

Why Care About Trees and Nature?

Most people don't think much about trees. They provide shade, give birds a place to build nests, and the leaves have pretty colors in autumn. But there is a lot more to know!

Trees are important in the environment

Trees act as anchors to lock soil in place along waterways, such as our creek. They hold the soil with their roots, which prevents bank erosion, and keeps unwanted sediments out of our waters. This helps keep the water clean. Trees, shrubs, and all grasses planted by riversides are called "stream buffers".

There are currently more trees on our planet than there are stars in our own galaxy! Sounds like a lot, but people are cutting down too many, and it is harming the environment. It is good to plant trees!



Trees help keep our stream clean by reducing soil erosion. Photo by Diane Moxley

Orange Humped Oakworm

Photo by Doug Tallamy

Trees can work together...

Nature is always working to be in balance. Animals want to eat trees. The trees don't want to be eaten. Some trees, when threatened by an attack of insects, release special chemical smells into the air called "pheromones". Nearby trees of the same species detect these airborne scents. These pheromones help warn the trees that insects are coming to eat them, and also attract predators that eat the insects! It is like a security system using smells!

Watch out! Caterpillars are coming!

Caterpillars? Sounds delicious!

Trees make sounds!

Trees don't talk, but they do make sounds. Scientists have invented a special microphone, like a "tree stethoscope"! If you hold it up to a tree's trunk, you can hear the water inside as it moves. Water travels from the roots up to the leaves inside special tubes just under the bark called "xylem". It sounds like a low rumble of Rice Krispies popping.





Trees support butterflies and moths, keep cities cool and make us feel good.



Luna Moth Caterpillar Photo by Linda McBride

Trees support butterflies and moths

If we want to have butterflies and moths, we need to have healthy butterfly and moth babies: caterpillars. Oak trees in Virginia support over 500 species (types) of caterpillars.

Without trees, we would not have these beautiful Luna moths. Their caterpillars eat several different types of tree leaves.



Luna Moths Photo by Sheryl Smith

Trees keep cities cool

Remember how nice it was to find a cool and shady spot under a tree on a really hot day? Did you now that housing planners are now including more **"green space"** areas as they design neighborhoods? This helps to reduce the surrounding residential temperatures that are created by our streets, sidewalks, etc. Plus, we have the benefit of a nice place to walk in nature.

This urban area stays cooler, thanks to trees! Photo by Luc Nadal (Creative Commons License)





Nature makes us feel good...

In recent times, society has recognized a steady increase in stress, anxiety and behavioral concerns in both children and adults. Many of these people are suffering **NDD** (<u>Nature Deficit Disorder</u>). Thankfully, the solution is a simple one. **Get outside in nature**. Just 20 minutes a day of being in nature will start to enhance your mindset. Feel the sun on your skin. Listen to birds or water trickling in the creek. Watch clouds drift by. It may feel difficult to get started, but the benefits will reward your spirit greatly.



Trees give us air to breathe, feed baby trees, and are a part of our history!



Trees give us air to breathe

We breathe in oxygen(O2) and breather out carbon dioxide (CO2). Trees do the exact opposite. They take in carbon dioxide, and give off oxygen. In a way you can think of them as having lungs, like we do. Only their lungs are considered the "green lungs of the Earth".

They produce oxygen for us to breathe. Plus, they act like carbon dioxide vacuum cleaners helping to suck up CO2 from the air. CO2 is a worry in the atmosphere. It is a greenhouse gas. It contributes to global warning.

Photo by Msact, CC3.0 license, adapted by Shelyl Smith

Did you know trees can feed baby trees?

In a study of trees in the Pacific Northwest, scientists discovered that mother trees supplied nearby baby trees with food (nutrients)! The nutrients go out through the mother's roots, and into spider-web looking fibers called "mycelium" or "microrhizomes". The mycelium fibers are actually a fungus and not part of the tree! Mycelium fibers connect under-ground to the baby tree's roots and deliver the nutrients.

Photo by Rob Hille, CC3.0

This tree is part of our history...

The Emancipation Oak is Virginia's most famous tree. It is a Southern Live Oak (Quercus Virginiana). It is 200 - 300 years old! It has a canopy 100' wide. It is in the city of Hampton.

This tree is special for two reasons. It is the place where Mary Smith Peake, the first African-American teacher of the American Missionary Association, taught many African-American children and adults during the Civil War. The Union army declared that anyone who made it to Fort Monroe was no longer a slave. It was illegal in the South for enslaved persons to go to school, so Mary Smith Peake started to school for the escaping African-Americans who managed to make their way to Fort Monroe. She held classes under this tree, teaching both children and adults to read and write.

This tree is also very special because, in 1863, it is where the first Southern reading of **President Abraham Lincoln's Emancipation Proclamation** took place. African-American adults and children gathered under the tree to hear Mary Smith Peake read aloud the words that meant no one would be a slave anymore.

National Geographic lists The Emancipation Oak as one of the 10 Great Trees In The World!





Redbud Image from Wikimedia Commons

Pine Image: Rasbak, Gnu License Maple

Image: Fcb981, Gnu License

Why do leaves change color in the autumn?

Trees sense that the days are shorter in the fall, so they prepare for winter. They move the green chlorophyll from the leaves back into the tree branches, where they save it for spring. Once the chlorophyll is gone from the leaf, the other pigment colors are now visible which used to be covered by green! Depending on the pigments, the leaves may turn yellow, orange, red or purple. The trees also absorb the water from the leaves, so they dry out and fall off.

Photo by Diane Moxley

Trees start life as seeds. There are many types of (species) of trees, and each has a different way of packaging seeds. Oaks have acorns, Maples have winged helicopter-style seeds, Sweetgum trees have gumballs, and Apple trees have a soft edible fruit around the seed. The long pine cone pictured here are as big as a man's shoe!



Apples Photo by Eamonn Q Muiri, CCA2.0

> Pecans age by Jerry A. Payne USDA, CCA3.0





Wonderful Life of Trees

The flowers of many trees have both male and female parts in each flower. However, some trees like Gingko and Sassafras are either male or female. For these trees, we need to have at least one male, and one female tree, to produce seeds or fruit! Black Locust Tree Flowers Photo by Linda McBride

Tulip Poplar Flowers Photo by Linda McBride

Trees provide a home for birds, beetles, caterpillars, and other small animals.

Black-capped Chickadees Photo by Diane Moxley

Tree Bark Textures

Three photos below by Diane Moxley







Each year, tree trunks and branches grow wider. The special growing cells that make them wider are just under the bark. These cells mark a new layer twice a year: a wide one in the spring to carry lots of water, and a narrow one in the fall to carry less water. The narrow fall layers tend to be darker in color than the wider spring layers. When we cut down a tree or cut off a branch, we see these layers as rings of light and dark wood. They are called annual rings, and we can tell how old a tree is by counting them.

Image by Arnoldius, CC-by-sa-2.5



Wonderful Life of Trees

Flowers and Seeds:

Flowers and seeds are used by the trees to reproduce (make more trees). Flowers and seeds can be many different colors, shapes and sizes!





Each leaf is like a tiny solar panel. *Chlorophyll* in the leaves (which makes them look green) absorbs sunlight. The leaves combine the energy of the sun with water and nutrients from the ground to make food for the tree (sugar). This amazing process is called *photosynthesis*.

Branches and Trunk:

The branches and trunk support the tree so the leaves can absorb sunlight. They are also the tree's plumbing system: they bring water and nutrients up to the leaves, and distribute the food made by the leaves.

Bark:

The branches and trunk are covered with a protective layer called bark, which keeps out insects and diseases, just like human skin. It expands each year as the tree grows wider. Bark can be rough, smooth or lumpy!



Tree Annual Rings Photo by Arnoldius, CC-by-ssa-2.5

Photo by Mohamed Nimhas, Vecteezy.com

Roots:

The roots are like an anchor to hold the tree in the soil. They absorb the water and nutrients to feed the tree, and sometimes pass on nutrients to other trees. They store the food created by the leaves.