**Ecosystem Sleuths**

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**School:** Barton Elementary School

**Target Grade/Subject:** 4/5 grade, or can be easily adapted for any grade.

**Duration:** Two to three 45-minute class periods. Note: **not** including the full day field trip to the Belle Isle Nature Center.

**Lesson Overview:** Students will work in groups to complete the Activity Guide Sheet (AGS). This is intended to be an accumulation of previously-taught lessons on ecosystems, using measuring tools (thermometers, meter sticks, hand lens, etc) and a field trip the class took to the Belle Isle Nature Center. Students will be instructed on safety issues and given specific areas to look for their items on the AGS.

**Sources Consulted:** Ecosystems & Biodiversity Lesson Plans from the MEECS Workshop on 12/4/10 (Adapted from Ecosystem Scavenger Hunt pgs.17-20), Adapted from Field Investigations, from 3/12/11 workshop.

**Learning Objectives:**

*Students will be able to:*

1. Compare/contrast ecosystems.
2. Utilize tools to investigate and measure items.
3. Describe living and nonliving things in an ecosystem and infer how they interact so the living organisms may meet their needs.

**Grade Level Content Expectations:**

L.EC. Develop an understanding of the interdependence of the variety of populations, communities, and ecosystems, including those in the Great Lakes region. Develop an understanding of different types of interdependence and that biotic and abiotic factors affect balance of an ecosystem.

L.EC.E.1: Interactions - organisms interact in various ways including providing food and shelter to one another. Some interactions are helpful: others are harmful to the organism and other organisms.

S.IP.00.11: Make purposeful observation of the natural world using the appropriate senses.

S.IP.00.12: Generate questions based on observations.

S.IP.00.13: Plan and conduct simple investigations.

S.IP.00.14: Manipulate simple tools that aid observation and data collection.

S.IA.00.12: Share ideas about science through purposeful conversation.

**Materials Needed:**

*Per student*

- Hand lens - one for each student
- Activity Guide Sheet
- Pencil

*Per group*

- 2 Thermometers
- Meter stick
- Insect viewer
- Binoculars
- Clipboards
Focus Questions:
We saw many different kinds of plants and animals at the Belle Isle Nature Center. For the next 5 minutes, I want you to write down as many things that you can think of that you saw at the Nature Center. After you have finished, we will review what you have written. After students have written their lists, ask them which of these are biotic, and which are abiotic. Examples for biotic should include: birds - turkeys, woodpeckers, etc, snakes, trees, grass, shrubs, poison ivy, deer, chipmunks, turtles, fish, etc. Examples for abiotic should include: water, rocks, evidence of wind, clouds, soil, and the sun. Ask students to review what a habitat is (the natural home for a living thing), and ask them what do we mean by the term “ecosystem”? (Make sure students understand that it is a community of organisms interacting with one another and the non-living environment).
Ask students if they think the temperature will be the same or different on the ground versus 2 meters high, and in the sun versus in the shade. If they think any of these will be different, ask them to predict which will be warmer or cooler.

Procedure:
1. Review outdoor safety and activity rules. (Stay with group, stay in designated area, no running, pushing, careful with glass thermometers, respect all living things, do not hurt any of the animals you may find, or damage any plants, etc).
2. Divide students into groups with 3-4 students in each group. Have groups assign roles such as: supply captain, recorder, person to determine where to measure the temperature, person to hold the meter stick, etc.
3. Review the directions for completing the AGS. Answer any questions students may have on how to complete the guide.
4. Have students go to predetermined areas on the school ground. Make sure groups are separated far enough to give them room to work. Give the groups boundaries so as to ensure they have enough space to work without bumping into other groups.
5. Have students stand (or sit) silently and listen to the sounds of the environment for about 3-5 minutes. Have them discuss what they heard and record it.
6. Have students complete the rest of the AGS. **Note, this may take more than 1 class period.**
7. Gather materials within the groups and return to the classroom.
8. Have students complete the Reflection page individually.
9. After students have completed the Reflection page, discuss their observations.
Field Observations

1. What sounds do you hear?

2. Look for 2 different types of trees. Draw their leaves and describe what their bark looks like.

3. Look for an invertebrate - what does it look like? Describe it in details, you may draw it if you would like. Where did you find it, what was it doing?

4. Look for a bird, where was it found, and what does it look like?
Activity Guide Sheet (pg. 2)

5. Find another type of animal (or evidence of one). Describe it, what was it doing?

6. Look for 2 different types of plants (not trees), and describe and/or draw them.

7. Record the temperature of the ground and at a height of approximately 2 meters. Measure these in the sun and then in the shade:

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<td>Temperature at 2 meters:</td>
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8. Find 2 nonliving (abiotic) things. What are they, describe and/or draw them.
**Assessment:**

Name ____________________________________________

**Reflection**

1. How were the sounds in the schoolyard similar to the sounds at Belle Isle? How were they different?

2. How did your living samples interact with the nonliving samples?

3. How does the school-yard compare and contrast with your observations of the ecosystems at the Belle Isle Nature Center? Give two examples of similar biotic and abiotic samples. Give two examples of differences of biotic and abiotic samples.

4. Why do you think the schoolyard has different plants and animals than Belle Isle?
Assessment Rubric:

Observe students during activity. Make sure they are reading the thermometers correctly. Review Reflection page and use the following rubric:

0 Points: Student does not participate in activity and/or Reflection paper.

1 Point: Student participates minimally during scavenger hunt, but only answers 1 (or none) of the questions on the Reflection paper.

2 Points: Student participates fully in outdoor activity, but only correctly answers 2 out of 4 items on the Reflection paper.

3 Points: Student participates fully in outdoor activity, and correctly answers 3 out of 4 items on the Reflection paper.

4 Points: Student participates fully in outdoor activity, and correctly answers 4 out of 4 items on the Reflection paper.
Reflection

I didn’t think about clipboards - BAD MISTAKE! We survived without them, but it would have made it much easier if I would have gotten them. The students were pretty resourceful though, using the sidewalk, sides of the building, and one another’s back to write on.

The silent listening to the outdoor sounds was a last minute thought, but I’m so glad we did this exercise. The students really appreciated the sounds as they listened intensely - I had them do this with their eyes closed. Some students actually became very creative when describing what they heard, including the sounds of the wind blowing the leaves and grasses. This is something they could do on a routine basis; it would be an excellent writing assignment as well as a science lesson.

Question #3 seemed to be difficult for the students to answer. If I were to do it again, I would reword the question, or at least put it in 2 parts. I think the students are used to answering shorter, more direct questions.

I was very surprised that we didn’t see any squirrels or other vertebrates. Usually the school ground is full of squirrels. If the outdoor part of the lesson were to be spread out into at least two separate days, I’m sure they would be able to see a squirrel (or dog, etc.).

The more students get outside and observe their surroundings in a scientific way, the better they become at appreciating nature, and the need to take care of our environment. I believe they will take their observation skills and begin to utilize them every time they go outside, or even when they look out a window.