

## Ecosystem Ingredients (Vegetation)

## Teacher's Guide

**Subject:** Integrated Science (Life; Earth-Space; Physical)

**Topic:** Record keeping, abundance and diversity sampling.

**Summary:** Students will use transect lines and quadrats to explore the influence of non-living (abiotic) factors (temperature, light, water, elevation, etc.) on plant distribution and diversity moving from the low marsh (water's edge) into the high marsh area.

After completing the field lab, students will be able to:

**Objective(s):**

1. Describe the distribution of various vegetation in an estuarine environment according to their tolerance of the present abiotic factors.
2. Use environmental quality monitoring equipment properly.
3. Observe, measure and record data using appropriate units of measurement.

**Ecosystem(s):** Estuarine, marsh

### Equipment:

- Environmental Quality Meter
- Shovel (to examine sediment)
- Vegetation ID Guide
- Transect tape, quadrats
- GPS (determine latitude/longitude, elevation)
- Soil thermometer (takes roughly 1 minute)

### Background:

- Vocabulary: Ecosystem,
- Reference Material: Pelotes Island Nature Preserve: reading & math questions, Africa quadrat study, quadrat/transect study using classroom and students, Too Many Crabs exercise.  
Project Learning Tree: Field, Forest and Stream #48
- Equipment Training: Transect tape, Quadrats, Environmental Quality Meter

### Procedure (Engage; Explore; Explain)

1. Engage the students by asking a specific question that gets to the heart of the activity: **Why do plants grow in different zones or areas of a habitat? What type of abiotic factors influence the distribution of these plants? What types of animals utilize these different types of habitats/plants? What are some natural and/or human-caused events that might affect marsh plants (examples: tides, hurricanes, development, erosion from boat traffic, etc.)?**
2. Use the students' answers to ascertain what they already know, clarify any misconceptions, and then ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab.
3. Briefly explain the use of each piece of equipment.
4. Divide students into two small groups and give each group a complete set of equipment. Explain that one group will start the transect in the low marsh habitat at the water's edge, and the other will start in the high marsh area.
5. Students will move along a transect line (which GTMNERR staff will have set out) and stop every 5 meters to take certain measurements and identify the plants in their quadrat.
6. The groups at low and high marsh will take the measurements (indicated on their data sheets) when they first reach each quadrat.
7. After completing their measurements (teacher ensures that students are taking turns at the different quadrats in conducting measurements), each student will be responsible for identifying and quantifying the plants found within their section of the quadrat (each quadrat has four sections so if more than four students, some may do the same section).
8. Students from low & high marsh should then regroup, share (and compare) data.
9. After completing the lab, allow the students to answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

## **Sunshine State Standards:**

**Science:** SC.G.2.3.2.7.1, SC.H.1.3.1.7.1

**Math:** MA.A.3.3.2, MA.A.3.3.3., MA.A.4.3.1, MA.B.1.3.1, MA.B.1.3.4, MA.B.2.3.1, MA.B.4.3.1, MA.B.4.3.2, MA.C.2.3.2, MA.C.3.3.2, MA.D.1.3.1, MA.D.1.3.2, MA.E.1.3.1, MA.E.1.3.3, MA.E.3.3.1

**Geography/Social Studies:** NATIONAL GEOGRAPHY STANDARDS: #4, #7, #8

**Language Arts:** LA.C.1.3.1.7.1, LA.A.2.3.7.7.3, LA.A.2.3.7.7.1

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# Student Data Sheet

## General Information

Full Name:		Date:	
School (teacher):		Time:	

## Student Hypothesis and Rationale

If some non-living factors are more important in determining what plants can or cannot survive in this area, then I think that (choose one: temperature, humidity, rainfall, or wind) is the most important non-living factor affecting plant life, because \_\_\_\_\_.

## Field Observations/Measurements/Data

Parameter (Units)	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4
Longitude:				
Latitude:				
Low or High Marsh:				
Is water visible on top of the soil?				
Can water be squeezed from the soil?				
Sunlight at ground level (lux)				
Air temperature C				
Soil temperature C				
Humidity				
Wind Speed				

Use this space to draw the plants in your quadrat **using the corresponding Letters on the plant id guide:** Also draw or note any evidence of animals or humans.

## Ecosystem Ingredients (Vegetation)

## Assessment

1. Which area had the highest number of different kinds of plants? Why?

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2. Did all of the quadrat sample areas have moist soil/substrate? If so, were some areas more wet than others? Why?

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3. Based on your observations, which nonliving factor (s) had the greatest influence on the distribution of plants? In other words-why do you think certain plants lived in one part of the marsh, and certain plants in other places of the marsh? Explain.

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4. By looking at the various kinds of vegetation you found in the different quadrat sample areas, what types of adaptations might some of these plants have to make to survive in the marsh habitat?

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5. If all of the plants in the high marsh area were cut down, what effect do you think this would have on the habitat closer to the water?

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6. Think about the observations you have just made. Did the activity raise new questions? Write a short question (start with “What, Why, Where, When, or How”) about something you want to learn more about.

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