



Brightwater Site

Brightwater Field Trip

Possibilities for Observation and Analysis of Biodiversity within an Ecosystem

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SK Science 10 Curriculum: Life Science – Sustainability of Ecosystems

SE2: Examine Biodiversity within Local Ecosystems

Curricular Objective: Observe and document a range of organisms to illustrate the biodiversity within a local ecosystem

Key Questions:

What is biodiversity and how is it measured?

How does biodiversity serve as an indicator of an ecosystem's health?

Time Frame:

½ day field trip to Brightwater Science and Environmental Centre

Materials: Field Trip Logistical materials, on-site materials (see below)

Pre-Trip Plans:

Research 3-5 types of Saskatchewan plants in school or in the library before heading out to Brightwater.

- Use the Atlas of Saskatchewan, the Brightwater plant books, *Plants of the Western Boreal Forest and the Eastern Parkland*, or Sask plant websites (ie: <http://mydaybook.wikidot.com/>)
- Each student will choose 3-5 plants that are native to the Saskatchewan mixed prairie ecosystem or the Parkland ecosystem, which they will then be looking

for while they are out at Brightwater. Their choice of plants could include a mix from the categories of trees, shrubs, and grasses or short flowering plants. Make sure they are looking for plants that they will likely find in this region. It might be helpful to provide a list of possible plants for this region or look at the Brightwater website power-point for images and a list of some of the plants found there.

- They will write out all of the physical characteristics of the plant that they will be looking for and observing while on their field trip. This may require some pre-teaching about plant features such as alternating vs. paired leaf patterns, square vs. round stems, parallel vs. netted veins on leaves, variations in bark, flower petal patterns, fruit or seed types, etc.

The pre-trip lessons could also involve an examination of local plants in your own schoolyard, neighbourhood, riverbank or park. This activity can have students observe and document a range of organisms to illustrate the biodiversity within a local ecosystem. This can also be an opportunity to teach the need for detailed qualitative and quantitative observations when doing scientific research.

Brightwater Experience:

Materials: field notebooks, pencil, rulers, tape measures, map of Brightwater, hula hoops, camera.

Time Allotment:

- 15-30 minutes/micro-ecosystem + walking time = **1 ½ - 2 ½ hours** depending on how in-depth you get at each area or how much discussion there is on other topics such as succession, evolution, or biodiversity.
- Add 15-20 minutes/area If the optional population study is done for each micro-ecosystem

A. Plant Observations:

- Teachers can be flexible in how they plan the order of the day.
- For this activity, all that is required is that the teacher hikes to and introduces the students to three different small-scale ecosystems where the students will have time (individually or in groups – depends on teacher preferences) to try and find the plants they researched back in school, and explain through observation why this plant fits into the plant type they already researched.

- The three possible ecosystems teachers and students can visit could include: the prairie mixed-moist grassland, the parkland valley forested area, and the Beaver-creek riparian shoreline.
- If they cannot find their previously researched plant, they can make detailed observations on another plant in each of the ecosystems you visit.
- To focus on the details, the teacher can have students make a detailed drawing of the specific plants they found. Draw plants as they see them to the best of their ability – they don't have to be perfect artists, as the idea is to have them focus on the details of their observations. If there is a lack of time for drawings, students can take multiple pictures of each plant and its surrounding environment so that it can later be analyzed in the classroom.
- The students should also make quantitative measurements of leaves, stalks/trunks, plant height, plant colour, etc. Discuss ways in which they can make best estimates of tree height. (Ex. have someone of known height stand next to it and extrapolate a total height; could measure shadows, etc.)

B. Environmental Influences on Plant Growth - Biotic and Abiotic influences

Inquiry Questions:

What are the natural limiting factors for plant growth in each micro-ecosystem visited?

What is the micro-climate variations of each area visited?

Which plant adaptations make it succeed in the location it is found?

- For each area visited, the students could also make note of the biotic and abiotic characteristics associated with each of the plants they observed and measured. (Ex. what other types of plants are found nearby? What are the soil conditions? Is it a shaded area? What direction does the slope face? Micro-climate of area? Etc.)

C. Population Study

Inquiry Question:

Is there a correlation between the abiotic/biotic factors and the population density of each area?

- There is also an option for students to do a population study in each area to recognize the biodiversity of each micro-ecosystem. This can be done by marking out an area of one step by one step square and counting the number of species in that area. These numbers can be collaboratively compared.

D. Weather unit tie-ins at various locations and their effects on the ecosystems

Have the students record the date and a variety of abiotic factors that might affect plant growth and distribution.

- Temperature
- Wind speed
- Humidity

Possible Follow—Up Questions:

1. Big picture tie-in: how do the three ecosystems fit with each other?
2. Compare and contrast Brightwater and pre-trip ecosystems
3. Human impact, past, present and future, positive and negative

Example: military base, brome grass (invasive species), (lack of) fire and other natural factors

4. Effects of biotic and abiotic factors
5. Climate tie-ins: micro and macro climatic factors from weather unit

OR

Help the students develop questions such as the above prior to heading out to Brightwater.