



6TH GRADE

STEAM & SOCIAL STUDIES





GUARAN-TREED OXYGEN

Driving Question:

How does the number of trees in an urban area affect organisms, including humans, in that ecosystem?

Materials Needed:

Photos of a healthy versus stagnant pond or waterway, calculator, aerial views of town, access to Google Maps, a device for research, science notebook or sketchbook, writing utensil, temperature probe, online resources such as [The Oxygen Project](#).

In this lesson, students will:

- recognize the importance of urban trees, both to the oxygen/carbon cycle and heat islands.

National Learning Standards:

Science: MS-LS2-5; MS-ESS3-4
 Social Studies: VIII,b
 Art: Cr1.1.6a; Cr1.2.6a; Re.7.2.6a;
 Cn11.1.6a



SPINNING THE COCOON

Ask students if they've ever been near a stagnant, still waterway such as a pond or lake and ask them to describe it. Students might describe the smell of decay, the lack of organisms in the water, or the stillness of the pond. If students have not had exposure to waterways, the instructor should show images and describe what it is like. On the inverse, ask them to describe a healthy pond or lake. A healthy waterway is teeming with fish, aquatic plants, and other life forms and is generally relatively clear near the surface. Ask students what makes a waterway healthy or unhealthy. Tell students that factors such as pollutants, the amount of motion in a waterway, sunlight and temperature all impact the amount of oxygen in the habitat. Pollutants kill organisms which decrease oxygen due to decaying matter. Decreased motion also depletes oxygen. Changes to sunlight and temperature can cause a decline in aquatic plants further reducing oxygen.

Just like an aquatic environment, terrestrial environments need oxygen to thrive and be happy. Write the formula for photosynthesis on the board and review with students. Students should know that plants take in carbon dioxide from the environment and release oxygen for organisms to breathe. While much of our oxygen is provided by aquatic species, a large amount is provided by trees. Ask students if they can guess how many people one tree can support with oxygen. Tell them that, according to the University of Georgia, one large tree can support up to four people. Divide the number of students in class by four to determine the number of trees needed to provide oxygen for the class.

Watch the United States Census Bureau's population [clock](#) to show students how quickly the world population is growing, and ask them if they think we are planting trees at the same rate to provide oxygen for all of those people. Explain that, rather than planting more trees, we are losing our forests rapidly. Show students this National Geographic [video](#) on deforestation and discuss what students can do to prevent tree loss in order to help continue providing oxygen and lowering carbon dioxide levels in our environment.

Explain to students that humans have been changing their environment for centuries. Ask students to come up with examples of human environmental modification. After they provide examples, explain how progress is the driving force for many world economies and trees are not typically on the priority list for many businesses. For example, if a business wants to maximize space and create profits they will not save the trees that are on the lot where they build.

Lead students on a quick trip outside and take the temperature in the shade of a tree versus in the direct sunlight. Discuss how, in addition to providing oxygen and sequestering carbon, trees also provide canopy to prevent heat islands in urban areas. During summers in Texas when temperatures soar, this tree canopy can mean the difference between health and heat stroke for individuals who might have to walk to work despite dangerous heat levels.



METAMORPHOSIS

Student groups will begin by researching tree types that would be well suited to the local environment. Students should consider the following when examining tree types: lifespan of the tree, mature size, spacing requirements, watering requirements and what biomass it might produce (pine needles, nuts, leaves, etc.). Students should also keep in mind that selecting diverse trees is better than having a monoculture.

Students will use this information as well as aerial maps of the city to decide which trees to plant and possible locations to plant them. Students can use programs such as Google Maps' street view to design tree canopies over public park sidewalks or redesign street medians with trees with small roots. Students should plan and design at least three areas that were previously uncovered, and use either art paper or a computer drafting program to create before and after images of the chosen areas. Students will present these images, the type and number of trees they chose, and how these trees will affect the carbon and oxygen in town.

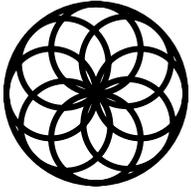
THROUGH THE LENS



Document your process of painting your trees, from selecting the tree(s) to choosing the winning drawings to painting. Allow the students to provide commentary throughout the process and have each student speak about the importance of tree conservation and how this project will bring awareness to your cause.

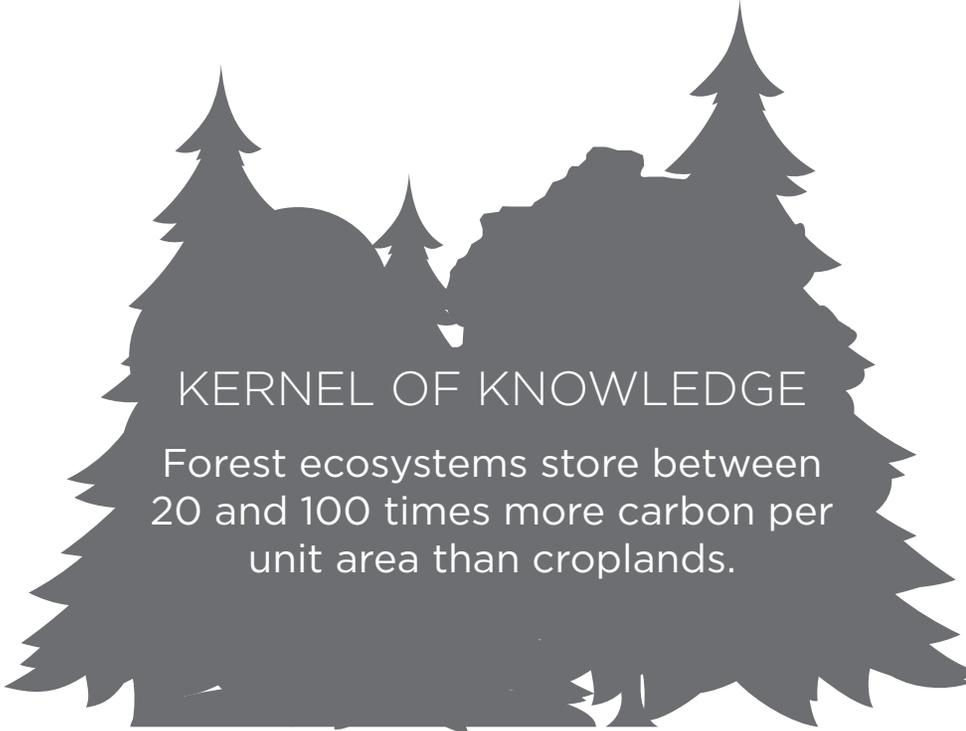
UPCYCLE

Student groups should take their plans for planting trees a step further by applying for urban tree grants such as the [urban forest grant](#) in Austin, Texas. Students should research which grants are available in their area and either apply for them or prepare a presentation for their city council urging them to apply for them. If there are no grants available in their area, students should brainstorm ways to raise funds themselves.



KALEIDOSCOPE

As an extension, have students [watch](#) the original Lorax on their own (available on YouTube). Have them make connections from the lesson on deforestation to the movie. They can do this in a video response on Flipgrid or in an essay.



KERNEL OF KNOWLEDGE

Forest ecosystems store between 20 and 100 times more carbon per unit area than croplands.



eARTh

Trees play an integral role in our lives, from providing oxygen to breathe to creating shaded areas for temperature regulation. Unfortunately, as our cities grow and build, often trees are cut down and not replanted. This affects people across the globe. In response to this, some artists in India have started a project to raise awareness and offer solutions to this issue. They are painting trees to save them from being cut down because of development and road expansion. The images they paint on them vary, but they each have a deep meaning in Indian culture. Visit this [link](#) to see examples of these trees and read more about the artists' goal.

Now, locate one or a few trees that you can paint around your school or community. Decide as a class the message that you would like to convey in the painting of your tree. It needs to focus on the importance of conservation and highlighting the value that trees provide. You could ask each student to create a sketch and then vote on the ones that the class feels truly reflects the message. If you are not allowed to paint the trees around your school or area, then you can wrap them in colorful yarn and hang drawings or important facts about tree conservation from the branches.

Community Garden

- Urban forests provide fruit and other foods for people to come and pick. Find a spot in your community where you and your students could plant an urban forest or community garden. You could even plant one at your school and have the students take turns taking the food home. They could create a dish at home with their family and bring it back to class for everyone to taste, or prepare the food as a class.



CAREER CONNECTION

Horticulturist - A horticulturist knows the science behind different plants, flowers and greenery. They conduct research in gardening and landscaping, plant propagation, crop production, plant breeding, genetic engineering, plant biochemistry and plant physiology. This generally requires an associate's or bachelor's degree.

Landscape Architect - Landscape architects design attractive and functional public parks, gardens, playgrounds, residential areas, college campuses and public spaces. They also plan the locations of buildings, roads, walkways, flowers, shrubs and trees within these environments. For this career, a bachelor's degree and experience in the field is needed.



CAREER HIGHLIGHT

Theodor Suess Geisel, or Dr. Seuss, was a writer, poet and illustrator among other things. He was wildly creative and also highly invested in humans caring for both each other and the environment. In one of his most famous books, *The Lorax*, Dr. Seuss brings attention to the importance of trees and their conservation.



Driggs Av

ONE WAY

NO PARKING
ANY DAY
8:00 AM - 5:00 PM



NO PARKING
ANY DAY

