The Salt Marsh Players

(adapted from WOW! The Wonders of Wetlands)

Grade Level

3rd – 6th

Objectives

* To be able to describe how waves are formed.

* To be able to list two animals and two plants that live in the marsh.

* To be able to describe how animals behave in the marsh.

N.C. Standard Course of Study

Grade 4
(4.L.1.1, 4.L.1.2)

Grade 5
(5.L.2.1, 5.L.2.2, 5.L.2.3)

Grade 6
(6.L.2.1, 6.L.2.2)

Activity:

Overview:

Students are given roles in a skit designed to illustrate how a salt marsh works and how the organisms in it interact with each other. Students may benefit from researching their organisms/roles ahead of time.

Materials:

- bubble soap and blower
- 12' x 1' piece of blue cloth or blue paper "waves"
- 2 paper towel tubes
- character cards (included)
- materials for making pictures or costumes to represent each character card

Background:

Salt marshes are transition areas between the land and the sea. These areas are dominated by marsh grass and may be very wide or very narrow; depending on the depth of the nearby water. Everything that lives in this habitat must be able to tolerate changing salinity, temperature, and water levels because of the tides that come in and out twice a day.

Marshes are also home to numerous plant and animal species. Some organisms are permanent members of the marsh ecosystem (for example cordgrass, salt meadow hay, glasswort, fiddler crabs, and oysters) and other organisms just visit the marsh when the tide is in (such as fish, shrimp, blue crabs) or when the tide is out (raccoons and red fox). All play an important role in the marsh ecosystem.

Ask a student to come to the front of the classroom and demonstrate the following: You are at the beach, collecting shells near where the waves are washing in (where the best shells are). It is early in the season and the water is very cold. What do you do as waves come and go? - - run away from incoming waves.

Explain that animals living in tidal habitats have to put up with alternate flooding and exposure every day. Some may move away from the incoming tide, as demonstrated above, some come to the marsh only when it is flooded, and others simply adjust their activities to suit different degrees of "wetness". The class will act out some of these behaviors, creating a "living" salt marsh!

Create the Characters:

Hand out the "character cards" provided, one to each student (make duplicates if there are not enough). Have the students make a mask, simple costume, or sign (using drawings or magazine photos) to wear to identify their character. To make water: use a long piece of blue cloth or blue yarn (about 12 feet long) or connect blue paper "waves" to make a strand with the above dimensions. Attach each end of the water to a paper towel tube and roll it up like a scroll.

Set the stage:

Go to an open area or clear space in the classroom. Designate one end of the area as the body of water, and the rest of the area as the marsh. The part closest to the water is called the low marsh; the part farthest away is the high marsh (see diagram).

1. Ask the students who are "Water" to take their places, unroll the water and stretch it across the playing area, as if the tide were low. Ask them to make gentle waves with the water (they can practice, and then stop to watch the others take their places).

2. Ask "What makes the waves?"- "Wind" should speak up. Ask the wind to read his or her card to the class. Wind will make the wind sounds and dance around as the waves move again, then stop.

3. What is it that makes the tide move in and out? The "Sun" and "Moon" should come forward, read their cards, and stand on chairs, making circles above their heads with their arms - - a full moon and a sun, shining brightly.

4. Next ask the plants, in turn, to read their cards and take their appropriate places in the marsh - - they should all be standing somewhere between the ends of the water (see diagram). When all are in place, ask the wind to sound again, and have the plants wave in the breeze. Plants should remember that they are rooted to the ground.

5. Now do the same for each of the animals. Ask each to state what he or she will do during high or low tides. The fish and blue crab do not come out of the water. They should position themselves behind the water line and will move in and out of the marsh with the tide.

6. What is in the water that helps the plants and animals to survive? “Oxygen” should go behind the water line, too. What helps mix new oxygen into the water? The wind - - as the wind blows, making waves that help mix in oxygen, “Oxygen” will blow bubbles using bubble soap!

7. Have all the characters get ready to “perform” together.

Bring the salt marsh to life!

Narrator:

The sun and moon are high in the sky, the wind begins to blow, the waves move gently, and the plants sway in the breeze. It is low tide! The animals now behave as directed for low tide. (Have students continue their low tide activity for 2 minutes).

Narrator:

The tide begins to rise! The water line should move slowly towards the high marsh, with fish and crabs and oxygen bubbles following behind. As the water passes over each character, he or she should change to high tide activities. (Teacher may have to talk them through this change. Remind them of their activities and notice what others are doing).

Narrator at the peak of high tide:

It is high tide!

At this point, the group should stop in place and quickly tell what he or she is doing. Now ask the tide to turn and go back – as the tide passes over each character, the activities should change again. Just for fun (and applause at the end), you may wish to perform the saltmarsh in front of another group!

Discussion questions:

1. How do plants and animals use oxygen?
   Animals take in oxygen to breath. Plants release oxygen.

2. How does the sun affect the tide?
   The sun is also a pulling force on the tides, but less than the moon. When the sun and moon are on the same side of the earth affecting tides, there will be more difference in the tides (Spring tides). When they are at right angles to each other, there is less difference in the low and high tide (neap tides).

3. How do the different animals in the marsh eat?
   Some animals come into the marshes to eat at high tide, such as fish. There are also animals that come to the marsh to eat at low tide, such as raccoons. Oysters feed when water covers them (filter feeders) and some animals eat anytime, such as marsh periwinkles, hermit crabs and mud snails.

4. If you were looking for mussels would you look at high or low tide? Why?
   Mussels are sessile animals that live in the mid to upper areas of the marsh that are covered only at high tide. They are very easy to locate partially buried in the mud at low tide.

Extension:

1. Make a model or a poster of a salt marsh and include other plants and animals that are found in North Carolina.

2. Show students a tide chart that covers several days. Demonstrate how to read the chart and discuss why fishermen use tide charts.

3. Have students research adaptations that allow these animals to survive in the salt marsh.

Vocabulary:

- bivalve
- gravitational pull
- high marsh
- invertebrates
- low marsh
- sub-tidal zone
- tides
- intertidal zone
- producers
- consumers
- adaptations
- camouflage
- predators

References:

Slattery, B.E. & A.S. Kesselheim. 1995. WOW! The Wonders of the Wetlands. Environmental Concern and the Watercourse, Bozeman, MT. 330 pgs. Used with permission.

Coulombe, Deborah A.. 1992. The Seaside Naturalist A Guide to Study at the Seashore. Fireside, Rockefeller Center New York, NC. 246 pgs.

National Science Standards:

Content Standards	*Unifying concepts and processes [1-4 & 5-8]*
	Life Science [1-4 & 5-8]
	Science in personal and social perspectives [1-4 & 5-8]

Ocean Literacy Principles:

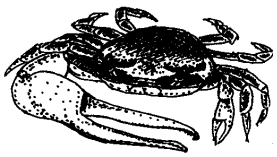
Essential Principle #1	*The Earth has one big ocean with many features. (Fundamental Concepts – c)*
Essential Principle #5.	*The ocean supports a great diversity of life and ecosystems. (Fundamental Concepts – a, d, e, f, h, i)*
Essential Principle #6.	*The ocean and humans are inextricably interconnected. (Fundamental Concepts – c)*

Character Cards

Cordgrass

I grow in the low marshes where the ground gets flooded by water for long periods of time each day. During the highest tides, I might be completely under water! Since I am a rooted plant, I can't move except to sway with the breeze. I must tolerate getting wet.

Fiddler Crab



I run about the marsh at low tide eating the bits of dead plants and animals (detritus) that are found in the intertidal mud. If I am female, I have two small claws and can eat with both of them. If I am male, one of my claws is big. I wave it around to protect my mating burrow and to attract a mate. It will not, unfortunately, reach into my mouth for eating.

Horseshoe Crab

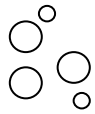
I am not really a true crab at all! I am an odd, primitive creature most closely related to a spider. I stay at sea until a full moon in the spring, when it is time to lay eggs. Female crabs, with smaller males in tow, swim ashore with the incoming tide, crawl onto the sand above the tide line and lay thousands of tiny eggs.

Character Cards

Salt Meadow Hay

I am often called “marsh hay” because at one time I was harvested and fed to cattle. I grow in the high marsh where I get flooded for a few hours each day. When the wind blows, my neighbors and I sway softly. At low tide we lie in swirly cowlicks with roots still in the mud.

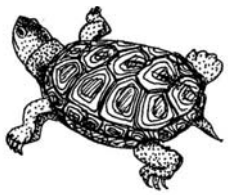
Oxygen
(O_2, what a gas!)



Water must contain oxygen to support all of the living things that live in it! As the tide moves in and out, I will move along just behind the water line, showering all things I encounter with the oxygen bubbles! They are made for the oxygen given off by underwater plants and the air pushed in by the wind.

Diamondback Terrapin

I am the only turtle that lives in salty wetlands. I must breathe air, but I live in the estuarine waters and swim up to the surface and poke my nose out to breath. I like to eat snails, crabs, worms, insects and fish, so I go where the food is. I lay my eggs in the warm sand on the shore.



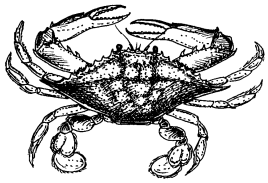
Character Cards

Periwinkle Snail

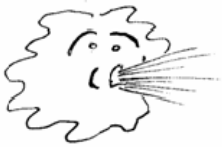
I prefer to live in the low salt marsh. I breathe with gills and need to be near water. During low tide, I glide around the mudflat looking for algae. As the tide comes in, I crawl up the stems and leaves of cordgrass to avoid predators.

Blue Crab

I am the tasty Blue Crab who comes into the marsh with the tide. Here, I find lots of oysters, fish and other creatures to eat. Since I breathe with gills, I must swim out of the marsh with the retreating tide or dig myself into the muddy bottom. When I am "soft" (I have shed my shell to grow), the marsh is a great place to hide from predators.



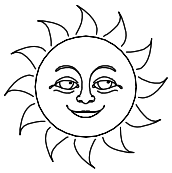
Wind



I help the sun and moon to drive the tide in and out. If I blow very hard, I can force the water to come in or go out farther than usual. I also add oxygen to water, which helps make the water healthy and keep plants and animals alive. Sometimes I can be very noisy as I sweep across the marsh!

Character Cards

Sun



I am the sun and I help to drive the tide! The gravitational pull is created as the earth rotates around me. This causes the water to "pile up" making a high tide, or pull away from shore, causing low tide. I also provide the energy for the plants to grow. This drives the food webs of the estuary.

Great Blue Heron

I am a large, beautiful bird that wades gracefully in the shallow water, hunting for food. With my long neck and long, pointed bill I strike down and snatch fish, crabs, water insects, and even small mammals out of the water. As the tide comes in, I move to higher parts of the marsh to stay in shallow water. Sometimes I just fly away.

Moon

I am the moon and I am the major force driving the tide! I create a gravitational pull as I rotate around the earth. This causes the water to "pile up," making a high tide, or pull away from the shore, causing low tide. I am about 70% responsible for the changing tide. *(You will need to stand on a chair and make a big circle above your head with your arms and "shine" over the marsh.)*

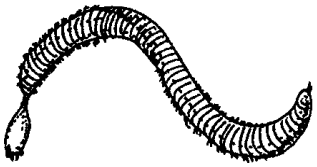
Character Cards

Clapper Rail

I am an elusive, hen-like bird, often called the "marsh hen" because I live and nest in salt marshes. At low tide, I forage and probe my long bill into the mud, looking for fiddler crabs, worms and other small creatures and seeds. High tide limits my space to the high marsh, but here I can still eat snails who have climbed up grasses to escape the water.

Clam Worm

I am a colorful worm who burrows in the mud in the *subtidal zone* or in the low marsh, where I build a tube out of sand. When the tide is high and my tube is under water, I may swim out to look for food, such as the soft insides of clams, dead fish or other small water animals. When the tide is low, I stay deep inside my tube.



Ribbed Mussel

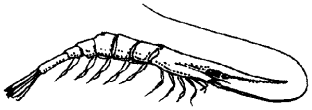
I am a bivalve, a two shelled animal, like a clam. I live in mud in the low marsh, where half of me sticks above the mud. At high tide, I open my shells a bit, take in water, and strain out oxygen and tiny plants and animals to eat (plankton). At low tide I close up tightly to hold moisture in my gills for breathing until the next high tide.

Character Cards

Raccoon

Though I do not live in the salt marsh, I do come here to hunt for dragonflies, crabs, oysters, clams, fish and other good bits of food. I am not fond of swimming, so when the tide rises, I leave the marsh for higher ground.

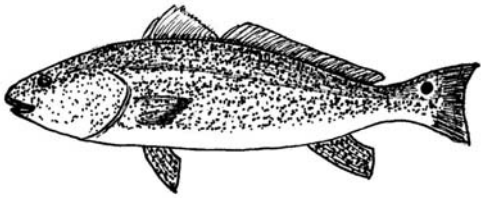
Shrimp



I am a valuable seafood animal that hatches in the ocean and then swims into the estuary to grow. I grow several centimeters while hiding in the marsh grasses in the summer. While in the marsh, I stay in deeper water and move towards the marsh at high tide and back out into deeper water when the tide goes out. When I become an adult, I swim back to sea.

Red Drum

I am a fish that is reddish in color and I usually have at least one black spot on my tail. I am North Carolina's state fish. I live in the water around the salt marsh where I grow into an adult. I like to eat smaller fish and crabs, especially fiddler crabs! I have to learn to swim fast, though, so dolphins don't eat me!



Character Cards

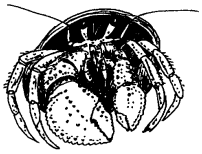
Mud snails

I am a small dark colored snail. I am almost always found along the edges of salt marshes near the water where I like to feed on bits of dead animals. I never leave my shell but grow by taking in calcium from my food and the water. I don't need to move with the tides because I have gills.

Oyster

As an adult I live in the marsh attached to a hard surface, often another oyster shell. I am a bivalve like a clam, but I am sessile, which means that I don't move after I attach to a hard surface except to open and close when the tide is high enough to cover my shell. When the tide is high, I can filter the water for oxygen and food, usually plankton.

Hermit Crab



I am a small crab that doesn't have a strong outer shell like other crabs, so I must find empty snail shells for homes instead. I live along the edge of the marsh in shallow water and move to the high marsh as the tide comes in. When I outgrow my shell, I must find another one that is bigger.

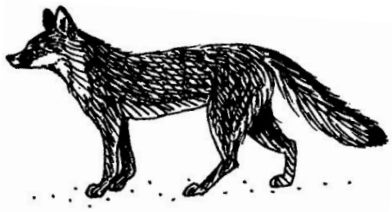
Character Cards

Water

I am salty water and I am the tide. When it is time for the tide to rise, I move slowly into the low marsh, then up into the high marsh. At the high tide point, I will stop and rest a minute, then turn in place and move slowly back "out to sea." (You will need a partner to help you make and move the "water".)

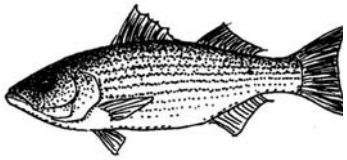
Red Fox

I am a mammal who does not live in the salt marsh, but I do come here to hunt for rabbits, rodents, small marsh birds and eggs, invertebrates, and berries. As the tide rises, I leave the marsh. I usually hunt in drier areas during the winter.



Striped Bass

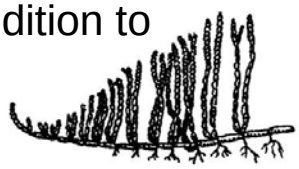
Like many kinds of fish, I use the marsh as a nursery area, a protected place to raise my young (called "fry" or "fingerlings" at different stages). My tiny offspring dart in and out of the marsh plants as they swim in and out with the tide (remember fish breathe with gills!). These hungry youngsters can find lots of food here.



Character Cards

Glasswort / Pickleweed

I am a rather stiff, plump little plant that crouches down in the lower end of the high marsh, where I am alternately covered with water and exposed. I soak up a lot of salt water, which gives me my fleshy appearance. Considered a delicacy, glasswort makes a crunchy, salty addition to salads.



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The Salt Marsh Stage

Shown at low tide: arrows show movement as a tide rises.