



Wonders in the Woods

Hopefully you had time to enjoy the “Wonders in the Woods” video where we explored Heritage Conservancy’s Hart’s Woods Preserve. Trees are a critical part of our environment and provide so many services to us, especially by protecting our drinking water. Here are two activities to help you learn more about trees, how trees transfer nutrients and water, and how they help to support local streams.

Activity: Tracing Water Passage in a Celery Stalk

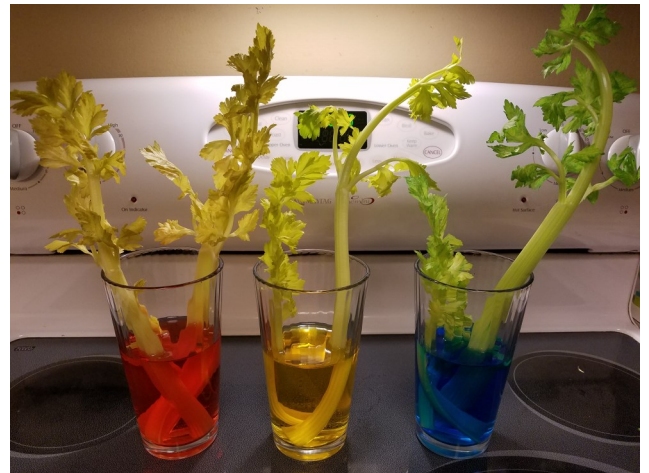
As we walked through Hart’s Woods and considered the vital parts of every tree, we talked about the amazing process of water traveling all the way from the roots up to the leaves against the force of gravity. This movement of water takes place in tiny tubes called **xylem**. Water is able to move up from the roots because of **capillary action** caused by water molecules’ attraction to the xylem walls (**adhesion**) and the water molecules’ attraction to each other (**cohesion**). Another process that causes water to move up the xylem is **transpiration**, whereby water molecules escape from leaves through openings called **stomata**. This causes air pressure inside the xylem to decrease — just like when you suck the air out of a straw — causing the liquid in the straw to rise.



This movement of water from the roots to the leaves through the xylem by capillary action is present in all vascular plants in addition to trees. Let’s try a little experiment to see if we can see the xylem in action in a celery stalk:

Directions:

1. Fill a cup (one that will not tip over) about ½ full with water. Add 5-10 drops of dark food coloring, such as red or blue, and stir.
2. Take a stalk of celery with leaves attached, and with adult help, cut a small piece off the bottom of the stalk. Place the stalk into the cup.
3. Wait 24 hours!
4. Observe any changes that have occurred in the celery leaves. What do you think happened?
5. Now, remove the celery stalk from the water and examine the bottom. What do you see?
6. Finally, with adult help, cut a small piece from the bottom of the celery stalk. Do you observe any tube-like structures tinted by the colored water that could be the xylem in the celery stalk? Did the colored water travel up the stalk into the leaves, just like in a tree?
7. Feel free to leave your experiment up for another few days to see if the leaves change color as more of the colored water is transported to them from the base of the celery stalk.



While our celery experiment seems like a simple illustration of water moving up the celery stalk and into the leaves, the process of water molecules moving through xylem all the way up to the top of a very tall tree is simply amazing. Using capillary action and transpiration, trees defy gravity everyday!





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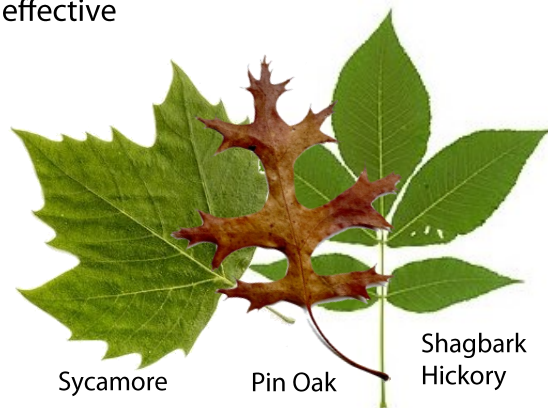
Forests Are Stream Helpers!

Extension Activity for Older Students

In our video about the amazing trees in Hart's Woods Preserve, we mentioned the very important role that forests play in improving stream quality in our watersheds. Trees and other vegetation growing along streams in permanent strips are called **riparian buffers**. Researchers throughout Pennsylvania are encouraging the planting and care of forested buffers as the most effective way to improve water quality in our streams.

Trees and forest buffers along streams help to:

- Stabilize banks by preventing erosion of sediment (soil)
- Slow and filter storm water runoff
- Moderate streamflow and flooding
- Offer shade to cool stream water
- Provide wildlife corridors and habitat
- Enhance biodiversity and overall stream ecology



Which types of native trees are best suited for growing and thriving in the soils around streams? Here are a few examples:

- Wet conditions: Silver Maple, Sycamore, River Birch
- Average conditions: Pin Oak, Honey Locust, Red Maple
- Dry conditions: White Oak, Sassafras, Shagbark Hickory

Go through your camera roll (or get outdoors and take some new photos) and find pictures of rivers and streams. Notice what the banks of the streams and rivers look like, then try ranking them from healthiest to least healthy. Here are a few characteristics of local healthy riparian buffers:

- Lush native vegetation extending 100ft on both sides of stream
- No bare soil exposed
- Gradually sloping stream banks

Activity adapted from 4-H Water Project by PSU Extension

To help on a hands-on tree planting project, sign up to volunteer with Heritage Conservancy by emailing Liz Barmach at ebarmach@heritageconservancy.org



If you would like to learn more about forest buffers and their benefits for streams, you can visit the website of the Stroud Water Research Center at: <https://stroudcenter.org/restoration/streamside-forests/>