**The “Hidden” Forest**

**Objective**

Students will define urban forestry, list some values of urban forests, and calculate ecosystem benefits and other values of trees on their school grounds (or other local property.)

**Standards of Learning:** Science 6.1, 6.9, LS.1, LS.4, LS.6, LS.9. LS.11, BIO.1, BIO.6, BIO.8

(Also 4.5, 4.9, and 5.1, but this lesson is designed for grades 6+)

**Materials**

Forest Land Assessment map (see last page of lesson)

Common Native Trees of Virginia, or other tree identification guides or apps

Flexible measuring tapes

Calculators

Clipboards, paper, pencils

Computers to access National Tree Benefits Calculator (<http://www.treebenefits.com/calculator/>) (free program)

**Background**

Although the Forest Cover Types map shows general forest types occurring all over the state, we know from looking at the Forest Land Assessment that not all areas are actually forested. Urban areas (cities and towns) are shown on the map as red or pink patches, while rural forests show as green. Does this mean there are no trees in urban areas? On the contrary, there are many small patches of woodland, parks, street trees, and home landscapes that make up Virginia’s urban forest. On a map of this scale, these urban forests are a hidden treasure.

Like trees in larger forests, urban trees provide many benefits to the ecosystem. They produce oxygen and remove some types of pollution from the air. By taking in carbon dioxide and storing its carbon in their cells, they keep some of this greenhouse gas out of the atmosphere. Trees absorb excess rainwater, helping to prevent flooding. This is especially important in urban areas, where there are lots of impermeable surfaces like roads, parking lots, and rooftops. Trees planted near a stream can filter out sediment and pollutants from urban land use. And, of course, trees provide habitat – food, shelter, and breeding space - for many types of wildlife that might not otherwise be able to live in cities.

Although urban trees are seldom harvested for wood products, they have great economic benefits as they grow. Planting trees strategically near buildings can provide shade or buffer the wind, reducing winter heating and/or summer cooling costs for the building. Trees also increase the value of a home, sometimes adding as much as 20% to property values. People enjoy looking at and walking under trees. Studies have demonstrated that sick people who can see trees from their window get better faster. Other studies have shown that people shop longer in shopping areas with trees. Urban areas with more tree cover tend to be cooler in summer than those with fewer trees. Trees can even shade the cars in a parking lot, keeping them cooler in summer.

**Activity**

In the schoolyard (or other nearby developed site with some trees):

Decide on the boundaries of your study area: the whole schoolyard, or a smaller delineated area close to the building/parking areas. Subdivide the site into sections, and assign teams or pairs of students to each section. Teams should use field guides, keys, or apps to identify each tree in their section by species. They should also measure the diameter of each tree they identify. (To calculate diameter, measure circumference at 4.5 feet above the ground using a flexible tape measure, and divide by pi.)

In the classroom:

Using their species and diameter measurement data, have each team use the National Tree Benefits Calculator (<http://www.treebenefits.com/calculator/>) to estimate the benefits of the trees in their study area. This program is free and very easy to use. (Note that “school” is not listed as a location choice, so you may want to use “small commercial business.”)

Teams should tally the overall value of their trees, as well as the values from CO2 and stormwater categories (and others if you choose). Tally the results from all teams to estimate the total benefits of trees in the schoolyard.

**Questions for Review and Discussion**

* What were some characteristics of the “most valuable” trees? Was species important? Was size important?
* What other benefits do trees provide in an urban landscape?
* What would be some benefits of planting more trees on your school property? What costs would the school incur in planting and maintaining more trees?
* Which of the calculated benefits might also be provided by other types of plants (shrubs, flowers, etc.)? How do you think these plants would compare with trees in terms of the benefits they provide?

**Optional Enrichment**

Write a letter to your school administrators outlining the benefits of trees on your school grounds. If you believe more trees should be planted there, explain your reasons.

Create a poster about the value of trees on the school grounds. Display it on a bulletin board that everyone at school can see.

Repeat this analysis on a different “developed” site, such as a home landscape or park. Compare and contrast the benefits of trees on this site with those on your school site.

Consider applying as a school for a tree-planting grant from the Virginia Trees for Clean Water program (<http://dof.virginia.gov/business/bids.htm>.)

*Lesson plan developed by Ellen Powell, Virginia Dept. of Forestry*

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