Lesson 4: Research Site

Define your local study site and gather baseline data for your area.

Grade Level: Middle School 6-8

Essential Question:

How does the scientific process work? And how do you define a research site?

Objectives:

At the end of this lesson, students will be able to:

- *examine* a local ecosystem and begin to define the abiotic factors found at the site.

Assessment opportunities:

At the end of this lesson, you will be able to assess students through:

- Journal entries,
- Group presentations.

Background Information

The teacher will need to define an area of study accessible to the students, such as a field, unmowed drainage area, ditch, windbreak site, or another area (preferably within walking distance) that would serve to represent an area of relatively high biodiversity. The students can measure abiotic factors of choice and record local species in this location.

The students will probably need direction in finding correlations among the data collected. Remind them that you are looking for explanations about biodiversity. Questions to direct their thinking might include: "Is there an abiotic factor that varies with the number of species found in a sample plot?" "Do samples with high plant diversity also have high animal diversity?"

Common Student Misconceptions or Challenges

Students have difficulty understanding how important it is to make accurate observations, and to record the data so it is understandable to a reader. Students also struggle to determine how to present the data so it shows relationships between variables.

Performance Expectations: Next Generation Science Standards:

MS-LS2-1.
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

MS-LS2-2.
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

http://www.nextgenscience.org/msls2-ecosystems-interactions-energy-dynamics

Key Understandings

Not all study sites of the same ecosystem have exactly the same conditions or species. The local system, located in the area of the school, probably has a slightly different set of conditions than another similar site, and a unique set of species. This lesson allows the students to become familiar with species that live in their local ecosystem and drive ecosystem functions.

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Establishing a research technique and site: Abiotic forces.

Materials:

- pH paper
- thermometers
- binoculars
- meter sticks
- magnifying lenses
- string
- survey flags or stakes
- light meter
- other tools for measuring environmental parameters

Time Commitment:

2-3 45 minute class periods.

Preparation:

- Define the local study site.
- Decide what abiotic factors to measure.
- Set up random meter quadrats to be investigated by student teams.
- Have students set up data records in journal or lab notebook.

Directions:

1. Before visiting the site: decide with students what abiotic factors might be important in determining the structure of the local ecosystem. Have them set up appropriate data recording charts in their journal or lab notebook.

2. At the site, students should sketch the layout of the site and write a description of the site. Include geography, geology, topography water availability ect.

3. Students will set up 1-meter square study quadrats using the meter sticks, string, and flags. Students should write a description of the plot. They can draw an aerial view of the plot, and diagram (map) abiotic factors.

4. Measure soil pH, soil temperature, air temperature, soil type, or whatever parameters the class has decided upon, and record them in the table developed in class.

5. By the end of the lesson the collected data should provide a good overview of what is found in the area, besides biotic features, which will be completed in lesson 5. This may take several class periods depending on how much detail is desired.

6. Wrap-up:
Journal entries include:

- How did you decide what data to gather?
- Were you successful in collecting the data you wanted? Why or why not?
- What do you think the data means?
- How can you analyze the data?
- Can you see any possible data correlations? Make one graph showing one possible data correlation between two of the variables that you measured.

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