

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, elevation, 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 environment
3. Use equipment required to measure abiotic factors

Ecosystem(s): Any/All

Equipment:

- Data sheet
- Multimeter/Labquest (1/group)
- Temperature Probe
- Anemometer (1/group)
- Light Probe (1/group)
- Sling Psychrometer
- Digital Camera (1/group) (optional)
- Vegetation type ID sheet (1/group)

Background (Pre-field Classroom Activity)

- Reference Material: Project Learning Tree: Field, Forest and Stream #48
- Equipment Orientation: GPS; Multimeter/Labquest, sling psychrometer

Procedure (Engage; Explore; Explain)

1. Ask students why some plants and animals live in some areas but not in others. Explain that certain ingredients (parameters) for life (water, sunlight, wind, temperature) vary in amount from place to place.
2. Explain to students that they will examine and compare these ingredients (non-living factors) at three different locations. The three locations can be: 1) Shallow depression of off trail near tower 2) Pine flatwoods 3) Cabbage Palm Hammock.
3. If three facilitators are present, divide the group into three teams. Each team should have one complete set of equipment. (GPS, weather meter, thermometer, soil thermometer, vegetation guide) and describe the proper use of the equipment. Demonstrate the proper use of the equipment.
4. Send one team to each of the three locations (Option: navigate to each location using the GPS). Explain that they will have approximately 10 minutes at each location to collect their data. If time permits allow each person an opportunity to use each piece of equipment before finishing the three locations. If time is short assign each student or pair to a particular piece of equipment as specialists.
5. 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.2.3.1; MA.B.4.3.1; MA.E.3.3.1; **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 (choose one)

A. If the plants at three places - all in the same general area - are different from each other, then the abiotic factor (choose one: sunlight, temperature, soil moisture) will also be different at each location, because . . .

Field Observations/Measurements/Data

“Ingredient” (units)		Location 1	Location 2	Location 3
GPS	Latitude:			
	Longitude:			
Light intensity at ground level (lux)				
Air temperature at ground level (C)				
Wind speed at ground level (mph)				
Humidity at ground level (%)				
Soil temperature (C)				
Soil moisture (wet, moist, dry)				
Water depth (cm)				
Number of plant types present (refer to plant type chart)				

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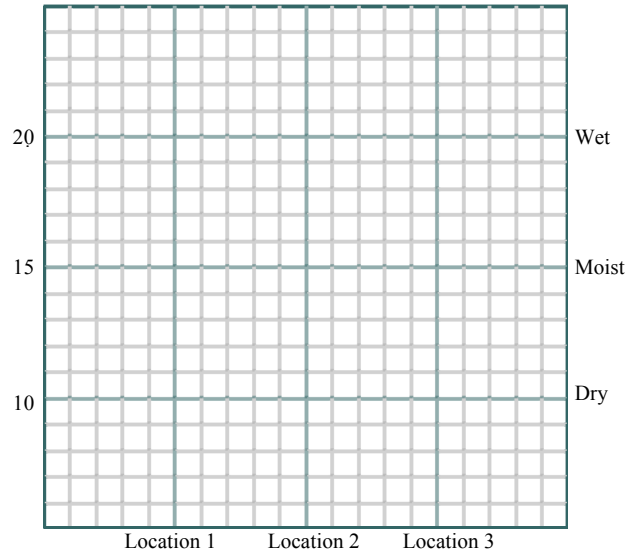
Discussion Questions

1. Which abiotic factor changed (varied/fluctuated) the most from location to location? Which change the least?

Most:

Least:

2. Graph the temperature and the soil moisture at each of the three locations using the graphing paper to the right. Refer to the scale for temperature on the left side of the graph and the scale for soil moisture on the right side of the graph.



3. Was your hypothesis supported by your data? Whether your hypothesis was supported or not, what conclusions or inferences can you make based on your observations, measurements and results?

4. If abiotic factors influence plant types and plant types influence animal types, then what can you infer about the wildlife in each of the three areas you observed?

5. The presence of water (standing or flowing) plays an important part in where plants can grow/survive, give an example of how people influence or affect the location and movement of water.

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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Reference Chart: Plant Types



Pteridium aquilinum
Bracken Fern



Golden Polypody Fern



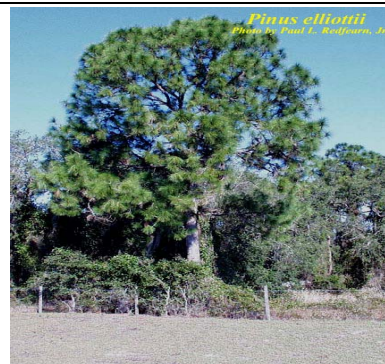
Sabal palmetto
Photo by Dennis Girard
Sabal/Cabbage Palm



Vittaria lineata
Photo by Shirley Denton
Shoestring Fern



Myrica cerifera
Photo by Shirley Denton
Wax Myrtle



Pinus elliotii
Photo by Paul E. Wolfson, Jr.
Slash Pine



St. John's Wort



Toxicodendron radicans
Photo by Walter Hodge
USF Herbarium Slide Collection
Poison Ivy



Greenbriar



Peppervine



Star Rush



Shiny Sumac



Saltbush



Swamp Fern