-6

Indicators

- 4.4 The student will investigate and understand basic plant anatomy and life processes.
- 4.5 The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment.
- 4.8 The student will investigate and understand important Virginia natural resources.
- 5.5 The student will investigate and understand that organisms are made of cells and have distinguishing characteristics.
- 6.8 The student will investigate and understand that organisms perform life processes that are essential for the survival and perpetuation of the species.
- 6.9 The student will investigate and understand that organisms depend on other organisms and the nonliving components of the environment.
- 6.11 The student will investigate and understand public policy decisions relating to the environment.

Wetland Word List for Teachers

- Please choose the appropriate vocabulary words to use with your class.
- The underlined portion of each definition is simplified and may be used with younger students.
- The portion of the definition not underlined is provided for teachers, but may be used with students.
- Scientific names are provided only as supplementary information for teachers.

Adaptation -- special ways plants and animals are able to survive; modifications an organism makes in order to adjust and better survive in its environment.

Bacteria -- microscopic animals that help with decomposition, single-celled organisms; some of which contribute to decomposition processes in wetlands.

Black needlerush (*Juncus roemerianus*) --- a very needle-sharp tipped, round stemmed rush that grows in dense stands in high marsh areas.

Blue crab (*Callinectes sapidus* --- a beautifully colored crustacean with olive green carapace and bright blue claws. The blue crab has excellent eyesight, is a proficient swimmer thanks to its fifth pair of paddling legs; an important commercial species.

Byssal threads -- These threads attach the mussel to the salt marsh cordgrass roots to hold them in place; fibrous thread produced by the ribbed mussel.

Camouflage -- animals that blend in with their surroundings; animals use their color, patterns, shapes or behaviors that allow animals to blend in with the surroundings. For instance, some animals have colors that enable them to hide from predators.

Clam -- one of the most easily recognized bivalves. Clams live below the surface, have siphons for filtering plankton and detritus, and a foot for burrowing.

Coffee bean snail -- salt marsh snail (*Melampus bidentatus*) – a small snail living in the high marsh under layer of detritus or on grass stems, it has an air-breathing lung and does not live immersed in water.

Consumers – These animals can not make their own food, they must eat other plants or animals.

Decomposers -- microscopic organisms that cause dead plants and animals to rot or decay, organisms, mainly bacteria, that break down dead plants and animals into simpler substances.

Detritus -- marsh mud; decomposed plant and animal debris, detritus is the basis of the food chain in the salt marsh. It is food for zooplankton, filter feeders and young marine life.

Dragonflies -- are beautiful flying insects found in wetland areas. Dragonflies and damselflies capture their prey on the wing by forming a basket with their legs.

Eel grass (*Zostera marina*) -- underwater seagrass, with roots in the bay bottom, growing in relatively shallow water where sunlight can reach and photosynthesis can take place, flowering and pollination takes place underwater.

Egrets -- beautiful long legged wading birds found in shallows and wetlands. Three white egrets visit Assateague; the Great egret is the largest, the Snowy egret, and the small Cattle egret. Egrets and herons eat fish, snails, crabs and insects.

Fiddler crab (*Uca pugnax*) -- small crabs living in muddy marshlands, males have one large claw ("the fiddle") he will wave to keep trespassers away or to attract a mate. Females have two small claws. Fiddlers are active during low tide, at high tide they retreat into their burrows plugging their holes behind them.

Filter feeder -- animals that filter food from the water; these animals are specially adapted for feeding on microscopic plankton and detritus.

Fresh water -- water without dissolved salts. Tap water is fresh water.

Food chain -- sunlight helps plants grow, plants are eaten by animals, animals are eaten by other animals, a passage of energy or food from producers (plants) to plant eaters (herbivores) and meat eaters (carnivores), the consumers.

Glasswort (*Salicornia* spp.) -- is a salt tolerant marsh plant with fleshy round stem-like leaves; plant turns bright red in the fall.

Habitat -- where a plant or animal lives, its natural home.

Herons -- beautiful long legged wading birds found in shallows and wetlands. Great blue, Little blue, and Tricolor are commonly seen herons at Assateague. Herons and egrets are closely related and both eat fish, snails, crabs and insects.

High marsh -- upper areas of the marsh only flooded periodically during extreme tides and storms, salt meadow hay, black needle rush and some shrubs grow here.

Low marsh -- lowest area of the marsh, flooded twice a day from tides, salt marsh cord grass grows here.

Mosquitoes -- a small buzzing, biting insect that lives and breeds in wetland areas, female mosquitoes need blood to produce eggs, eggs are deposited in wet areas and hatch in about two weeks, the larvae ("wigglers") feed on algae and plankton until the pupa stage, after this period of inactivity, the adults emerge. Male mosquitoes feed on pollen and nectar.

Mummichogs (*Fundulus heteroclitus*) -- Native American word meaning "go in groups", schools of mummichogs minnows live in the shallows of the bay and marsh and feed on mosquito larva, a type of killifish, chubby with rounded tails and protruding lower jaw.

Muskrat (*Ondatra zibethicus*) -- a brown, glossy furred mammal with a scaly tail, about the size of a small cat. Muskrats live in salt water or fresh water; they build lodges, are excellent swimmers, and eat fish, frogs, crayfish, and vegetation.

Mussels, ribbed mussels (*Geukensia demissa*) -- have ribbed shells and live attached to the base of salt marsh cord grass on the edge of the marsh, blue mussels (*Mytilus edulis*) -- have blue-black smooth shells and live attached to hard surfaces like sea walls and piers; mussels are filter feeding bivalves, they attach to surfaces with byssal threads.

Nutrients -- elements or compounds needed for the reproduction, survival or growth of plants and animals.

Osprey (*Pandion haliaetus*) -- “fish hawk”, a large hawk, eat fish caught in their talons, build nests of sticks in old trees, channel markers, nesting platforms etc., mate for life, return to same nesting area each year.

Periwinkle (*Littorina irrorata*) – a univalve (snail), found living on the stems of salt marsh cordgrass and black needlerush feeding on algae and detritus.

Photosynthesis -- the process by which green plants produce their own food with energy from the sun, carbon dioxide and water are utilized and oxygen is released in the process.

Pioneer plant -- a plant that is able to take hold in an area with generally harsh growing conditions, pioneer plants create conditions that enable other plants to get a foothold.

Plankton -- microscopic plants and animals that float in the water at the mercy of the winds and currents, most have limited swimming abilities.

Predator -- An animal that hunts and kills other animals for food.

Producers -- plants produce their own food with energy from the sun.

Purple marsh crab (*Sesarma reticulatum*) – small crabs living in the salt marsh, they have square shaped shells and their eyes are found at the corners. Marsh crabs are often mistaken for female fiddler crabs. Marsh crabs share many of the same areas as fiddler crabs.

Raccoon (*Procyon lotor*) – the familiar black masked, ring tailed, brown mammal, very common in wetland areas, raccoons at Assateague eat crabs and mussels in the salt marsh.

River otter (*Lutra canadensis*) -- a dark brown, sleek furred, long whiskered mammal, graceful, powerful swimmer, lives in salt water and fresh water, feed on fish, crayfish, crabs and frogs.

Salt marsh -- a grassy transition zone between the land and salt water, a nursery area for many forms of life in the marine environment.

Salt marsh cordgrass (*Spartina alterniflora*) – a coarse grass growing in low marsh, adapted to growth in salt water, excretes excess salt through plant cell walls, primary detrital ingredient.

Salt meadow hay (*Spartina patens*) – grass growing in high marsh, salt tolerant plant, adapted to periodic tidal flooding.

Salt panne -- a depression found usually in the high marsh, floods only during the highest tides, soil is too salty for most marsh plants, bacteria may thrive in these areas, as detrital material accumulates and plants take hold, salt pannes may eventually evolve back to marsh.

Salt water -- water with many dissolved salts and minerals. The oceans are salt (with an average salinity of 35 ppt (parts per thousand)), and many bays and estuaries are salty.

Scavenger -- an animal that feeds on dead animal or dead plant material.

Submerged aquatic vegetation (SAV) -- underwater seagrass beds, a unique underwater habitat that provides a safe nursery area for young marine life, adds detrital matter, holds bay bottom in place, helps absorb wave action, helps filter debris from water, and adds oxygen to the water.

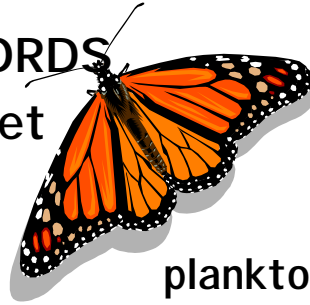
Tides -- result from the gravitation pull between the earth, sun and the moon; the surface of the ocean is flexible and forms bulges as a result of the moon and sun's gravitational pull on the earth; tides occur as the earth and moon rotate around the sun; high tides occur when the bulge passes, low tides occur between bulges.

Waterfowl – ducks and geese use wetlands for food sources, nesting areas and resting places.

Wetland -- a unique landform characterized by the presence of water, only specially adapted plants and animals live here.

WETLAND WORDS

Answer Sheet



Pre-Visit



Have students match each word with the meaning:

adaptation

bacteria

camouflage

detritus

filter feeder

fresh water

habitat

high marsh

low marsh

nutrients

photosynthesis

pioneer plant

plankton

salt marsh

salt water

seagrass beds

tides

wetland

1. A special area of land where water is present most of the time is called a wetland.
2. Plankton are microscopic plants and animals floating in the water and moving with the wind, tides and currents.
3. An adaptation is an adjustment made by a plant or animal in order to better survive in its environment.
4. Food, water, shelter and space are necessary for a plant or animal to live.
This natural home is called a habitat.
5. Fresh water is water without dissolved salts, like tap water.
6. Plants and animals need nutrients in order to grow, reproduce and survive.
7. Decomposed plant and animal debris form marsh mud or detritus.

8. The grassy area between land and salt water is called the salt marsh.
9. Microscopic organisms called bacteria are responsible for decomposition in the salt marsh.
10. Salt water is water with many dissolved salts, like the ocean.
11. Plant and animals use color, patterns or shapes for camouflage or blending in with the surroundings.
12. Underwater grasses or seagrass beds, provide a safe habitat for marine creatures. The roots help hold the bay bottom in place, and the grass blades help clean and add oxygen to the water.
13. The high marsh is the upper area of the marsh. This area is flooded only now and then by stormy weather.
14. Pioneer plants are the first plants to grow in an area. They improve soil conditions so other plants can begin to grow.
15. Animals that strain nutrients like plankton and detritus from the water are called filter feeders.

16. The low marsh is the lowest area of the marsh. This area is flooded daily by tides.
17. Tides result from the gravitational pull between the earth, sun and moon. This cycle occurs twice daily and about 50 minutes later each day.
18. Green plants use the energy from the sun to convert carbon dioxide and water into food. Oxygen is released in this process called photosynthesis.



ASSATEAGUE ISLAND WETLAND BINGO

Generalization: Wetlands are productive and valuable resources.

Objectives:

1. Students will be able to define at least 3 words or phrases from the Wetland Vocabulary list.
2. Students will be able to identify some of the animals associated with the wetland habitats.



Preparation: Make enough copies of the bingo sheet for each student. Select words or phrases from the vocabulary list to use in the bingo game. Collect a few prizes should you choose to present awards to winners.

Materials: Bingo sheets, chips (if you are doing the simplest form of the game), awards, colored pencils.

Procedure:

Have a little fun with Wetland Words while preparing students for their visit to the island. Assateague Wetland Bingo is designed to introduce students to vocabulary associated with wetlands.

Youngest students



1. Select 9 words from the vocabulary list and print them on the board.
2. Distribute bingo sheets.
3. Discuss words and provide a short definition.
4. Have students write each definition (or descriptive phrase) in whichever block they choose so that each bingo sheet is different. They must also leave room to write the matching vocabulary word.
5. Make sure the students understand that every block should display a short definition (and room to write the matching vocabulary word). No empty blocks.
6. Once students are ready, begin calling out vocabulary words. Don't forget to keep track of the words so they can be properly matched for the winners.

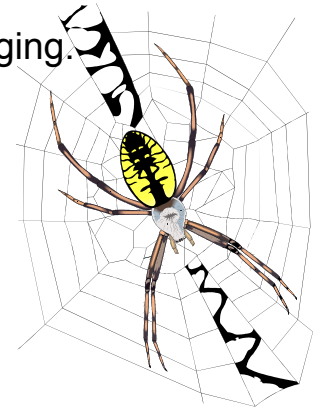
7. Students must match the correct definition to each vocabulary word. They should write these in a bright colored pencil so they can easily tell when they have 3 across, down, or diagonal.
8. A student should call out "Assateague!" when they have 3 in any direction. In order to win the game they must have matched the correct vocabulary word and definition.

More challenging

1. Select 10 or more words from the sheet or those you wish to cover from your own list. Explain to students that they will pick out 9 of these to write into blocks for the game.
2. Follow directions 2 through 8 from above description
3. Moving fast and steady make this game more challenging.

Most challenging

1. Distribute the 16-block bingo sheet.
2. Select 16 vocabulary words.
3. Follow directions 3 through 9 from above description.





PUNCTUATION WARM UP

Directions: Go over the punctuation codes with class. As you read each sentence include punctuation marks. Example: "Filter feeders (comma) like clams and mussels (comma)..... You may wish to have the class read each sentence aloud as well. When you come across a punctuation mark, perform the correct action. Make this more difficult by staying silent when you come to the mark and just using the code. Example: "Filter feeders (2 stomps) like clams and mussels (2 stomps). The faster you go the more difficult it will get!

Punctuate these sentences using the following codes:

(.) 1 clap	(?) 2 claps	(!) 1 stomp
(,) 2 stomps	(') 1 finger snap	(:) 2 finger snaps
(-) 1 clap and 1 stomp	("") 1 clap, 1 stomp and 1 snap	

1. Filter feeders, like clams and mussels, use siphons to eat.
2. "The wild horses can bite and kick" the ranger exclaimed!
3. "What's that bird over there" one of the visitors asked?
4. How does the horseshoe crab use its tail?
5. Piping Plovers, small endangered shorebirds, make their nests in the sand on Assateague Island.
6. Some of the things that rangers carry in their backpacks are: a compass, clam shells, skate egg cases, whelk shells, and pictures.
7. Some examples of shellfish are: ribbed mussels, quahog clams and oysters.
8. "Fifty-two dollars for a postcard," the visitor exclaimed! "No," said the ranger. "It's fifty-two cents."
9. Assateague's wild horses eat grasses, leaves, twigs, seaweed and poison ivy!
10. To catch a blue crab, or even a fish, you need a lot of patience!
11. "You should leave all food in you car," warned the ranger. "The horses might get into your tent while you're camping!"
12. "What time is low tide?" The surfer asked the lifeguard.

Extension: As a post trip activity, have each student write their own using information or experiences from their field trip to the island.



SHELLFISH LINEUP

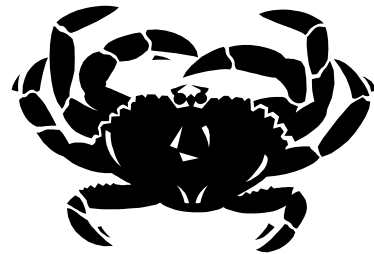
Warm up: Problem solving

Directions: Write the following clues on the board or overhead projector. Have each student work the problem individually and record his or her answer on paper. The students might find this easiest to do if they have written the creature names on individual slips of paper in advance. Then go through the problem by vocally modeling your thought process on the board. Ask students if any of them got the same answer but use the clues differently?

CLUES:

1. The blue crab will not stay next to the clam or the ribbed mussel.
2. The shrimp is not on an end, but the oyster is.
3. Ribbed mussel is between the clam and the shrimp.
4. And, the whelk is on the right end.

How are these shellfish arranged in a row?



SOLUTION:

Oyster, Clam, Ribbed Mussel, Shrimp, Blue Crab, Whelk



WATERMAN'S DILEMMA

Warm up: Problem Solving

Directions: Read the following problem aloud to the class, or write it on the board. Have each student work out the problem individually, or in cooperative learning groups then work through it as a class. This might even be a good learning center activity.

**HINT: It is much easier to use manipulatives to solve this problem. This will allow students to try different solutions. (ex. different colored bingo chips or scrap paper).*

Problem:

A waterman has captured a blue crab, a minnow and a grass shrimp in his nets. He must transport them to his boat where he has a larger tank. The waterman has only one very very small bucket in which he can carry only one creature at a time. If left alone, the blue crab will eat the minnow, and the minnow will eat the grass shrimp. How can the waterman safely transport everything to his boat where he can (when he has all three together) make the proper arrangements?

SOLUTION: (2 possible approaches)

1. Take the minnow over.
2. Leave it in the tank.
3. Go back.
4. Take the blue crab OR the shrimp over.
5. Leave the blue crab OR the shrimp in the tank.
6. Pick up the minnow.
7. Take the minnow back and leave it.
8. Pick up the blue crab OR the shrimp from the net.
9. Then take the blue crab OR the shrimp to the other side.
10. Go back and pick up the minnow and take it over.





POSING AN OPEN ENDED QUESTION

Overview: In this activity the teacher poses an open ended question, that has no actual answer, to the class. Students must then research the question and find a creative way to answer it.

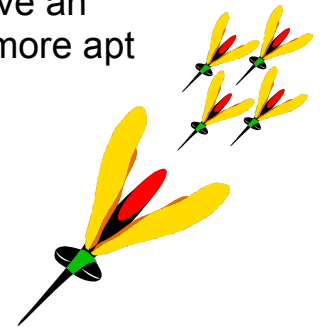
Objectives:

1. Students will use the skills of problem solving, investigation, and creativity to research and solve an open ended question.
2. Students will use encyclopedias, internet, and other reference materials to gather information and map out a solution to the question posed.

Materials: encyclopedias, other library materials, internet access (helpful but not necessary)

Procedure: Combine students into their cooperative learning groups pose and open-ended question. Encourage them to explore for a creative solution. By using an open ended question that does not have an “actual” right answer, students will feel less intimidated and more apt to try and come up with an answer. The key is to encourage creativity in students as they try to find a solution.

A possible question that can be posed to the class is:
HOW MANY MOSQUITO BITES WOULD IT TAKE TO DRAIN THE HUMAN BODY OF ALL ITS BLOOD?



Of course this could never happen but if it could what would the answer be? There are many ways of approaching this question. How much blood does a mosquito consume during each bite? How much blood does the average human hold? In the process of finding out about these things, students may discover other interesting facts. Such as, it is only the female that takes our blood and this is so she can lay her eggs. There may be other ways to answer this question. Let the students explore and then come up with their own plans and answers.

Extension: Learning groups might make up their own questions and exchange them. Any question without an actual solution can be used. Students could be asked to make graphs, posters, write essays, or give an oral explanation of their answers.



Wetland Wrap-up

Generalization: Wetlands are important to all of us.

Objective: Students will communicate wetland concepts.

Materials: copy of the Wetland Wrap-up for each student, drawing paper, pencils, tape, small pieces of paper each with one of the phrases from the worksheet, container.

Procedure:

1. Distribute drawing paper and pencils (no colored pencils, as this is a quick activity).
2. Students will pick a phrase from the container. They must not let anyone know what phrase they have selected.
3. Let students know which phrases have not been selected so they can be crossed off their lists, or make the activity a bit more challenging and leave the extra phrases in the mix. Students may come up with some interesting perspectives.
4. Give students 5 – 10 minutes to quickly draw a picture of their assigned phrase that will allow other students to match the phrase with the picture. This is not an art contest. Students should use whatever they can to get their point across. Art skills are not necessary. The idea is to communicate the concept. Make sure students put their name on the front of their drawings.
5. Tape pictures around the room.
6. Distribute Wetland Wrap-up worksheets.
7. Students will then go around the room and match wetland phrases with student names.
8. Discuss selections, especially when they do not match. Students may have convincing reasons for making their selections.





STUDENT FIELD TRIP ASSESSMENT

Generalization: A student evaluation can be an effective assessment tool for teachers and park staff.

Objectives:

1. Students will describe whether or not they felt the experience was valuable to them as part of the curriculum.
2. Students will describe 3 things they learned during field trip or school visit.

Preparation: Make copies of the Student Evaluation sheet for each student.

Materials: Student and teacher evaluation sheets.

Procedure: This exercise is useful for both teachers and park staff. Students get an opportunity to share their thoughts and ideas with the education staff at Assateague Island. Teachers get another opportunity to observe what students take in during a field trip.

1. Distribute Student Evaluation worksheets.
2. Ask students to fill them out and explain that National Park education staff is interested in their comments.
3. Teachers might fill out the Teacher Evaluation while students are working on theirs.
4. Mail both sets of evaluations to:

Liz Davis
Education Coordinator
Assateague Island National Seashore
7206 National Seashore Lane
Berlin, MD 21811

Classes sending in both teacher and student evaluations will receive additional classroom materials.



EVALUATION

Assateague Island National Seashore

Please share your thoughts with us. We need your help to provide the best educational experience possible.

School: _____

Grade Level: _____ Type of program: _____

Does the program relate to your curriculum? Explain.

Was the material presented at grade level? _____

Did the students enjoy the program? _____

Which activities were most effective and why? _____

Which activities were least effective and why? _____

Rate the extent to which the ranger was able to deliver the information in an interesting and enthusiastic manner.

Excellent Good Fair Poor Unable to Judge

Please comment if your response was "fair, poor, or unable to judge."

Please comment on any changes or additions that could be made to improve the visit.

How did you use pre/post visit activities? Please comment on their effectiveness.

Educators who fill out and return this evaluation to the address listed on the back will be sent additional classroom materials.

Thank you.
Please mail to:

Liz Davis
Education Coordinator
Assateague Island National Seashore
7206 National Seashore Lane
Berlin, MD 21811

