

LESSON 2: TREES IN MY CITY

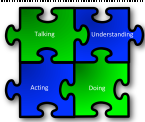
OVERVIEW:

Students have seen how people can actively work to improve the environment. Students will determine current tree / green coverage and why this information is important when planning for change. Students will learn the impacts trees can have on cities and will use understanding to identify tree species and plan future tree plantings in following lessons.

SUB-QUESTION:

What does the data show?

WAYS OF KNOWING URBAN ECOLOGY



Students will...

Understand

- Tree coverage can be calculated as the percent coverage of a given area.

Talk

- Discuss methodologies for determining tree canopy and green coverage.

Do

- Determine the percent tree canopy and green coverage for a specific location.
- Compare percent coverage between dissimilar locations.

Act

- Collect evidence that could be used to create a persuasive piece of writing about tree canopy equity.

MODULE PROGRESS:

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7
Recicladores	Percent tree coverage	Tree Inventory	Benefits of Trees	Synthesizing action plans	Analyzing action plans	Finalizing action plan

NGSS ALIGNMENT:

Elementary:

- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Middle Grades:

- MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2. Evaluate competing design solutions using a systematic process to

determine how well they meet the criteria and constraints of the problem.

High School:

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*

HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

CCSS MATH ALIGNMENT:

Content: 3-MD.6; 6-G.1; 7-G.1; 7-G.6; G-C.5; G-MG.2

Practices: Model with mathematics; use appropriate tools strategically; attend to precision

OTHER CURRICULAR CONNECTIONS:

History, Economics, Health, Language Arts

SAFETY GUIDELINES:

N/A

PREPARATION:

- Create a map of the area you want to study, showing green space and trees (bird's eye view). This can be done easily using Google Earth.

Time:

1-2 class periods

Materials:

Activity 2.1: What's my coverage?

- Map of the area you want to study
- Graph paper duplicated onto clear acetate
- Dry erase markers
- Tape (optional)

Activity 2.2: Pixel Size

- Ruler

Activity 2.3: Data for decision making

- QR code for website or pre-print a variety of pdfs from different LAUSD schools

Activity 2.4: Impact of Trees

- Benefits of trees powerpoint

INSTRUCTIONAL SEQUENCE**Activity 2.1: What's My Coverage**

1. Make predictions:
 - a. Ask students what percent of their school do they think is covered with green space? Have students record their thinking. You might want to have students write down their number on a Post-it with their name and sort the predictions in order.
 - b. Explain that a tree's canopy is the footprint that tree covers when looking directly down on it. Ask students to predict the percent of campus that is covered by trees. Have students write down their predictions.
 - c. Ask students whether they think all schools have about the same green and tree coverage. If they don't think it's the same, have them give a rationale for their thinking.
2. Give students a map of the school and ask how they could determine how much of the campus is covered by green space and how much is covered by just trees. Listen for reasonable approaches.
3. Give students a piece of clear acetate with grid marks and have them place it over their maps. Students can use dry erase markers to shade in tree coverage, count the colored squares, and use this proportion to determine percent coverage. Have them repeat for all green space.
4. Have students compare their findings. Are they the same? Have students think about why or why not.
5. Discuss other ways to determine percent coverage based on their background in geometry.

Activity 2.2: Pixel Size

1. Ask students to think about the size of the graph paper squares. What would happen if the squares were larger? What about smaller? How would this impact the accuracy of the work and repeatability of measurements?
2. Have students adjust the size of their graph paper, repeat the process, and then compare their results. Were the results more or less similar to each other? Students could collect the results and find the class mean and standard deviation for the data to determine the reliability of their data. Discuss what constitutes data that is reliable enough to make decisions? What pixel size is optimal?
3. Ask students to brainstorm how knowing the percent tree and green space can be used by those at the school, the district, and the greater community.

Activity 2.3: Data for Decision Making

1. Ask students if they think the amount of green and tree space at their school is typical of all schools. Discuss how they could find out:

- a. Students might talk about finding schools in different neighborhoods using Google Earth, printing out maps and repeating the same process with these locations.
2. Direct students to the LAUSD Tree Canopy study [website](#) to collect information about trees in different neighborhoods that have already been mapped. *(If you are concerned about Internet conductivity, select a few schools ahead of time and download pdf reports so groups of students can examine them.)*
3. Based on the maps students examine, discuss what other information would be useful to have when making decisions about tree canopy. Chart student responses. Listen for the following:
 - a. Tree species – number of trees; number of species; size of trees by location; or number per acre
 - b. Compare number of trees or number of species on campus vs. the district or neighborhood as a whole
 - c. Surface types – what could be used for planting and what cannot
 - d. Percent of surface types (paved vs. unpaved) on campus or across campuses
 - e. Comparisons of percent canopy cover for the school site in general vs. the play area
 - f. Percent canopy cover on campus vs. the district or neighborhood as a whole



Activity 2.4: The impact of Trees

1. Ask students what impacts trees have to the environment. Chart all responses.
2. Share “The Benefits of Trees” powerpoint with students. You might want students to take notes using a graphic organizer or other organizing structure. Encourage students to think about the impact of urban trees on environmental indicators such as air quality, storm water runoff, and the impact of planting trees in urban environments on energy savings and carbon generation avoidance.