

Ecosystem Ingredients

Teacher's Guide

Subject (Body of Knowledge):

Integrated Science (Life; Earth-Space; Physical)

Big Idea (topics):

Diversity and Evolution of Living Organisms (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.

Objective(s):

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

1. Recognize abiotic versus biotic factors
2. Explain how abiotic factors influence the environment
3. Use equipment required to measure abiotic factors

Ecosystem(s):

Varied

Equipment:

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

Background (Pre-field Classroom Activity)

- **Vocabulary:** non-living factors, abiotic, micro-environmental conditions, biotic, parameters, sunlight (lux), air temperature, soil temperature, humidity, plant types
- **Reference Material:** Project Learning Tree: Field, Forest and Stream #48
- **Equipment Orientation:** GPS; Multimeter

Procedures (Engage; Explore; Explain; Elaborate; Evaluate):

1. **Engage.** Ask students why some plants and animals live in some areas but not in others. What are the ingredients (parameters) that are necessary for life? (water, sunlight, wind, temperature). Are these factors biotic or abiotic?
2. **Explore.** Have the students complete their hypothesis. Explain to students that they will examine and compare these ingredients (non-living factors) at three different locations. Divide group into teams and give each one complete set of equipment (GPS, weather meter, thermometer, soil thermometer, vegetation guide) and describe the proper use of the equipment.
3. **Explain.**
 - a. Answer and discuss the assessment questions as a group and allow each student to record an answer.
 - b. Review the key concepts (items on pre/posttest).

Sunshine State Standards:

Science: SC.912.P.10.3; **Mathematics:** MA.8.G.5.1; **Language Arts:** LA.6.4.2.2; **Social Studies:** SS.7.G.5.1

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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

“Ingredient” (units)		Location 1	Location 2	Location 3
GPS	Latitude:			
	Longitude:			
Sunlight at ground level (lux)				
Air Temperature at eye level (C)				
Wind at eye level (mph)				
Humidity at eye level (%)				
Soil Temperature (C)				
Is water visible or is the soil visibly wet? (yes/no)				
If water is present, what is the salinity?				
Number of plant types present (refer to plant type chart)				

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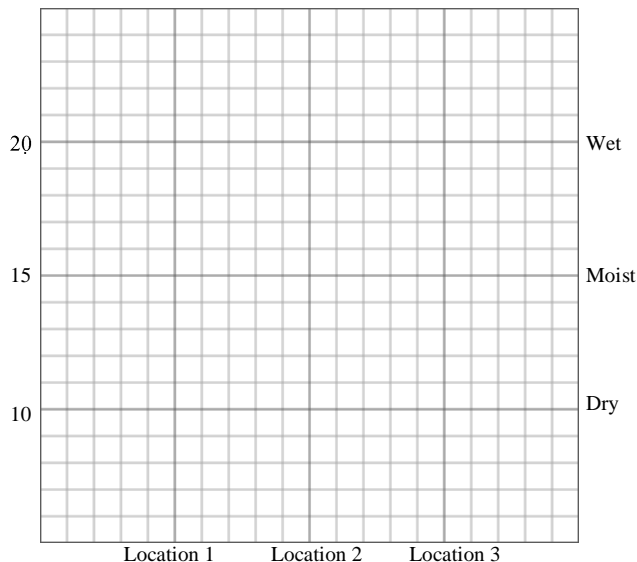
Discussion Questions

1. Which abiotic factor changed 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. Label the axes, include units of measure, and give your graph a title.



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 you were on the side of a mountain, what other abiotic factors might influence the plants and animals?

5. Give an example of how people influence or affect abiotic factors of their immediate environment and globally.

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.
