



5TH GRADE
STEM & ART LESSON





LET IT BE

Driving Question:

How do human activities change an ecosystem, and what steps can be taken to minimize or repair human impact on that environment?

Materials Needed:

Notebook to record observations, writing utensil, sketch book, materials to create a 2D painting/drawing (will depend on chosen medium)

In this lesson, students will:

- recognize how the changes made to an ecosystem affect the ecosystem and organisms within;
- identify how the height of buildings in highly urbanized areas affect the growth of plants at the ground level;
- construct a model that helps restore an ecosystem, even if it's in a small way; and
- create a mural of native flowers and plants.

National Learning Standards:

Science: 5-ESS3-1; 3-5-ETS1-2

Art: Cr1.1.5a



SPINNING THE COCOON

Begin the lesson by looking at progressive aerial photos of your town or a town near you that is undergoing development. (These can be found on the county or city website.) If your town isn't currently undergoing change, you might find old aerial maps of the area before it was highly developed at your local library archives to compare to current images from Google Earth. Tell students that of the 172 million acres in Texas, 128 million are involved in agriculture while much of the other land has been developed into cities and other urban areas. Show the side-by-side images to students and ask them to identify what has changed over time. Students might describe businesses or high-rise towers where there were once cotton fields or subdivisions where there were once piney woods.

Draw two columns on the board. As a class, discuss how this progress may have affected the biotic (living) and abiotic (nonliving) factors of the area and write them under the appropriate column. Students may discuss how a stream was diverted to avoid flooding in a business district or talk about how the number of birds declined due to not having trees to roost in or access to soil for the insects they eat. Students should be aware of how human impact has created destruction or modification of habitats of native species and thus decreased the biodiversity of the area.

Take the discussion further by bringing up species that go through Texas on their annual migrations such as Monarch butterflies or hawks. Ask students to brainstorm ideas for what might occur with these migrating species if the habitats they to stop in were to be modified or destroyed.

KERNEL OF KNOWLEDGE

Planting native plants and grasses such as the Texas state grass, Sideoats Grama, can help reduce the amount of water it takes to keep landscaping areas watered.



METAMORPHOSIS

Students will research what plants and animals are native to the area as well as what species migrated through and what resources they used while migrating. Using this knowledge, students will design their own urban habitat restoration project. Students will evaluate areas such as their own home or a business rooftop and target a location for their project. At that location, they will create a plan to “restore” the area by reintroducing biotic and/or abiotic factors. Students might do something as complex as design a rooftop garden or “green roof” using native grasses or small trees on top of a business. They might also create something as simple as restoring some of the plants necessary to help monarchs migrate. Students should include justification for all aspects of their design and include how it might impact other native species.

THROUGH THE LENS



Using Animoto, an app that allows you to easily make 30-second videos at no cost, have students create an informative video using material gathered from the class project. They can use photos taken from designing the urban habitat or record themselves speaking about the importance of planting native trees and grass. The Animoto app supports the selection of specific styles and music to which you add your photos or recordings. Follow this [link](#) for details on how to download and use the app.

UPCYCLE

Unless you live in a more arid area of Texas, your city was probably home to many more trees than are currently present. Have students use temperature probes and probe software to collect data on the temperatures in various areas throughout town. They can visit places such shopping centers, neighborhoods and parks. While collecting data with the probe, have them also note the features in the area. Ask, “Are there native trees, tall buildings, or a lack of shade and shelter?” Using information learned during the initial project and the data you collected, have students write a proposal to help areas of the city make a partial return to their original state by planning a strategic tree planting. How could this also help native species?



eARTH

Have students research what types of flowers are native to your area or state. Tell them to choose their favorite one, and if possible, print a picture of that plant/flower. Ask students to share which one they chose and give a bit of information about it, such as the season in which it grows, where it grows, how large it gets, where its name came from, etc.

Now, students will create a classroom mural of native flowers and plants! Roll a large piece of white butcher paper out on a table or the floor. Instruct students to draw a large version of the flower or plant that they chose as their favorite on the paper. Depending on your class size, you might have students go one at a time, or a small group at a time. Have everyone draw their portion in pencil first so that, as a class, you can critique the overall design before adding color.

Once everything has been drawn, allow each student to color their work. The medium for this portion is flexible. They could use paint, marker, watercolor, color pencil or even collage. After they have colored their portion, have them write one fact about their chosen flower or plant on a note card or small piece of paper and tape it next to their plant. When it is complete, hang it in the hallway or classroom. As a class, discuss how each of these flowers and plants are important to our ecosystem. Invite other classes to make one as well, and attach them in the hallway, creating a large-scale mural!

Community Garden

- Some city-owned land is either unused or underused. Have students work with your local parks and recreation department to create more green space in these unused areas. They can solicit volunteer labor to tidy up parks or lots owned by the city, then collect tree and plant donations from local arbors or nurseries to fill the parks and spaces. If there aren't any local arbors or nurseries, try getting neighbors together to create a community produce garden. (North Texas has a growing season that starts in March.) Students can share the product of their labors with local food kitchens to help feed those in your city who are struggling. Some fruits and vegetables that grow in Texas are sweet potatoes, cucumber, honeydew, spinach, chile peppers and watermelon. Students might consider plants such as sunflowers that not only beautify the area, but also provide food through their seeds. If there aren't enough volunteers to maintain a vegetable garden, consider planting natives such as pecan trees or bluebonnets, our Texas state tree and state flower. Be sure to have the students check the soil type in your area, as Texas is home to 1,300 types of soil!



CAREER CONNECTION

Arborist - Arborists work with trees. They may trim, plant or otherwise maintain trees for both individuals and businesses. This career requires a high school diploma, and many arborists are certified through associations such as the International Society of Arboriculture.

Ecologist - Ecologists are scientists that specialize in studying ecosystems and how the organisms in them interact with each other. They may work to correct damage to an ecosystem or research an area to prevent damage from occurring. This career can range from needing an associate's degree for general lab work to requiring a master's degree for more advanced studies in ecosystem management.

Urban Planner - Urban planners look at land and develop plans for their use. They also plan out programs that encourage and aid in population growth. They may also work with existing towns to help revitalize them or help them grow. This career generally requires a master's degree.



CAREER HIGHLIGHT

Leonardo DiCaprio is an actor turned conservation activist who founded the Leonardo DiCaprio Foundation. His foundation works on many projects, including one dedicated to protecting eco-regions and habitat restoration for threatened wildlife populations.

