TREES

NATURE'S MACHINES

How do trees work?

What do trees do for us?

Created by **TREES** *louisville* in partnership with **msd** Safe, clean waterways

Trees do a lot of hard work.

Stand under the shade of a tree on a hot summer day, and you'll instantly feel cooler -- without even needing to turn on an air conditioner. A tree's leaves help filter pollution from the air, and trees produce oxygen which we require to breathe!

Many different kinds of birds, insects and other animals call trees their home, a place where they can find shelter and food. Trees even act a bit like sponges, sucking up and storing lots of water during rainstorms, which prevents flooding. And the fruit you like to eat (apples, pears, cherries and peaches, to name a few) -- all of it is produced by trees.

Thanks to the hard work of trees, we gain many benefits, and those benefits can be calculated into actual numbers -- dollars, pounds, gallons and degrees. Some types of trees may "work" harder than others, meaning the value of their benefits is higher.

So what's a tree worth? A recent study found that Louisville's current tree canopy provides us with $330 million worth of benefits <u>each year</u>.

In this study, you'll learn how to gather all the information you need to determine how much a tree is really worth to us and to the environment.

Steps to identifying tree benefits

1. Using your tree identification guide, determine the species of your tree.

2. Using your measuring tape, measure in inches the diameter of the tree at a point about 4 feet from ground level.

3. Calculate an estimate of the ecosystem benefits that this tree provides using the National Tree Benefit Calculator.

4. Share a write-up about the tree you measured, why you chose it and what its benefits mean to you.

5. Monitor the tree over the course of the year to observe any changes.

* Bonus! - Learn more about your tree using other online resources.

Step 1: Identify

First, <u>select the tree that you would like to study</u>. Then, open your tree identification guide. We'll use this to determine the species of your tree.

At the beginning of the tree guide, <u>select the image that most closely resembles the shape of the leaves on your tree</u>. Once you have found it, follow the guide to the page and letter indicated on the right-hand side. Keep following the steps until you have found the image of the tree species in your book that matches your selected tree.

My tree is a: _____

Page number: _____

Step 2: Measure

Because the amount of ecosystem benefits a tree provides depends on the size of the tree, we need to measure the tree in order to determine these values.

The most common measurement of a tree is the diameter of the trunk. Near the base of the trunk (where the tree meets the soil), trees have what is called a <u>root flare</u>. Due to the root flare, it makes sense to measure above the base of the tree trunk. Therefore, it is most common to measure the tree at a height of about 4.5 feet from the ground (approximately chest or shoulder height).

While having a partner hold the end of the measuring tape in one spot against the tree, wrap the tape around the tree, making sure the tape is at the same height all the way around. Record the number that lines up with zero on the tape. This number is the <u>circumference</u> of the tree.

Using geometry, you can convert the circumference to diameter.

$$\text{diameter} = \text{circumference} / \pi$$

The circumference of my tree is _____ inches.

The diameter of my tree is _____ inches.

Step 3: Estimate

Now that you have found your tree's species and tree diameter, you will be able to calculate the benefits your tree provides to the environment.

The National Tree Benefit Calculator is a great tool to estimate several ecosystem benefits provided by trees. To find the tool, visit:

http://www.treebenefits.com/calculator/

1. Enter your ZIP code (ecosystem benefits are calculated for specific climate zones based on ZIP code).

2. Select the tree species which you identified in Step 1*.

3. Enter your tree's diameter (diameter-at-breast-height) in inches.

4. Select the "land-use type" nearest your tree. (Hint: for a school campus, you may want to select "small commercial business")

5. Click "Calculate".

* If your tree species is not on the list, you can use one of the "other" categories.

Tree Benefit Results

Tree Species_____

Size_____in.

Overall Benefits: $_____

Stormwater intercepted: _____ gal

Energy conserved: _____kWh

Carbon dioxide reduction: _____lbs

Step 4: Share

It's time to get creative and share your work!

1. Take a picture of your group with the tree. As the tree grows, you'll be able to look back at this picture and see how the tree has changed over time.

2. Complete a short write-up about your tree. You could include:

- Why you chose this tree
- What you have learned about why trees are important to the environment
- What you could do to help others understand the benefits of trees

3. Share your photo on Twitter using the hashtag #treeslouisville for the world to see!

You can also email your photos and stories to info@treeslouisville.org and we will post them on the TreesLouisville website.

Step 5: Monitor

Pay attention to your tree! It would be very hard (and probably boring) to watch the tree grow. Instead, check on your tree every so often and see how it changes.

Things to consider about your tree:
In what shape (form) does your tree grow? Are leaves budding in spring, flowers blooming in summer, or leaves changing color in fall? Has a wind or ice storm broken any branches from your tree? Do squirrels, birds, or any other creatures make a home in your tree?

Tree form: _____ (refer to diagram)

Fruit/seeds:_____

_____

Animals/insects:_____

_____

Resources

Would you like to learn more about your tree, or other trees? There are a number of resources to help you identify and study trees in your neighborhood.

Leafsnap is a free smartphone app that allows you to identify a tree by snapping a photo of the tree's leaves. www.leafsnap.com

Arbor Day Foundation has a digital version of the tree identification book on their website: https://www.arborday.org/trees/whatTree/whatTree.cfm?ItemID=E6A

NC State University has a reading about the environmental, personal, social and community benefits of trees.
https://projects.ncsu.edu/project/treesofstrength/benefits.htm

Tree Forms

Trees come in many different shapes and sizes.
Find the tree form that best matches your tree.

TREE FORMS

ROUND   SPREADING   PYRAMIDAL

OVAL   CONICAL   VASE   COLUMNAR

OPEN   WEEPING   IRREGULAR