

Life Cycles of the Saltmarsh

Students will build life cycles of plants and animals of the saltmarsh.

OBJECTIVES

- Students will be able to describe a life cycle.
- Students will be able to identify the saltmarsh as a unique habitat for plants and animals.
- Students will be able to classify animals as reptiles, birds, fish or invertebrates.
- Students will be able to build a life cycle of spartina and an animal in the saltmarsh.
- Students will learn about adaptations of living things in the saltmarsh.
- Students will learn about inherited traits and fitness in reproduction.

SOUTH CAROLINA SCIENCE STANDARDS

K-ESS2-2, 1-LS1-2, 1-LS3-1, 2-LS2-1, 2-ESS3-1,
3-LS1-1, 3-LS3-1, 3-LS4-2, 3-LS4-3, 4-PS3-4,
4-LS1-1, 5-PS3-1, 5-LS2-1

MATERIALS IN BIN

- Copy of “Life Cycles of the Saltmarsh” activity
- Aquarium map (with activity exhibits marked)
- Large, magnetic dry-erase board for teachers (won't fit in bin)
- Folder with high and low tide images and answer keys
- Spartina life cycle bag
- Four small magnetic white boards (for students)
- Oyster life cycle bag*
- Red drum life cycle bag*
- Diamondback terrapin life cycle bag*
- White ibis life cycle bag*
- Life cycle answers (for teachers only)
- “A Day in the Salt Marsh” by Kevin Kurtz

* The life cycle bags will each have a stage of the plant or animal's life cycle with arrows (all magnetic).



VOCABULARY TERMS

Review terms with students before coming to the Aquarium to ensure that they have a basic understanding of the terms that will be used in the activity! Choose which terms are relevant/need to be reviewed based on your students' ages.

- **Life Cycle** – A series of changes an organism undergoes throughout their life
- **Reptile** – A class of cold-blooded vertebrates characterized by scaly skin and laying leathery eggs on land
- **Fish** – A limbless cold-blooded vertebrate with gills and fins that lives their entire life in water
- **Bird** – A warm-blooded vertebrate that lays eggs and is distinguished by having feathers, wings and a beak; typically can fly
- **Mammal** – A class of warm-blooded vertebrates characterized by having hair or fur and birthing live young

- **Invertebrate** – An organism lacking a backbone
- **Ecosystem** – The living organisms (ex: plants and animals) and the nonliving organisms (ex: rocks and water) that interact in an environment
- **Saltmarsh** – A grassland habitat near the coast that is regularly flooded with saltwater
- **Adaptation** – A physical or behavioral trait that helps an organism survive in its environment
- **Inherited Traits** – The characteristics that are passed from parent to offspring
- **Fitness** – The ability of an organism to survive to reproductive age, find a mate and produce offspring

BACKGROUND

The saltmarsh is one of the most productive ecosystems on earth. It covers 400,000 acres of South Carolina and can be found bordering estuaries and rivers or behind barrier islands. It has many functions including acting as protection from the ocean to the land, a nursery for many animals of the ocean, a filter between land and sea and a habitat for a variety of animals and plants. Because of the constant changing tides, the diversity of life is great in the saltmarsh. What thrives at high tide (oysters, fish, crabs) can be very different than what thrives at low tide (birds, periwinkle snails).

A life cycle is the process of growth that a living thing goes through. A life cycle starts at the newborn stage and continues through adulthood, including reproduction and raising offspring. The offspring can be born with traits similar to their parents — a concept called inherited traits. The traits that are passed on to offspring can help the newborn survive and make it more likely that this offspring will reproduce in the future. This process of passing down the most successful traits is known as fitness. These traits that are passed down from parents and help an organism to survive are known as adaptations. Adaptations can be physical (like the long legs of a heron or the tough shell of a diamondback terrapin) or behavioral (learned traits that are actions the organism does in order to survive).

Spartina (Sporobolus alterniflorus), also known as marsh grass or smooth cordgrass, is a very abundant plant in the saltmarsh. This plant can live in saltwater by excreting salt and can also deal with the harsh changing tides. The life cycle of spartina begins with a seed in the fall. The seed sprouts within the mud and becomes a seedling in the spring. The seedling grows into a plant that will make tiny white flowers in the fall to produce seeds.

Oysters (*Crassostrea virginica*) are bivalve mollusks that once settled in an oyster bank, don't move. They have a hard shell that protects them from predators. This invertebrate begins life as an egg (females release eggs into water to be fertilized). The fertilized egg will hatch into a larva and for about two weeks will float around in the water. After two weeks, it settles on a hard surface and is called spat (young oyster). It will continue to grow and become an adult after one to three years.

Red drum (*Sciaenops ocellatus*) is a fish species that spends its young life in the saltmarsh and adult life in the ocean. The black dot on its caudal (tail) fin can distract predators from the drums' eyes. Females will release eggs into the ocean near shore in early fall. The eggs hatch after about 24 hours and become larval fish. The tides bring the larvae into the saltmarsh where they grow and mature. Over time they become small juvenile fish and then adult fish after about four years.

A diamondback terrapin (*Malaclemys terrapin*) is a reptile and the only turtle that spends their entire life in a

saltmarsh. They have glands near their eyes that help them secrete any excess salt from their blood, allowing them to live in saltwater without dehydrating. Females lay 10–15 small leathery eggs by digging a hole in the mud or sand above the water level of the high tide in the marsh. The eggs incubate in the mud for 2–2.5 months and then hatch. The hatchlings are only about 1.5 inches long before they grow into juveniles. Males reach sexual maturity at about three years of age and females reach sexual maturity at about seven years of age.

A white ibis (*Eudocimus albus*) is a wading bird with white feathers and a long orange curved beak. Their nostrils are located near the base of their beak (closer to their head) to allow for continued breathing while using their beak to sift through mud around the saltmarsh. Females will lay 1–5 eggs in a nest in a tree near the marsh. The eggs hatch after about three weeks and the babies are called chicks. After about six weeks, the hatchlings become fledglings that can leave the nest and fly. At two years of age they are adults and can breed.

PROCEDURES

Pick up the Exhibit Activity and supplies from the Information Desk. Go to the Saltmarsh Aviary on the second floor.

- 1) Review the following with your students (*can be edited based on the age group*).
 - a. What is a life cycle? Can you name some stages of a life cycle (this can be the life cycle of us as humans or of an animal in the Aquarium)?
 - b. What is an adaptation? What are some adaptations that we have as humans? What are some adaptations that you can name for other animals or plants?
 - c. What are inherited traits? How can inherited traits either benefit or harm an individual?
 - d. What is survival of the fittest? Does it mean that an organism is especially strong?
 - e. How is fitness or 'survival of the fittest' related to inheritance and adaptations? How does it connect the two concepts?
- 2) Let students know that they are going to discover more about the saltmarsh by building life cycles. Demonstrate how to do the activity by building the spartina life cycle on the large board.
- 3) Now, split the group into pairs. You have enough materials to have 4 groups. If you don't need that many groups, leave extra life cycle bags in the bin.
- 4) Hand out the life cycle bags to the pairs, showing them with what animal they will be working. Ask each group what kind of animal they have. (Is it a reptile, bird, fish, amphibian, mammal or invertebrate?)
- 5) Give groups about five minutes to build their animal's life cycle using the materials in the bag.
- 6) Come back together as a group and have each pair show the group their animal's life cycle, making note of both the similarities and the differences between the stages of the life cycle. Ask the students to think about an adaptation or trait found in their animal that would be a favorable trait to pass on to their offspring.
- 7) When done, place all life cycle materials back in their correct bag and place everything in the bin.
- 8) If time allows, read "A Day in the Salt Marsh" by Kevin Kurtz.
- 9) Return the Exhibit Activity to the Information Desk when you are finished.

"A Day in the Salt Marsh" by Kevin Kurtz can be purchased from the local publisher, Arbordale Publishing, in Mount Pleasant, South Carolina or online.