

Metro Children's Water Festival 2020-virtual

Trees, Roots, and Cleaner Water

Tree Roots experiment-supplemental activity

Title Trees, Roots, and Cleaner Water

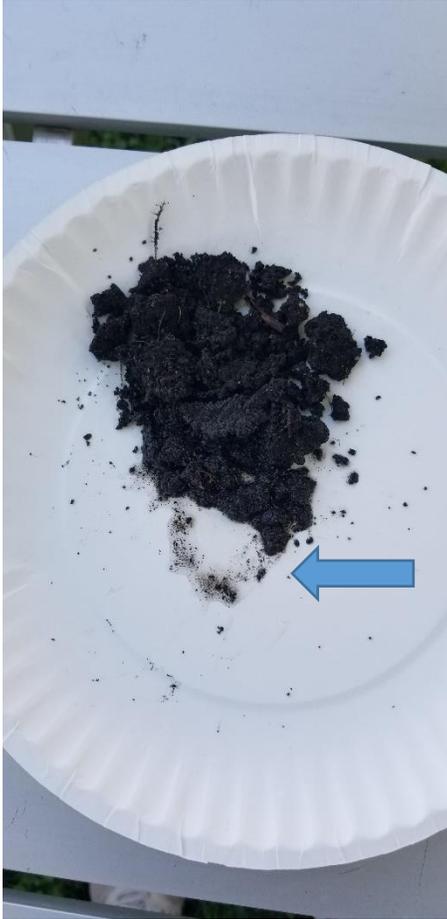
Outcome

1. Students will learn that soil erosion happens when raindrops move soil particles. Some of these soil particles may go down the storm drain into a stream causing water pollution.
2. Students will learn that trees can help reduce soil erosion in two ways: the tree top acts like an umbrella which stops or slows down the raindrops and the roots help hold the soil in place and take in the water in the soil. The more rain the tree roots can take up the less there is on the ground to move those soil particles.
3. Determine if fewer thick or many fine roots absorb more water.

INSTRUCTIONS—

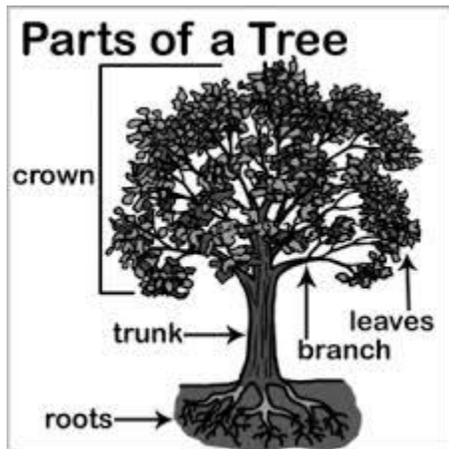
1. Collect a couple spoonfuls of soil from your schoolyard or from a place near home. Put on a paper plate. Use a spoon to carefully drop a few drops (raindrops) onto the soil. What happens? You should see small soil particles moving away from the main clump. When small pieces of soil break off from the ground and move away, this is called **"soil erosion"**. These moving soil particles can move to a storm drain and eventually to the Mississippi River causing water pollution.





2. Today I am going to share with you how trees can help keep that soil from moving and keep our water clean. Trees keep our water clean. Really? Really.

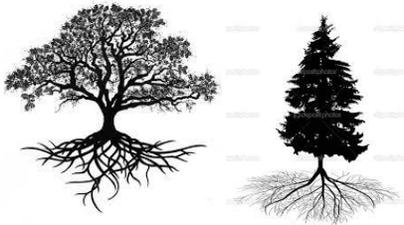
Before we start let us remember that trees have tree main parts--the roots in the ground, the trunk, and the top branches and leaves which make up the crown.



3. Trees can help stop or reduce soil erosion in two ways: the tree crown (branches and leaves) acts like an umbrella stopping and slowing down the raindrops so either less rain reaches the ground or if it does it reaches the ground it is with less force. The raindrop hitting the ground is not so much like a BAM but more like a gentle drip-- so there is less force to move the soil and cause soil erosion.
4. The second way the trees help stop soil erosion is the roots. The roots help stop soil erosion by taking up or absorbing the water. Without water plants die, right? The more water the roots take up or absorb into the tree means there is less water moving across the ground to cause soil erosion. And the second way is that roots are always growing and dying. A root that dies leaves little tunnels in the soil which help water sink in.

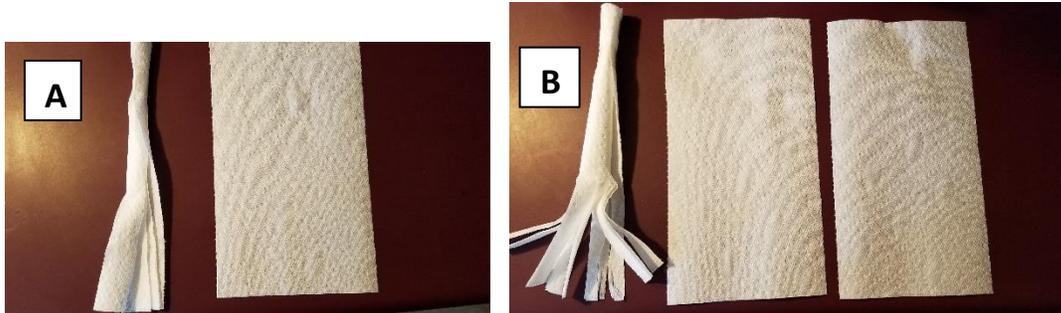
Lets explore some more about the roots because they are important but yet we don't know a lot about them because they are under the ground and we do not usually see them or think about them.

5. You can see in these pictures that trees have two types of roots-either ones that go deeper and are thick and fewer in number like this oak tree or ones that are shallow (not so deep), are thinner, and more number like the pine tree. Which one do you think will take up or absorb more water?



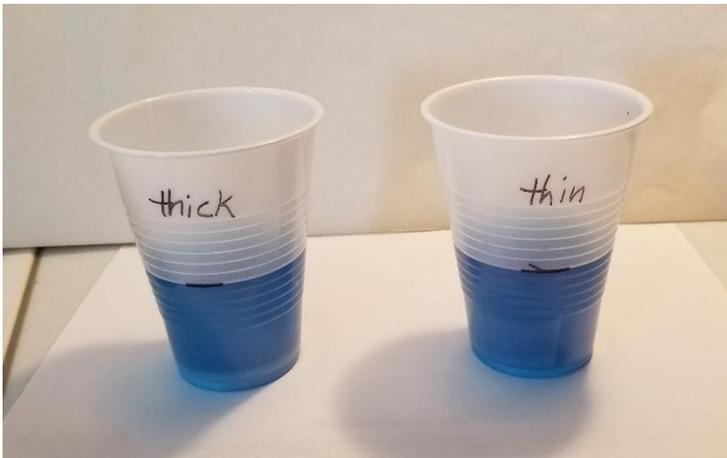
6. Teacher or parent-make two root samples, one made from ONE paper towel roll and make one cut with a scissors about ½ up representing the tree with fewer thicker roots. And one make

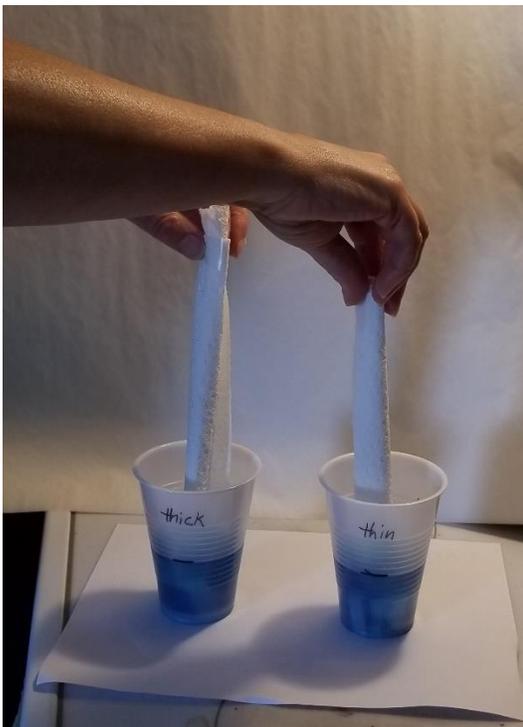
from TWO paper towels and cut $\frac{1}{2}$ up with 3 or 4 cuts representing the tree with thinner and more roots tree.



7. Which one do you think can take up or absorb more water? Do an experiment to find out.

Measure water into two cups, put the same amount in each cup, make a line so you see later how much is gone. I colored the water blue with blue food coloring just to see it better. Label one cup thick and one cup thin. You will place Root sample A with the one cut in the THICK labelled cup and Root sample B with the 3 or 4 cuts, giving it finer roots, in the THIN labeled cup.





Dip the roots in each one of the cups of water—thicker **A** in one, and thinner **B** root sample in the other. Count to 10. (Take out roots.) Now measure the water left in each cup. The root sample that has less left took up more water. (It should be the thinner/more roots that took up more water.)

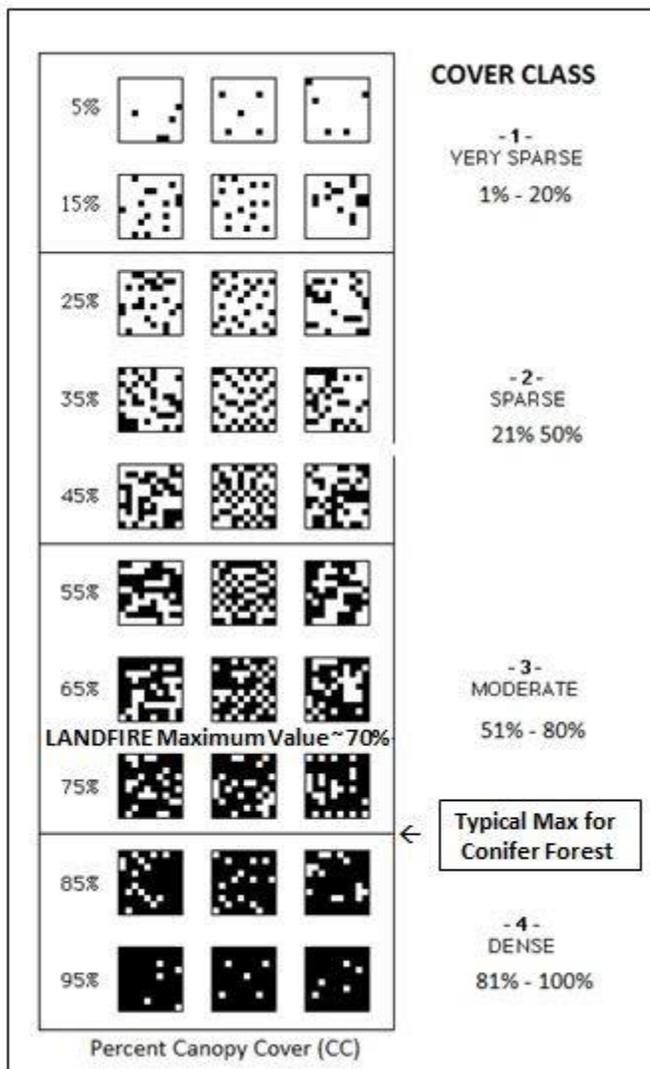
8. So we have learned today that trees are important in keeping our water clean. They help stop soil erosion. Soil erosion is bad because when this happens the soil particles move to the river or

lake and cause water pollution. The two parts of the tree that stop soil erosion and help keep our water clean are the top branches and leaves and the roots.

The branches and the leaves act like an umbrella stopping and slowing down the raindrops so either less rain reaches the ground or if it does it reaches the ground it is with less force so there is less soil erosion. The roots help stop soil erosion also by taking up or absorbing the water. The more water the roots take up or absorb means there is less water moving across the ground to cause soil erosion. We found that the thinner but more roots type took up more water.

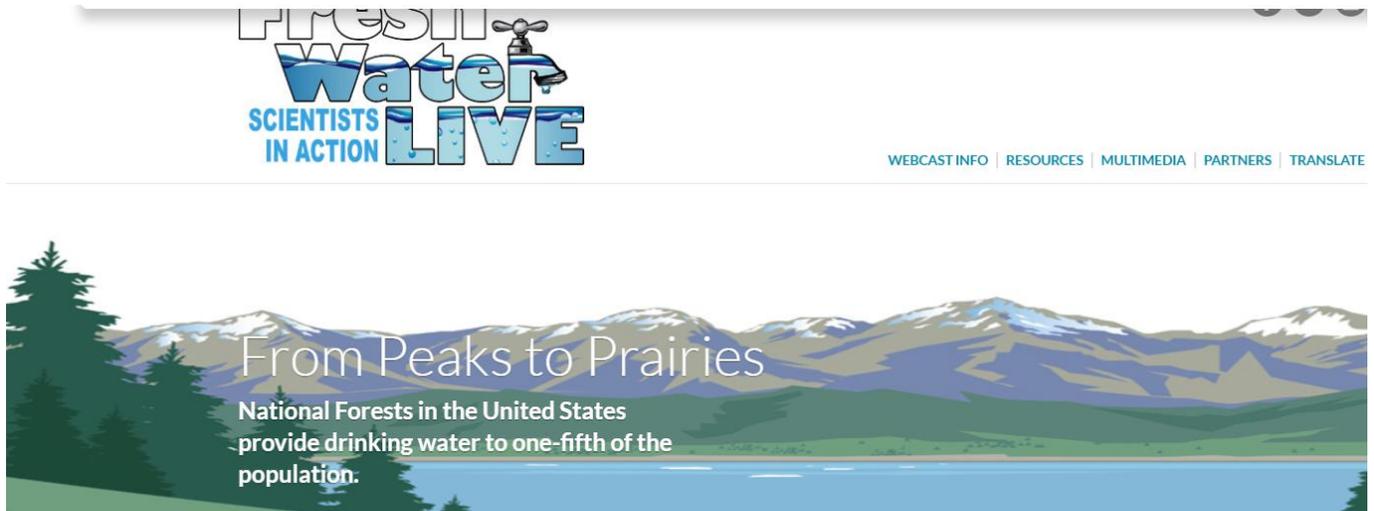
Outdoor Action component

1. Find out how much bare soil in on certain area of the school grounds or your home using a hula hoop, 4 rulers to make a square, or any other way to delineate a certain area. Here is a visual representation of various percentages.



2. Look around the school grounds or your home to figure out where moving soil particles would have to get to get down the storm drain.
3. Find a tree on your school grounds or home, preferably one that that more in the open with a full top. Remind the students how the trees help slow down the water—the top leaves and branches acting like an umbrella and the roots taking up water. Lets find out how big this tree umbrella is. Have a student stand at one edge of the tree top and another directly across. Use a string and ruler to measure the distance. Do this in several directions because the top is not a perfect circle. Calculate the average of all the measurements. Ask the students how far out roots go and have them stand by where they think that is. They will be surprised to learn that the roots go the edge of the tree top and beyond that 1 time. So if the edge of the tree top is 4 feet from the center of the tree, the roots will go 8 feet out from the center of the tree.

Virtual resources from USDA Forest Service—www.fsnaturelive.org



Everyone needs fresh water to live, but fresh water is limited and precious. Learn about the importance of fresh water, watersheds, the water cycle, and more by watching these programs.



CLICK HERE to watch a new 24-minute video highlighting watersheds in Colorado. This video features Carl Chambers, a USFS hydrologist, and Bob Reynolds, a geologist at the Denver Museum of Nature & Science.



CLICK HERE to follow water on a journey through a watershed in the Eastern United States. This is a 47-minute video.



CLICK HERE to watch a 43-minute video taped live at Grand Lake, Colorado, featuring questions from students and answers by Carl Chambers, a U.S. Forest Service hydrologist, and Bob Reynolds, a geologist with the Denver Museum of Nature & Science.