

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): Freshwater Wetlands; Rivers, Scrub, Uplands

Equipment:

- Data sheet
- Weather meter (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)

- Reference Material: Project Learning Tree: Field, Forest and Stream #48
- Vocabulary: Crossword, Vocabulary, Word Search (Pre-activities)
- Equipment Orientation (Lisa Bailey)

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.
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.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

Ecosystem Ingredients

Student Data Sheet

General Information

| | | | |
|-------------------|--------------|------------|--------------|
| Full Name: | | Date: | |
| School (teacher): | | Time: | |
| Latitude: | Record Below | Longitude: | Record Below |

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 visibly or is the soil visibly wet? (yes/no) | | | | |
| Number of plant types present (refer to plant type chart) | | | | |

Ecosystem Ingredients

Assessment

1. Which locations had water present on the surface or visibly wet soil? And which location had the least sunlight?

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

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 in a mountainous area in the USA and water availability, elevation, slope, temperature, humidity, windspeed and nutrient availability were all constant, why might plants be different on a south facing slope versus a north facing slope?

5. Give an example of how people influence or affect abiotic conditions on a micro-level and a global level.

Portfolio Journal Prompt

Farmers influence abiotic conditions to produce more crops. If you could design your own farm and could adjust the abiotic conditions any way you wanted, what would your farm look like (describe which abiotic conditions you would change and how you would change them.).

Ecosystem Ingredients

Reference Chart



Plants with large/broad leaves & stems



Short Grasses and Wildflowers



Tall grasses



Shrub or bush like plants



Palms



Trees with small thin leaves



Trees with larger (wide) leaves



Trees with needles