

Into the Weeds

Math, Measuring, & Models



Grade Level: 3 - 8

Background Information

Native plants offer many benefits to the ecosystem in which they exist. People often think about the benefits that they can see such as native flowers providing food for bees, green leaves providing camouflage for insects, seeds providing food for birds, and shrubs providing habitat for a variety of animals. However, native plants offer so much more. One important benefit that is often forgotten because it can't be seen is the deep root system of native plants.

The deep, strong root systems of native plants are beneficial because they:

- **Hold soil in place and prevent erosion.** This is especially important along the banks of our river which would quickly wash away from rainfall, snowmelt, and annual flooding if not for the native plant roots holding the soil in place.
- **Break up compacted soil.** Looser soil encourages new plant growth and allows more stormwater and air to penetrate deep into the ground. This, in turn, provides improved stormwater management and flood prevention.
- **Require less water and fertilizer to grow.** With such massive root systems, native plants are better at finding and soaking up water. Native grasses and flowers are a great alternative to Kentucky bluegrass (grass commonly grown in lawns) and common annual garden plants because the native plants will require very little water and usually will not need any fertilizer to grow beautiful and healthy.
- **Store carbon dioxide.** During photosynthesis, plants remove carbon dioxide from the air and store it in their roots.
- **Provide nutrients to the soil.** With approximately two-thirds of native plant tissue existing below the ground as part of the root system, native plants are able to provide valuable nutrients to the soil as roots naturally decay and regenerate.

Depending on grade level, you can choose how much detail you want to discuss with your students regarding the benefits of native plant roots. See the activity description on the next page.

Activity Description

Materials:

- Yarn (14 feet; less if you choose not to model all 21 plants)
- Scissors
- Masking tape (21 pieces, ~6 inches long)
- Pens (to write on masking tape)
- Tape measure or yard sticks

Instructions:

- Start by asking students why native plants are important. Then focus your discussion on plant roots.
As you can see in the images on the last page, native plant roots often grow deeper than the plant is tall. In each image, you will see one plant that has much shorter roots than the rest.
- Ask students to look at the diagrams and find the plant with the shortest roots. Based on what they learned about native plant roots, do they think that plant is native or non-native?
- Ask if they have seen that grass before and where it typically grows. *It is the most common grass species used in lawns.* Help them understand that Kentucky bluegrass is a non-native grass to North America and considered an invasive species in Wisconsin and some other midwestern states.
It was introduced to the United States in the 1800s and has been used in lawns ever since because of how quickly it establishes and fills out. However, with its short root system, it requires a large amount of water and fertilizer to grow green and lush. It also is easily washed out by erosion and pushed out by other invasive species.
- Now that students have found the non-native plant and considered the impact of its short root system, have them look for the longest roots. *Answer = Cylindric blazing star.*
- Ask students to look at the images and make observations about what else looks different about the roots besides the length. *They might say shape, width, thick/thin, number of roots, etc. Write down their ideas on the board and encourage lots of ideas.*
- After thinking about all of the differences, ask them which roots they think are the best or the strongest. No right answer.
- Finally, have them think about reasons why some plants might have lots of thinner shorter roots while another plant has thicker longer roots. Is one better than the other?
- If there is time, allow students to pick a plant and make a hypothesis about why that plant has evolved those roots. Then turn to a neighbor and share their ideas.

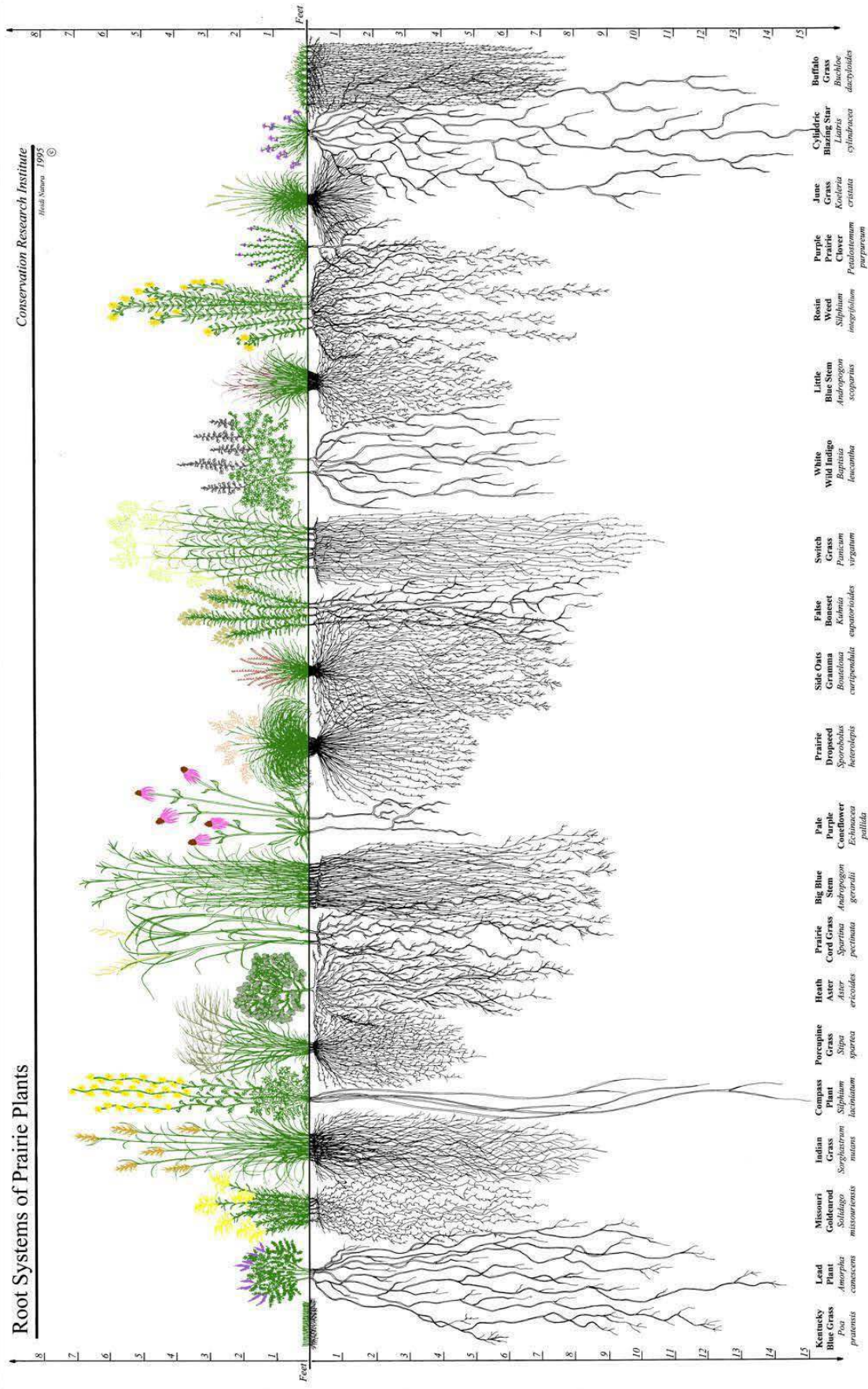
Yarn root modeling activity

To better visualize the length of roots which can't be seen growing underground, students will measure lengths of yarn to match the lengths of various roots in the diagrams below. You can choose whether you want to cut yarn to model all of the plants or just some. Once yarn is cut, students should write the name of the plant and length of roots on masking tape and stick the tape to one end of the yarn. Students can then go outside or stay inside to stretch out the yarn models and get a better idea of the length of roots underground. *Optional: cut yarn of another color to match the height of each plant above ground. Then compare that yarn to the length of the roots side-by-side.*

Root Systems of Prairie Plants

Conservation Research Institute

Heidi Numa 1995



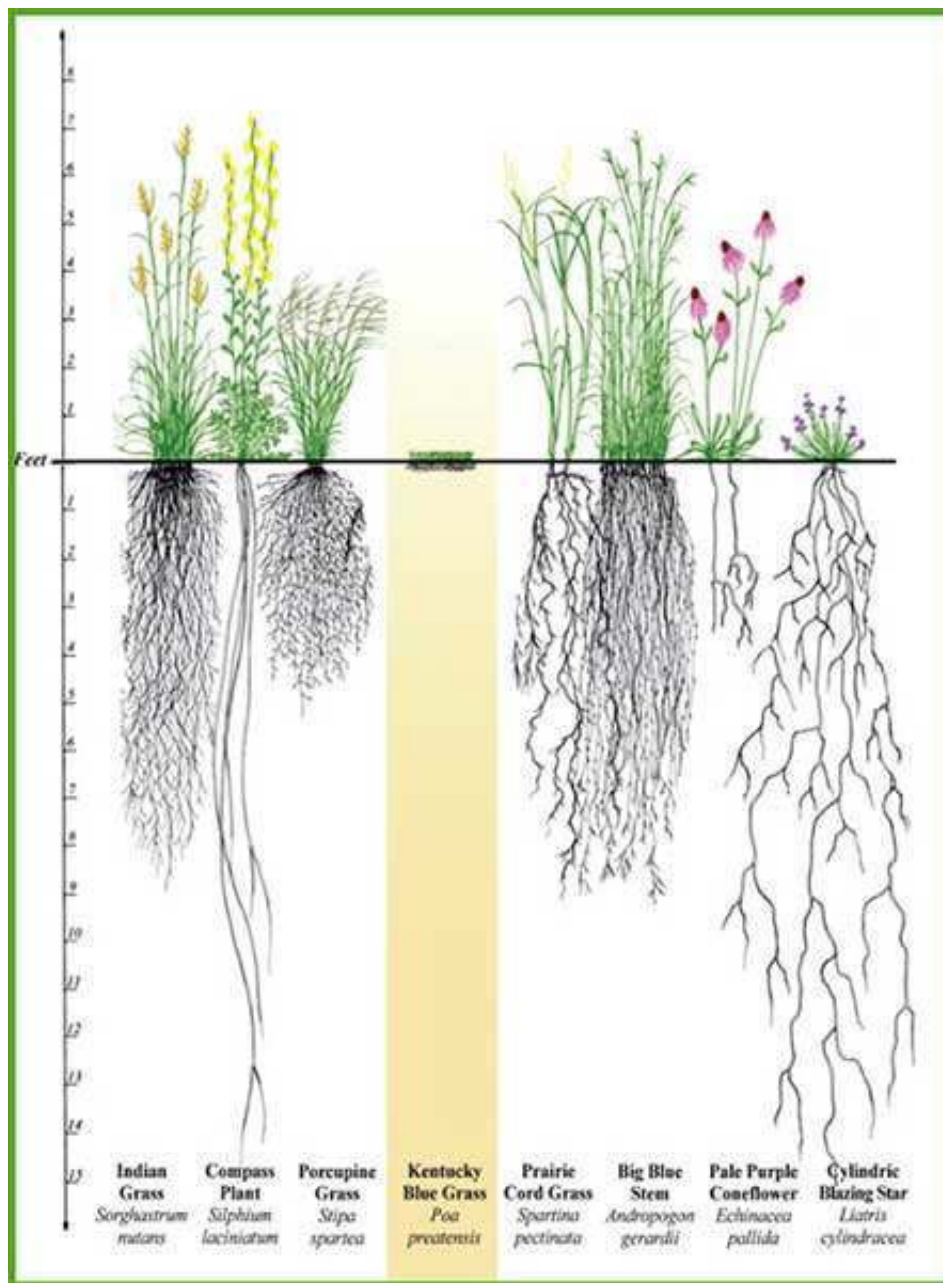


Image from Wisconsin Pollinators⁴

For more information about native plant roots, visit:

1. <https://www.mwmo.org/learn/preventing-water-pollution/native-plants/>
2. <https://storymaps.arcgis.com/stories/913adb16676d4c3aafc8da8c13947e00>
3. <https://www.stpaul.gov/departments/parks-recreation/natural-resources/environmental-education/como-woodland-outdoor-16>
4. <https://wisconsinpollinators.com/Articles/PlantRootSystems.aspx>

Let us know if you enjoyed doing this post-activity with your class. If you send in photos of your students with their root models, we might upload some as examples on our website!

Contact: Nicole Biagi, Outdoor Educator, nbiagi@wildriversconservancy.org