

Native Plants and Biodiversity

Digital Toolkit – Clean Creek Campus Extension Activity

Activity Summary: Learn more about local biodiversity on school campus. Students will assess different sites on campus for biodiversity using a biodiversity index, and will also survey what native and invasive plants are on the school grounds. Students can experiment with using different apps to assist in plant identification and contribute to local citizen science projects.

UNIT: Clean Creek Campus

GRADES: 3rd grade and up

MATERIALS:

- Keep Austin Beautiful's biodiversity quadrat activity kit or rulers to measure their own quadrats outside.
- Included Biodiversity Quadrat Worksheet
- Optional: Computers or tablets with iNaturalist app downloaded and account made with the program.
 - <https://www.inaturalist.org/>

OBJECTIVES:

Students will be able to:

- Understand what biodiversity is and why it matters
- Learn some simple measurements for biodiversity on a local level
- Utilize technology as a resource to identify flora on their campus

TEKS CORE CONCEPTS:

- Coming Summer 2019!

Introduction

Today we're going to be taking a look at biodiversity on campus! *What is biodiversity?* Diversity, or variety, of living things, like plants or animals. *Why is biodiversity important?* Helps ecosystem resiliency and stability. *What might be some threats to biodiversity?* Habitat loss, extinction, fragmentation, climate change, invasive plants, etc. *What are native and invasive plants?* **Native plants** – plants from here/native to a specific area, **invasive plants** – plants not from here that can compete with native plants for resources. *We can measure biodiversity to assess ecosystem health. There are different methods to doing this but we'll be using biodiversity quadrats to investigate biodiversity right here at school.*

Activity – Part I – Outside the classroom

1. *What is a biodiversity quadrat?* A quadrat is generally a square, sort of like a window, made to designate a square meter plot to assess for biodiversity. Using this small window, we will count how many different kinds of plants we find. Scientists use this to get a glimpse into the larger area that they're trying to study, because it would be impossible to count all of the plants and animals on every inch of the Earth's surface!
2. Explain to students how to keep track of their plant findings using their Biodiversity Quadrat Worksheets. One column is for the plant description and the other is for the tally marks of how many are found of that species.
3. Have students select specific areas to place their quadrats, and then have them record their observations. Optional: If tablets are available, have students use tablets and [iNaturalist](#) or another plant ID app to ID the plants within the quadrat and upload sightings. If iNaturalist unavailable, can use the [City of Austin's Grow Green guide](#) to assist with some plant ID, either by taking photos or creating drawings and descriptions of the plants for follow-up.
4. Optional: Include a survey of native and invasive plants around campus. Make a chart comparing the numbers and species of invasive plants that students encounter.

Native Plants and Biodiversity

Digital Toolkit – Clean Creek Campus Extension Activity

Activity – Part II – In the classroom

Once back inside, have students calculate the biodiversity index for their quadrats. They will need to begin by totaling the number of different species they found as well as the total number of individuals. *An index is a scale or measurement for something, so by calculating the biodiversity index, we can get a measure of how biodiverse an area is. Our index will be on a scale from 0-1.* **We are going to use a very simple formula to assess this: number of species in the area ÷ total number of individuals in the area = biodiversity index.**

Discussion: *What does this number tell us? (the higher, the more biodiversity). Why do you think you got the number you had? What kinds of places might have higher biodiversity than others? Less disturbed places. What kinds of places might have lower biodiversity? More disturbed or urban areas. What did you notice when you did your native and invasive plant survey? Why might that be?*

There are some places in the world where there is really high biodiversity for the amount of space. Many of these places are threatened by disturbances such as urban development, invasive species, and climate change. We call places like these biodiversity hotspots. Central Texas – including the Edwards Plateau ecoregion that we call home, is also a biodiversity hotspot, along with many others all over the world! We need to work together to help restore and preserve the biodiversity of this special space. *What can we do to restore biodiversity – Plant native plants, keep our watershed clean, conserve wild spaces, etc.*

By plugging into big citizen science projects like participating in recording sightings on iNaturalist, we can also help further knowledge about the area that we live in so scientists can better understand what our biodiversity looks like!

Extensions and additional resources:

Participate in your local City Nature Challenge using this Educator Toolkit that incorporates iNaturalist in the classroom: <http://citynaturechallenge.org/education-toolkit/>

- Link to main page for the 2019 challenge: <https://www.inaturalist.org/projects/city-nature-challenge-2019-austin>

Resources for mapping urban tree data and looking at ecosystem benefits of tree coverage:

- Mapping canopy coverage: <https://canopy.itreetools.org/>
- USDA Data of Urban Forest coverage in Texas: <https://www.nrs.fs.fed.us/data/urban/state/?state=TX>
- Alternate view of tree coverage as canopy perceived in Google Streetview: <http://senseable.mit.edu/treepedia>
- Toolkit through the Vibrant Cities Lab to assess urban tree canopy (advanced): <https://www.vibrantcitieslab.com/toolkit/urban-tree-canopy/>
- Project Learning Tree and US Forest Service Teaching curriculum for High School: Software and lesson plans for identifying and mapping trees in local area: <https://design.itreetools.org/>
 - o <http://www.plt.org/curriculum/teaching-with-itree/>