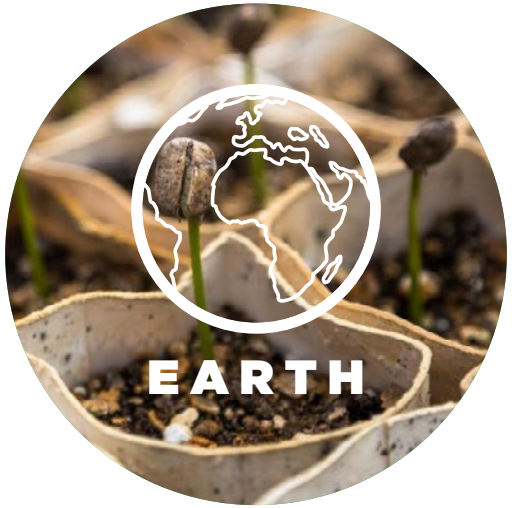
5TH GRADE

STEAM & SOCIAL STUDIES



LOCALLY GROWN

Driving Question:
How do adaptations in plants and animals affect the way they consume resources in their habitat? How can planting native species change the way resources are consumed?

Materials Needed:
Sketchbook or science notebook, writing utensil, design program or graph paper, materials for plant models

In this lesson, students will:

- examine adaptations in plants to determine what makes them best suited to the local environment. They will use this knowledge to plan a garden that uses the least resources, while providing the best aesthetics.

TEKS:
Science: 5.9(A)(C)
Social Studies: 5.11(B); 5.12(B)
Art: 5.1(A)(B)(C); 5.2(B)(C); 5.3(A)(C)(D); 5.4(A)(C)

SPINNING THE COCOON

Show students pictures or examples of various types of plant and tree leaves such as pine needles, waxy holly leaves, cactus spines, palm fronds or lobed oak leaves. Ask students to come up with ideas that explain the variances in leaf types and write their ideas on the board. Remind students of the term "adaptations," and discuss how adaptations in organisms are specific to the living and nonliving features of their ecosystem.

Take the students for a walk outdoors and look for organisms that thrive in the surrounding environment. It can be something as complex as a tree species or something as simple as a weed. Ask students to draw what features they believe these species possess that allow them to be so successful. While outdoors, direct students to pay special attention to the soil in non-landscaped areas, and whether it is sandy, clay or a combination of both.

Back in the classroom, discuss the students' drawings. Ask them to show and describe what they drew and share their ideas about what made those organisms successful. Some student ideas might include that they are able to conserve water due to their leaves, that they are able to grow in clay due to their hardy roots or that certain insects can eat tough leaves with their strong mandibles. Introduce the term "xeriscape" and explain to students that areas landscaped with xeriscaping techniques are considered greener and better for the environment because the plants require less water and are better adapted to the native area. Ask students to come up with ideas to further make landscaping green and compile ideas on the board.

KERNEL OF KNOWLEDGE

According to Douglas W. Tallamy, non-native plants generate 29% less biodiversity than native ones.

METAMORPHOSIS

Students will choose an outdoor area of the school that they would like to landscape (or re-landscape) with native plants. They will begin their design project by doing quick research on the climate in their area. They might visit the school's weather station, if you have one, or read weather and climate reports online. Also, they will need to examine the soil in the area they choose for their landscaping project.

As a group, students will research and build models of native plants. They will use these models to design a landscaped area at their school, that is not only attractive, but also ecofriendly. Students should use research and models to determine how the chosen species will look during all seasons and adjust their landscaping plan accordingly. Groups should pay special attention to the amount of space each plant's roots need to grow as well as whether the plant will provide shade covering to another plant they have chosen. Once groups decide on a final design, they will draw it using either graph paper or design software. Students should also complete a drawing of the way the area currently looks.

Using their drawings and research, student groups will prepare a presentation that outlines how the native plants will change that area. Students should discuss how the landscaping will change the path through which water travels, the amount of shade in the area, the aesthetics and the way habitats would change.

THROUGH THE LENS

Once the students choose the area that they would like to re-landscape with native plants, have them document each step from choosing the location, to planting, to growing the flowers and plants. Using an app such as Framelapse, Lapse It or iMotion, create a time-lapse video of the process. Display the video at the front of the school so that visitors can visually experience the process when they come to the building.

UPCYCLE

Students will design an experiment to explore the use of resources in their landscaping project compared to that of a non-native landscape. The students will use data recording skills and measurement tools to determine the amount of water used in both areas, as well as other resources such as mulch and fertilizer. They will use this data to present and propose a landscaping renovation to a local business. In their renovation plan, they should use mathematical calculations to generate a budget for installing the local plants, and the amount of money the business might save over time in watering and fertilizing costs.

It is important to note, that in our free-enterprise economy, businesses thrive on competition and turning a profit. By presenting the proposal to the local business, students should be sure to highlight the ability to promote their business as "green" and also how this saves them money. Cutting costs are key to higher revenue but promoting that a business cares about the environment has the potential to increase consumer demand for their products and increase their profit.

eARTh

Once the students have discussed adaptations and the ways in which plants evolve to thrive in their environments, introduce them to the term “botanical artists.” These are artists who paint or draw botanical subjects such as plants and flowers. Using this website, show them examples of famous botanical artists. As you look at the examples, ask the students to talk about what they see in the artworks. How do the artists utilize color? What about line? What principles of design seem to be the most important in these works?

Now, tell the students that they will be creating their own flower or plant from their imagination. First, they will need to decide in what type of environment their plant will live. Next, they will create a sketch of the plant in the environment of their choosing. They can be as creative as they want with their plant, but it must have at least two different features, or adaptations, that it has grown in order to thrive in its environment. Once the students have produced some ideas in their sketchbooks, they can draw or paint their final version on paper. The medium can be open but it needs to have color.

When the students have finished, they should present their botanical art to the class and explain the adaptations that they chose to give their plant, as well as talk about the creative choices in their work.

Community Garden

As a class, let the students choose their favorite plant or flower. Then, give them a large sheet of paper on which to draw or paint their flower. It might be helpful to print out a photocopy of their chosen plant or flower. Each artwork should be colored, and the name of their chosen plant printed clearly at the top of the piece. With your students, find a nearby nursing home or hospital where they can donate their botanical art. Another option would be to have each student create their work on an 8”x8” square, mount that onto a black backing, and attach them to make one large piece.

CAREER CONNECTION

Botanist - A botanist researches, classifies and categorizes different kinds of plant life. They may study the effects of pollution on plants and work toward finding environmental protections for them. They can work in variety of settings – from teaching in a classroom to creating and growing new plants in a laboratory. This profession requires a bachelor's degree in botany..

Botanical Illustrator - A botanical illustrator is a person who paints, sketches or otherwise illustrates botanical subjects, often for books or botanical journals. To become a botanical illustrator you can be self-taught, or earn a bachelor's and/or master's degree in two-dimensional (2D) art.

CAREER HIGHLIGHT

Margaret Mee was both a botanical artist and a conservationist who specialized in painting the flora of the Amazon rainforest. She also made a significant contribution to the worlds of science and conservation. Visit this link to see some examples of her amazing work and to read more about her.