Community Science

Urban Wildlife

Lesson 10: Habitat Comparison Study

Duration: 60 - 80 minutes **Location:** Outdoor

Overview

In this lesson students will study two areas, the flora and fauna within it, possible symbiotic relationships and compare the two study area findings.

Learning objectives

By the end of the session, students will be able to:

- demonstrate an advanced level of flora and fauna documentation,
- identify relationships between local flora and fauna as 'mutualistic', 'commensalistic', or 'parasitic', and
- understand how human impacts effect species survival and variation within species.

Curriculum Links

Grade: 9

Subject and Unit: Science, Biological Diversity

- Investigate and interpret diversity among species and within species, and describe how diversity contributes to species survival.
    - Investigate and interpret dependencies among species that link the survival of one species to the survival of others.
        - Identify examples of symbiotic relationships.
        - Classify symbiotic relationships as mutualism, commensalism or parasitism.
- Identify impact of human action on species survival and variation within species, and analyze related issues for personal and public decision-making.
    - Describe the ongoing changes in biological diversity through extinction and extirpation of native species, and investigate the role of environmental factors in causing these changes.

Equipment required

- ☐ Journals
- ☐ Pencils/pencil crayons
- ☐ Sharpeners

- Erasers
- Tablets
- Magnifying glasses (optional)

Additional information

Nature journaling is a technique used by many educators, naturalists, and scientists to observe the natural world and foster curiosity and creative thinking. Journaling is an interdisciplinary approach which uses writing, numeration and drawing. that is flexible to students of all ages, backgrounds, interests and skill. Journaling can be a foundational practice in classrooms, community groups, and outdoor education programs. The use of journals is a real scientific practice considered by many to be an indispensable tool when conducting scientific practices. The authentic use of a scientific tool, such as a journal, makes science more accessible to all students and allows them to see themselves as scientists.

> Journaling deepens our observations, thinking, and memory. Journal entries that include words, pictures, and numbers lead the journal-er to think in different ways and
> make a more complete record of what they see.
>
> Writing strengthens our thinking because we have to organize our thoughts as we put them down on the page.1 As we describe a squirrel's behavior or the shape of an
> insect's wing, we articulate and clarify our ideas. Doing this also helps us form stronger
> memories than if we had only witnessed the event or even taken notes on a computer.
> (The physical action of writing cements memories better than tapping keys does.2)
>
> Drawing leads to close, careful observation and improved memory.3 When we draw, we
> must look again and again at the least familiar parts of a subject, paying careful attention
> to structures and shapes. This leads us to notice biologically significant details, such as the angle of stems on a branch or the shape of a bird's beak, features we could
> easily miss in a written account alone.
>
> Using numbers helps us make different kinds of observations and reveals significant

patterns. Counting the spines on leaves or measuring distances between gopher holes will reveal spatial relationships and underlying processes rich for study. This process of quantifying observations will lead us to questions we wouldn't have thought to ask. Combining writing, drawing, and numbers on a journal page creates a dynamic and rich learning experience. Focused journal entries give structure to observation and help form lasting memories.

- John Muir Nature Journaling 101

Lesson plan

Time	Activity	Equipment Needed
10 minutes	Find two natural areas close to your schoolyard. One area can be your schoolyard and we encourage you to find an alternative location, park or wild area within walking distance. Specifically, you are looking or an area with a diversity of trees, shrubs, and ground cover. Finding locations which have variation from each other is ideal to allow for discussion. Some examples are below: • Wet vs. dry areas • Disturbed areas vs. restoration areas • North- versus south-facing slopes • Maintained vs. un-maintained areas • Forested vs. grassland areas It will be helpful if students have visited these natural areas prior and are familiar with the species they may encounter. Groups will conduct two studies, one in each area. Attempt to make the two study areas the same size and spend the same amount of time observing in each location. Should locations have a high biodiversity, decrease the study area to reduce the chance of students being overwhelmed. Similarly, should an area have a low biodiversity increase the area size.	

	Groups are able to observe/study these areas during different times/days. However, the studies should be carried out as close together as possible for an accurate comparison within season.	
10 minutes	Once you have identified your two study areas, brief the students that they will be independently exploring each area, recording plant and animal species (known and unknown) in their nature journal and comparing findings within the group and between the two areas. Species will be recorded through the following method (they may want to write these methods and tips down in their journals): 1. Do you know the species? a. If yes, then i. create a quick (less than 1 min.) drawing of the plant/animal, ii. label with the species name, iii. write some descriptive words/phrases, and iv. identify one symbiotic relationship it has. b. If no, then attempt to use the app SEEK by iNaturalist to identify the species. If you are still unable to identify then i. create a quick (less than 2 min.) drawing of the plant/animal, ii. highlight it is an unknown species, iii. write some descriptive words/phrases, and iv. identify one symbiotic relationship it has. Important details to draw or note for unknown plant species are:	- Nature journals - Writing utensils - Tablets

	• flowers (petal numbers, colour, arrangements, etc.), • fruit (colour, arrangement, etc.), • leaves (arrangement, colour, margins, etc.), and • bark (colour, texture, branch arrangements, height, etc.). Important details to draw or note for unknown animal species are: • size (unit of measurement or comparison *smaller than a rabbit but larger than a squirrel*), • colour and field markings (*brown body, white on the tail,* etc.*)*, • location (*on the top of a spruce tree, on the underside of a Saskatoon leaf, high in the sky,* etc.), and • behaviour (*flying south, digging, eating grass*, etc.).	
20 minutes – 40 minutes	Upon arriving at the natural area with students, mark the study area boundaries clearly. This can be with backpacks, flagging tape, strings, etc. Have students, independently with their journals, start the observation process. This can be as long or as short as you would like. The time frame would also change depending on the area you are observing, weather conditions, and if you will be revisiting these sites again. We recommend about 20 minutes.	- Nature journals - Writing utensils - Tablets - Boundary marking material
10 minutes	After your prescribed time at each location, bring the group together and discuss their notes using the recommended questions below. 1. What species did you find? a. Have students record species/numbers they missed in their nature journals 2. Which species did you find that you were unable to identify?	- Nature journals - Writing utensils - Tablets

	Was anyone else able to identify this species? Is not attempt to ID these species later in the classroom through submitting an image to iNaturalist or using guide books, etc. 3. What were some symbiotic relationships that you observed/noted? 4. How would you label the status of biodiversity of this area? High, moderate or low? Healthy, unhealthy or at risk?	
10 minutes	After visiting both sites have a larger group discussion, using the recommended questions below. 1. How many species did you find in each place? 2. What are some examples of symbiotic relationships that you highlighted? 3. What were the biggest differences you saw between the two study areas? Physically, number of species, etc. 4. How can we explain the differences between these areas? Are they due to human impacts? How have human activities caused changes to the biological diversity of these areas? How have public/government decisions impacted this areas? 5. Have human activities cause the extinction or extirpation of native species from this area? If so, how and why?	

Extension

1. Have students create habitat web for each study area with all the species identified. Students will label each species and then draw arrows between individual species to show symbiotic relationships. For example, there would be an arrow labeled ‘parasitic’ from a trembling aspen tree to a Canadian tiger swallowtail caterpillar because as the caterpillar eats leaves, negatively impacting the tree). This activity can be done as a class, in small groups or individually.