

## Ecosystem Ingredients

## Teacher's Guide

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

**Topics:** Abiotic Environmental Factors, Ecosystems, Microenvironments

**Summary:** This lab examines the influence of non-living or abiotic (temperature, light, water, salinity, wind, etc.) factors on plant assemblages by comparing micro-environmental conditions at different locations.

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

**Objective(s):**

1. Recognize abiotic versus biotic factors
2. Explain how abiotic factors influence the living components of an ecosystem
3. Use equipment to measure, record and analyze abiotic factors in SI (metric units)

**Ecosystem(s):** Beach Dune; Maritime tidal swamp; Coastal Strand; Maritime Hammock; Mesic Flatwoods

### Equipment:

- Data sheet
- Weather meter (1/group)
- Thermometer (1/group)
- GPS (1/group)
- Digital Soil Thermometer (1/group)
- Digital Camera (1/group) (optional)
- Refractometer
- Vegetation type ID sheet (1/group)

### Background (Pre-field Classroom Activity)

- Reference Material:
- Vocabulary: Abiotic, biotic.
- Equipment Orientation:

### Procedure (Engage; Explore; Explain)

1. Ask students why some plants and animals live in some areas but not in others. Explain that in any given place there are two general categories of ingredients: 1) those things that are living (e.g., plants and animals) and 2) those things that are not living (e.g., temperature, water, salinity, wind, elevation, etc.). Explain that the non-living factors (also called abiotic factors) influence what types of living things can survive in a given area. Some non-living factors are more important in some areas than they are in others. Ask the students to formulate a hypothesis about which non-living factor they think influences which types of plants can or cannot grow in this area.
2. Explain to students that they will examine and compare these ingredients (non-living factors) at three different locations.
3. Assign two or three students to each of the instruments being used (GPS, weather meter, thermometer, soil thermometer, vegetation guide) and describe the proper use of the equipment. There should be three sets of the equipment.
4. Divide the group into three with each group having one complete set of equipment. Explain that they will each start at a different location and will move to the other locations after 7 minutes. Each pair should be responsible for measuring and recording the same parameter at each location.
5. At the end of the boardwalk, students should copy the measurements of the other parameters from the people in their group so their data sheets are complete.
6. Students should answer the discussion questions at the bottom of their Data Sheet.

### Sunshine State Standards

**Science:** SC.D.1.3.4; SC.D.2.3.2; SC.G.1.3.2; SC.G.2.3.2; SC.H.1.3.7; SC.H.2.3.1

**Language Arts:** LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1

**Mathematics:** MA.A.4.3.1; MA.B.4.3.1

**Social Studies:** SS.A.6.3.2; SS.B.2.3.9

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## Student Data Sheet

### General Information

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

### Student Hypothesis and Rationale

I hypothesize that \_\_\_\_\_ will change the most from location to location because \_\_\_\_\_

\_\_\_\_\_.

Choose from **BOLDED** parameters below.

### Field Observations/Measurements/Data

“Ingredient” (units)		Location 1	Location 2	Location 3
GPS	Latitude:			
	Longitude:			
<b>Sunlight</b> at ground level (lux)				
<b>Air temperature</b> at ground level (C)				
<b>Wind speed</b> at ground level (mps)				
<b>Humidity</b> at ground level (%RH)				
<b>Soil Temperature</b> (C)				
<b>Soil moisture</b> (water is visible; soil is wet; soil is damp; soil is dry)				
Number of plant types present (refer to plant type chart)				

## Ecosystem Ingredients

## Assessment

1. Explain which non-living factor differed the most from site to site? Which differed the least from site to site?

Most:

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Least:

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2. Which ecosystem had the greatest variety of plant types and how many more plant types did it have than the next highest location?

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3. Look at your hypothesis, was it supported by your data? Explain why you think it was or was not supported. What kind of conclusions can you come to based on the observations you made?

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4. Pretend you were on a mountain. Explain or list the abiotic factors that may be different on the mountain from the habits you saw today.

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5. Explain how humans change the abiotic factors of their environment to better suit them. Write an example of human influence on the environment you saw today.

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6. Did something interest you today that you would like to know more about? Write your own question.

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### Ecosystem Ingredients

### Reference Chart



**Plants with large/broad leaves & stems**



**Tall grasses**



**Floating water plants**



**Shrub or bush like plants**



**Ground cover**



**Trees with small thin leaves**



**Trees with larger (wide) leaves**



**Vines**



**Trees with needles**



**Short Grasses and Wildflowers**



**Ferns**



**Mosses**