

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. Student 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

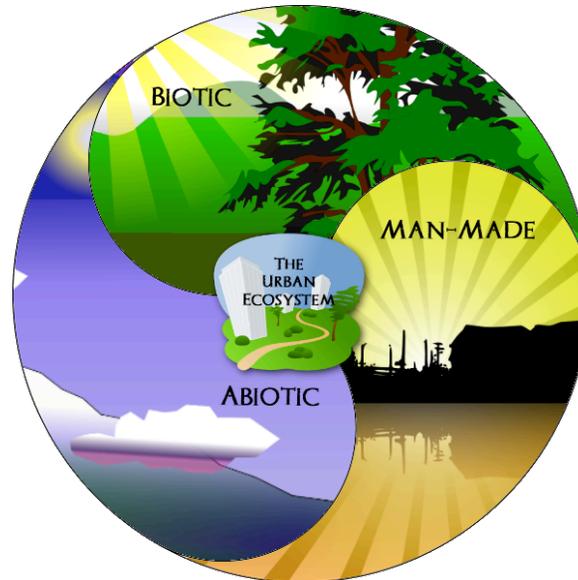
2. Remind your students that their homework for the night before was to identify at least one living, non-living, and man-made item on their way to or from school. Tell your students that these three different types of things, or parts, make up the urban ecosystem.
3. Inform your students that scientists 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 Ecosystem Structure 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.
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.

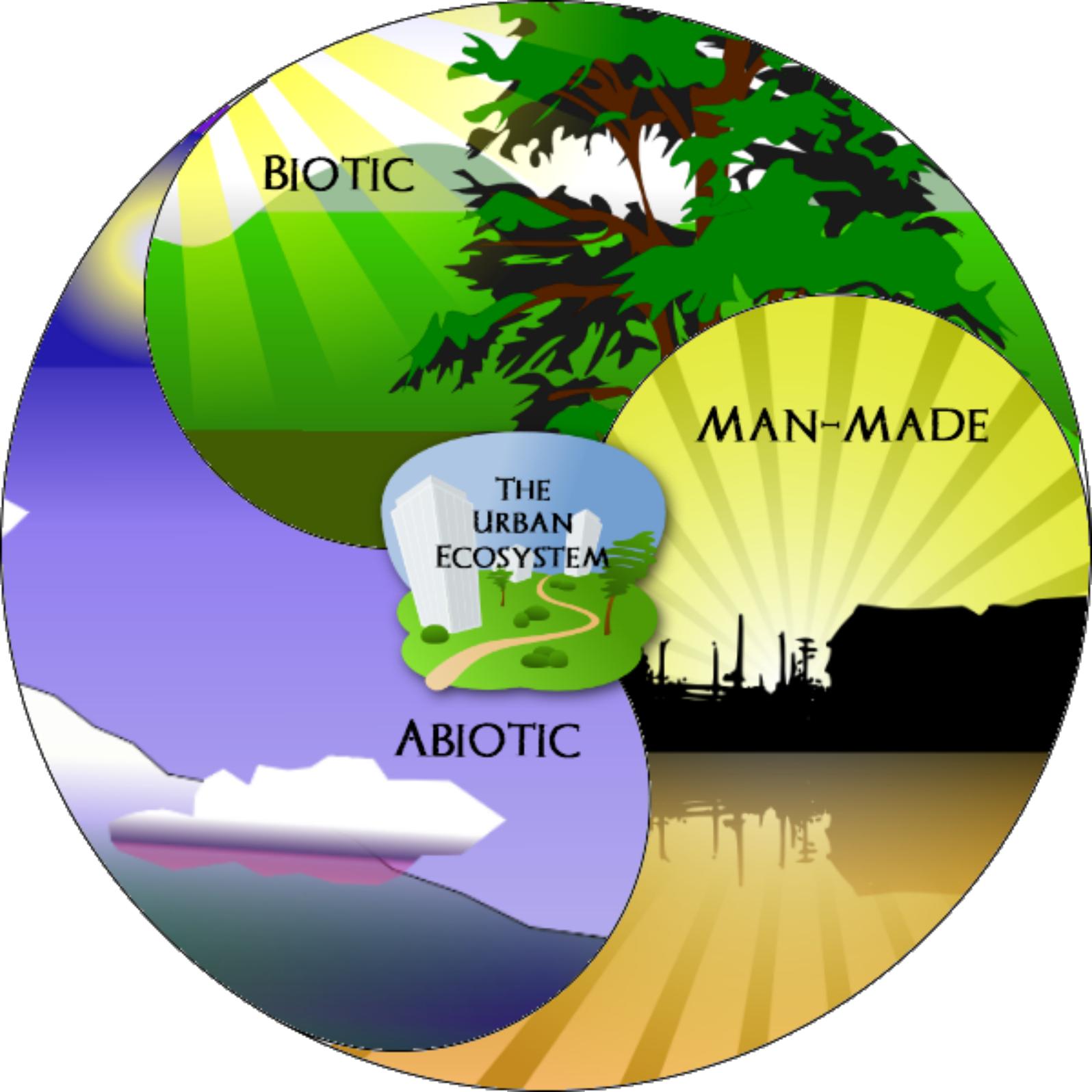
Common Student Misconceptions

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.



BIOTIC

MAN-MADE

THE
URBAN
ECOSYSTEM

ABIOTIC

Name: _____ Date: _____ Class/Period: _____

In The Field Site

Activity 2.2 Experiencing the Field Site

What does your field site LOOK like?



Describe what you *see* in your field site. You may use drawings to help you describe the site. *What do you see around you?*

What does your field site SOUND like?



Describe what you *hear* at your field site. There may be different kinds of sounds, so just try to hear as many as you can. *What do you hear around you?*

What does your field site SMELL like?



Describe what you *smell* at your field site. Some smells may be familiar, some you may never have smelled before. *What do you smell around you?*

Name: _____ Date: _____ Period: _____

What does your field site FEEL like?



Describe the way your site *feels*. You may stand still or you may touch different things at your field site. *What do you feel around you?*

What was impressive?

8-] What is something that impressed you about your field site? Why?

What was surprising?

8-O What is something that surprised you about your field site? Why?

Field Study Site Discussion

1. Would you consider this site to be a typical urban ecosystem? Why or why not?
2. What differences in the data would you expect to see if you were to visit the field site at a different time of day, day of the week, or season?
3. What did you find that was biotic, abiotic, and man-made?
4. What evidence did you find of humans or human activity at your field site?