

LESSON 2: Ecosystem Structure

Overview:

This lesson was designed to complement instruction about the different categories of elements that make up an ecosystem: biotic, abiotic and man-made. Students will first categorize the things they pass on their way to and from school. Next, students will visit the field study site for the first time to familiarize themselves with the site, to understand that “nature” exists everywhere, and to experience the idea that humans—and their activities—are embedded in the environment and ecosystems.

Sub-Question:

What makes up an ecosystem?

Ways of Knowing Urban Ecology:



Students will...

Understand

- Understand that an ecosystem is constituted of biotic, abiotic, and man-made elements (*ecosystem state and structure*).
- Place typical items from the urban ecosystems into the correct category of structural elements (*ecosystem state and structure*).
- Recognize that nature can be found in urban areas (*ecosystem state and structure*).
- Understand that humans and human activity are embedded within—rather than separate from—ecosystems (*human impact*).

Talk

No specific goals connected with talking urban ecology in this lesson.

Do

- Become familiarized with their study field site.
- Design corridors and patches for an urban landscape in order to increase the chances of species survival.

Act

No specific goals connected with acting on urban ecology in this lesson.

Safety Guidelines:

Safety precautions associated with field activities:

- All group member must remain with the group at all times
- Stay on marked trails
- Avoid picking up plants or animals (beware poisonous plants!)
- Never enter deep or moving water
- Have pre-established meeting times and places in case anyone gets separated
- Have a clear and well distributed agenda for the visit
- Have well established routines such as always starting and ending field activities with a circle-up at the site
- Carry a cell phone
- Carry a first-aid kit and know what’s in it and how to use it

- “Pack it in, pack it out” – do not leave any equipment or litter at the field site, especially any hazardous test chemicals.
- Represent your school community well when out in the field

Preparation:

Time:

1-2 class periods

Materials:

Activity 2.1

- Chalk or white board
- Computer and projector (optional)
- Printouts of the Ecosystem Structure diagram (optional)

Activity 2.2

- Clipboards or hard-backed books (to use as a writing surface)
- Student Four Senses worksheets
- Pencils and pens

Instructional Sequence:

Activity 2.1: Ecosystem Structure Categories

1. Set up a table on the board with the three categories as illustrated below:

Biotic	Abiotic	Man-Made

2. Remind your students that their homework for the night before was to identify at least one living, non-living, and man-made item on their way to or from school. Tell your students that these three different types of things, or parts, make up the urban ecosystem.
3. Inform your students that scientists have different names for two of these three categories and point to the chart on the board. Ask them which of the terms on the board means “living” and which means “non-living.”

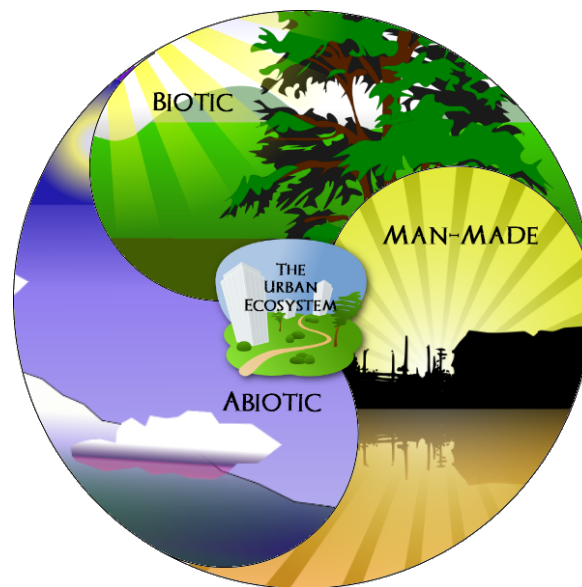
Teacher Background Knowledge

“Bio” refers to life and living. The prefix “a-” means “not.”

4. You may project the image of ecosystem structure (as illustrated below), available in the accompanying PowerPoint presentation. Inform them that while there are three different categories, these categories are interrelated and interact with one

another to form the urban ecosystem, as the definition of a system (from Lesson 1) indicates.

5. Discuss the types of things which fall into each category. You may use the accompanying PowerPoint presentation.
6. Ask your students to share the items they identified and ask them to identify these items using the new terms: biotic, abiotic, or man-made.
7. If no one mentions “people” or something along those lines, ask your students in which category people fall in (biotic). Make the distinction between us, as biological human beings, and the non-living things we construct (buildings, roads, cars, bicycles, computers, packaging, etc.). The most important thing to impress, however, is that humans—and what we produce—are a part of (and embedded in) ecosystems.



Activity 2.2: Four Senses Field Experience

1. Let your students know that they will now be going outside to your field study site to see and experience an urban ecosystem.
2. Describe where your field site is to your students, and how and why you chose that particular area (refer back to *How To Choose a Field Study Site*).
3. Review the Field Site Safety Guidelines with your students before leaving the classroom, and then take them to the field study site. Make sure to collect the Field Site Safety Contracts before taking them to the field study site.
4. Hand out the student observation sheets when you arrive at the field study site. These sheets are very basic at this point and designed to familiarize students with the study site, allow them to think about the idea of an ecosystem, and to experience nature in the city.

Common Student Misconceptions

A common misconception that students may have is that urban areas will have little to no “nature.” In general, urban areas do have less “natural” and open space than non-urban

areas. However it is important that students begin to recognize that urban areas do have elements of nature and open spaces and that there are significant benefits of open space. These benefits include increased investments by business, increased economic activity, attraction and retention of residents, and increased tourism.

5. Allow your students to complete pages 1 and 2 of the student activity sheet. It is helpful to guide your students through each of the senses, one at a time. Especially for the Touch part of the activity, remind your students of the safety guidelines.
6. *There are no right answers* for this part of the activity, as for now the emphasis is on granting students the experience of being at the site and familiarizing themselves with it.
7. When your class has completed the first two pages of the activity sheet, complete the last page of the activity sheet as a class discussion activity. You may have this discussion in the field or in the classroom (having the discussion in the classroom may be easier if you are having students write their responses).

Closing the Lesson

1. Review the three different categories of things in an ecosystem with your students: biotic, abiotic, and man-made.
2. Remind your students of the things that were present in their models of neighborhoods and the city from Lesson 1, and how these items fall into the three categories.
3. Let your students know that in the next class they will be discussing how ecosystems change over time.