



Digital Commons@

Loyola Marymount University
LMU Loyola Law School

Module 02: Land Use

Urban EcoLab

April 2021

Lesson Plan - Land Use in My Field Site

Center for Urban Resilience

Follow this and additional works at: <https://digitalcommons.lmu.edu/urbanecolab-module02>

Repository Citation

Center for Urban Resilience, "Lesson Plan - Land Use in My Field Site" (2021). *Module 02: Land Use*. 14. <https://digitalcommons.lmu.edu/urbanecolab-module02/14>

This Lesson 5: Land Use in My Field Site is brought to you for free and open access by the Urban EcoLab at Digital Commons @ Loyola Marymount University and Loyola Law School. It has been accepted for inclusion in Module 02: Land Use by an authorized administrator of Digital Commons@Loyola Marymount University and Loyola Law School. For more information, please contact digitalcommons@lmu.edu.

Lesson 5: Land Use in my Field Site

OVERVIEW

This lesson explores how land is used in the student's study site. Students will then go to their field site and collect tree, surface, and structure data. In the next activity students will make a map of how land is used in their field sites. Students will compare their field site to the surrounding area by using Google earth, focusing on green spaces and trees.

SUB-QUESTION:

How is land used in my study site?

Ways of Knowing Urban Ecology:



Students will...

Understand

- Understand that various aspects of site must be considered when describing the land use of that site. (*ecosystem state and structure*)

Talk

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

Do

- Collect ecological data in the field.
- Use a dichotomous key to identify local tree species.
- Use Google Earth to learn about their study site.

Act

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

SAFETY GUIDELINES

Safety precautions associated with field visits

PREPARATION

Time:

2 class periods

Day 1: Activity 5.1

Activity 5.2

Day 2: Activity 5.3

Activity 5.4

Materials

Activity 5.1

Dichotomous Tree Guides

Measuring Tape

Copies of Student Sheets

Activity 5.2

Copies of Student Data Collection Sheets

Activity 5.3

Graph paper
Colored Pencils

Activity 5.4

Computers with Google Earth
Copies of Student Sheets

INSTRUCTIONAL SEQUENCE**Activity 5.1: Characterizing Important Elements of the Site**

Tell students that today they are going to explore how land is used in their study site. The focus of this lesson is on improving the site.

1. Review concepts from the day before
 - Ask students what are some various ways that land is used? What are the reasons for different land uses?
2. Before students go outside they need to learn techniques on how to collect the data. The data on trees will not be explicitly used in this lesson but is important in module 8, and will therefore be collected in advance
 - In this activity, students will learn the basics of tree identification and measurement. Students will use a dichotomous key to identify trees, measure diameter at breast height, assess health, and growing conditions of the trees in their study site. These techniques will allow them to input data about their field site into a spreadsheet that calculates the economic and ecological value of trees in Module 8.
3. Tree Data
 - Dichotomous Key
 - Teachers should acquire enough dichotomous tree guides for students to be able to work in groups of twos or threes.

A good (a cheap book) for identification of trees is:

[Tree Finder: A Manual for the Identification of Trees by Their Leaves \(Nature Study Guides\)](#) by May T. Watts(\$3.50)

There is also several on-line resources one of which is: (Free)

http://www.urbanecologyscience.org/files/trees/Flash/bc_tree_id.swf

- Discuss with students the process of using a dichotomous key. Inform students that different trees have different economic and environmental benefits – so it is important that we know what kinds of trees are in our study site in order to calculate their effect.

Teaching Strategy

If your students have not identified trees before it is helpful to:

1. Bring in leaves from two trees and have your students identify them before going out to the field.
2. You should make sure that the students understand at least the following major tree identification aspects before going out to the field:
 - a. Simple or Compound
 - b. Alternate and Opposite branching

Being able to determine whether your tree has simple or compound leaves and whether it is alternate or opposite branching can narrow your tree identification significantly.

Some students also struggle with pinnately and palmately veined leaves so you may want to discuss that as well.

- To help students practice the steps necessary to using a dichotomous key, bring in several cuttings of trees branches to allow students to practice. To help students understand the process of using the key, it may help to walk through an identification of a branch using the dichotomous key as a whole class.
- Allow students to work together in twos and threes to identify the tree cuttings. As each group of students finishes identifying the tree branches, have them switch cuttings with other groups.
- Diameter at breast height
 - Distribute the student instructions on how to measure the diameter at breast height (DBH).
 - If time and weather allows, go outside to practice measuring DBH. This is also a good time for students to try using their dichotomous keys to identify trees. If weather does not permit, have students practice measuring DBH of circular objects in your classroom (e.g. Basketball, soccer ball, lampshade, etc).
 - Tip: figure out the DBH of several trees in your study site ahead of time and mark them. Ask students to find the DBH of these trees and report back to you. In this way you can determine if your students are correctly calculating DBH.
- Growing Conditions
 - Distribute the student instructions for assessing growing conditions.
 - The growing conditions impact the economic value and environmental impact of the tree. Student data will be added to the spreadsheet calculations of tree value.
- Health Conditions

- Distribute the student instructions for assessing health conditions.
 - The health conditions impact the economic value and environmental impact of the tree. Student data will be added to the spreadsheet calculations of tree value.
 - Distance and Direction from the building
 - You will need measure the distance the tree is from the building. If the tree is greater than 25 feet from the building then it contributes nothing to energy savings to that building.
 - Students will also need to document the direction the tree is from the building. Trees provide more energy savings if they are on the west or south side of a building.
4. Along with the tree data students will also need to document and measure important aspects of their field site
- Impervious Surfaces- surfaces that are not penetrable by water. What types of surfaces are they? Where are they located? How much space do they take up? What is it used for?
 - Open (green) space- Where is it located? How much space is it? What is it used for?
 - Man made structures, ex: statue, flagpole, fence, playground, ect. Where are they located? How much space do they take up? What is it used for?
5. Students should also make a sketch of the field site to help them when they go to make their maps.

Activity 5.2 Collecting Data

In this activity, students will take the skills they learned in the previous section and apply them as they begin to catalog the way land is used and the trees in their study site.

1. Students should work in groups of two or three. Each group should have a dichotomous key and a tape measure (or string and a ruler), in addition to a clipboard with the data sheet and student worksheets on DBH, growing conditions, and health.
2. Allow students to walk around the study site. An area should be defined so students know what to include.
3. Remember to orient the students – they will need to know if the tree is north, south, east, or west of the school.
4. Students also need to estimate the height of the tree. A rough estimate is acceptable. Have students compare the tree to the height of a nearby utility pole – the poles are usually between 20 and 40 feet tall (most are 30 feet).
5. Students also need to estimate the amount of space each surface or structure takes up. They can do this by waking each side of the space counting the number of steps they took. One step is approximately equal to one foot. Area can then be calculated.
6. It is very important that students DO NOT lose their tree data. It is needed for an activity in the last module.

Concluding Day 1

1. Bring students back together and back to the classroom
2. Discuss the students' experience. Did anything surprise you? How was land used in the field site?

Activity 5.3 Mapping land use in their field site

1. Students should take out their data collection sheets and sketch from the day before
2. Students will construct a map of land use in their field sites on a piece of graph paper. Students should use their sketch as a reference but their maps should reflect their data collection.
3. Students should create a scale that reflects their own measurements
4. Students should include a North arrow on their maps
5. Students should also include a legend on their maps. The maps should reflect the differences in land use in either shapes or color, and the legend should clarify the student's choices. If you want to have the student distinguish between different types of surfaces and trees this should also be included in the legend.

Activity 5.4 Google Earth

Students can use Google Earth on a computer to compare their field study site to the greater area. (There are different versions of Google Earth available, so these steps & instructions may not work as stated with all versions. You should explore Google Earth a bit to make it work for your situation before doing this exercise with your students.)

1. Ask students if they know where the open spaces nearest to their study site are. How might open spaces benefit humans? How might open spaces benefit animals? Then describe how *Google Earth* works.
2. Have students work individually or in pairs at a classroom computer to use Google Earth to locate their study site and nearby open spaces.
 - As a class you may want to define open space. Remind students that recreational areas can count as open space.
3. As a class, discuss students' answers to the critical thinking questions.

Teacher Background Knowledge – Mac Adaptation

1. May need different version of Google Earth. If your Mac doesn't have OSX4., the latest version of GE won't work. You'll need to download a previous version of GE. Even if you do have the latest version of OS X (or whatever comes after the book's publication date), the format of the GE website may continue to look different from the PC version.
2. For the Mac equivalent of PC instruction 2, there is no Local Search tab on previous GE versions. Instead, if you know the address, go to the Fly To tab, type in the address, including the ZIP code and country and press return.
3. After GE has found your study site, without typing anything else, locate the circular zoom and tilt icon on your screen. Explore the Zoom, Tilt, and Drag controls to become familiar with the computer site.
4. The *Placemark* tack icon may be in a different place on your Mac screen than on

- the PC screen. When you find it, click on the tack icon.
5. Type in the name of your study site in the Name Google Earth - New Placemark box that opens up on the screen. Type in a brief description of the site.
 6. Same as PC instructions: Click on the Placemark tack icon to the right of the study site name, and chose a new icon to designate your study site with a click on the new icon.
 7. Scroll down to the bottom of the Mac screen and find the OK button. You **MUST** click on the OK button in order to save your new place marker.
 8. The rest of the directions should be similar to the PC instructions, with the exception that you have to follow the Mac instructions to place another icon. Also, later versions of PC and Mac platforms (and any others) may allow other measurements. The Mac version allows for a Path measurement as well as a line measurement. Future measurements may include area.

Common Student Misconception

- A common misconception that students may have is that urban areas will have little to no open space. In general, urban areas do have less open space than non-urban areas. However it is important that students begin to recognize that urban areas do have open spaces.
- In fact there are significant benefits of open space. These benefits include increased investment by business, increased economic activity, attraction and retention of residents and more tourism.

Concluding

1. How might land use patterns (esp. trees and open spaces) differ between an urban and suburban area? On *Google Earth*, search a nearby suburb if you live in a city; and if you live in a suburb, search a nearby city. Discuss the similarities and differences as a class.