

EarthWorks Orchard Curriculum

Parts of a Tree - Roots

Grade(s): 2-5, concentrating more on nutrients with older students	Topic: Parts of a Tree	Season: Any
Timing: 45 minutes, including 5 minute RPK, 5 minute introduction, 20 minute outdoor game, and 15 minute concluding writing activity		
Objectives: <ul style="list-style-type: none">• Students are able to explain that the function of roots is to draw up water and nutrients for the plant from within the soil• Students can calculate the likely length of a trees' roots by measuring the horizontal canopy spread of the tree and multiplying by 2• Students recognize that all of the roots of a tree are working together to bring necessary water and nutrients, and that there are 100s to 1000s of feet of roots for each tree• Students can identify some vegetables they eat that are plant roots		
Materials: <ul style="list-style-type: none">• Examples of roots we eat (carrots, parsnips, radishes, beets, etc.)• Small cups, enough to have 10 per team• Large yogurt containers, 2 per relay team, filled with water• Stopwatch (or you can estimate)• A set of 10 colorful cards that can be seen in grass with the word "nutrient" on them for younger students and specific nutrients written on them for older students: phosphorous, potassium, calcium, copper, iron, zinc <i>for each group</i>• Magic marker, pen or crayon• Measuring tape		
Degree of need for extra teacher or parent helper? High		
Journal Prompt: Why are tree roots important?		
Lesson Sequence: Reactivate Prior Knowledge (5 minutes) Show students the roots you brought and have them try to identify them. What part of the plant are these? How can you tell? They are important to us because we eat them, but how are they important to the plants they came from? Introduction (5 minutes) Tell students that today they are going to learn about a different part of the plant. Show them some examples of that plant part that you got at from a garden or farm or the store (carrots, etc.) and have students guess what part of the plant it is: the roots. Go over root vocabulary and what the function of a root is. Explain that today, they are going to play a game in which they make up roots and will help a tree get water and nutrients from the soil. Have them guess how long trees' roots can be, and how deep they can go in the soil. Tell them the roots are usually at least 2 times the canopy spread of a tree, so when they are walking around, even if a tree is really far away from them they could be walking over a really long root deep in the ground! Take them outside and gather them around a small or medium-sized tree (or their class tree, if they have adopted one). Roots Relay (20 minutes)		

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1. Gather around one of the trees in the orchard (aim for a tree 15 feet tall or less).
2. Help one student measure the horizontal canopy spread and multiply by 2. Mark off this distance to show the children how far from the trunk the roots spread.
3. Tell the students they will be the tree's roots, and have the very important job of taking the water and nutrients the tree needs from the soil and bringing them to the tree trunk. They will need to work together as a team just as all of the tiny roots of a real tree do. They will be spread out about the same distance as the actual roots are from the tree trunk. They need to take the nutrients and water to the tree trunk as quickly as possible for the tree to survive.
4. Divide the class into groups. Each group is **one** of the tree's roots.
5. Space the groups into lines that radiate from the tree, with the first student in the line placed close to trunk, and the last student placed at the farthest tip of root spread.
6. Place one yogurt container filled with water, and one container filled with the labeled index cards (each representing a nutrient) at the end of each line. The last student in each root line should be able to reach inside the container. Next to these containers, place several Dixie cups.
7. The last child in each line will pick up a cup and an index card and pass it to the next child in line, who will pass it down. The idea is to pass as many cups of water and index cards as they can to the trunk of the tree. When the child closest to the tree gets an index card or cup, he or she should put it down on the ground in front of him or her.
8. HAVE STUDENTS DO A RUN THROUGH OF THIS TO MAKE SURE THAT EVERYONE UNDERSTANDS HOW THE RACE WORKS
9. Tell them you will time them (about 45 seconds) and not to start until you tell them to go. Remind them that they can only have one cup and one nutrient card in their hands at a time (if you have a competitive class, you might want to create a penalty in case you see them with more than one).
10. After 45 seconds, stop the race. Ask the children how many cups of water and nutrients made it all the way to the trunk of the tree (from each "root" and all together). Why do we want to make sure our orchard trees get the water and nutrients they need? What would a tree do without roots? Stress that all of the roots work together to help their tree.

Conclusion (15 minutes)

Once back inside ask, "when you were a root, what did you do for the plant? Why were you important?" Have students draw a picture of their team in the game and the important job they did as roots, using vocabulary words. Have kids think about how much they had to spread out from their tree to get food for the tree and why having lots of space for trees and plants is really important.

Vocabulary

Canopy
Nutrient
Root

Vocabulario

Manto
Nutriente
Raíz

Extensions / Homework Ideas:

- Have students write poems or stories that compare roots of plants to other organisms

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or structures in nature that they recognize. Maybe roots remind them of spider webs or a birds nest or really tangled hair. Emphasize the language arts aspect (metaphors, similes, good descriptors). Or have them write about other living creatures and how they get water and nutrients and how those structures are similar to/different from roots, again using good descriptors.