Seed to Superlative Trees

Investigative Questions: What are some of the biggest/tallest/largest trees in Virginia? How do the biggest trees begin their life cycles?

NOTE: This activity was generated based on student assessment questions asking about what trees are the biggest/tallest/oldest and about plant life cycles, especially for trees.

Goal: Students learn about tree life cycles as they make observations about seeds, seedlings, and mature tree. Students compare heights and diameter at breast height (in terms of perimeter) of "superlative" trees of the Arboretum (and of VA).

Objectives

Knowledge: By comparing the sizes of seeds from an oak, dogwood, ginkgo, horse chestnut, hackberry, and dawn redwood with the tree's potential height, students will realize that seed size does not correlate to tree size.
Skills: Students develop measuring skills as they compare and contrast the sizes of common Arboretum tree seeds, seedlings, and mature trees. Students select and use appropriate tools to measure a tree seed, seedling, and mature tree. They will make and record observations on datasheets and compare their data with the data for other trees.
Value: There are many trees species in VA; the largest/tallest trees can vary by species (for example, a dogwood tree is a small tree where a chestnut is a very tall tree).

Virginia SOL: Science (2018) 3.7, 3.8; Math (2016) 3.7, 3.15; English 3.1; Soc Studies 3.6

Special Safety: Be CAREFUL with baby saplings! You don't want your students to harm them as they are measuring.
Be sure that the older trees do not have poison ivy growing on their trunks.

Materials
- Measuring tools (Rulers, 50-meter field tapes, tailor's tapes—cloth measuring tapes)
- Data sheet, clipboard, and pencil for each group
- Big Trees of Virginia table (make sure the species names match the trees the students are investigating)
- Trees- (At Blandy we selected Dawn redwood, dogwood, chestnut oak, buckeye, ginkgo, and hackberry)
    - Seeds from each tree species selected.
    - Seedlings or young trees of each species (Blandy's were sourced from the greenhouse)
    - Mature example on grounds

    *See **Modification for the Classroom** (bottom of this lesson) for tips on using trees at your school

Instructional Strategy
1. <u>Introduction:</u> Many students wonder about what the tallest or largest trees in the world are. In this activity, we learn about tree life cycles and learn about some of the largest trees in Virginia.
2. <u>Inquire:</u> Review a tree life cycle. Do small trees look like adult trees? Relate it to frog or butterfly life cycles. How do all trees begin? They come from seeds. Are all seeds the same size? Do you think that the seed's size determines what the mature tree size will be? (Give example of size of redwood seed and height of largest specimen. Each redwood seed is about the size of a tomato or pepper seed.) Like animals, trees have life cycles. They begin as seeds that grow into small trees and then mature trees that make seeds to start the cycle again.
3. <u>Ask:</u> Do you recall that there are many, many different types of trees? We can learn about the biggest trees in the world or the oldest trees in the world but they may grow far from us. Instead, let's learn about the largest trees in Virginia (trees that you could easily visit!). Researchers and people that own houses and land measure the height and trunk perimeter of their trees. They vote on a tree to be a champion tree (Inquire: What does the word champion mean? Gather a definition of "champion" from students and then explain that champion trees are the

best examples of a particular type of tree.) Scientists then collect this information to figure out the champion trees of each species in Virginia!

4. <u>Life cycles</u>: Review tree life cycles with students. Explain to students they are going to study tree seed size, what the seedling looks like (warn students, just like young animals – young plants are very fragile and need to be treated as gently as a cute baby mammal), and how tall the largest specimen of this tree species is in Virginia is.

5. <u>Superlatives/Champions</u>:
   a. Break into no more than six groups, assigning each to a species. Each group gathers supplies (clipboard, paper, rulers). Each group member will measure and then draw the seed on their data sheet.
   b. Next, investigate their seedling by measuring the height from the soil to the top of the seedling. Record this information. Also, try to measure the perimeter of the small seedling (remind students that they did this in their schoolyard during the previous visit). Please be very careful with the baby trees!
   c. Next, using the Big Trees of Virginia table; find the name of your tree to record the height of the largest tree of **that** species in Virginia on the datasheet.
   d. Working in a team, use the meter tapes to measure the height of the tree, (along Dogwood Lane at Blandy) along the ground. Remember to place a flag to mark the base and top of your tree!
   e. Extension: Each group measures out the trunk perimeter of the largest tree (Depending on time).

6. <u>Compare</u>: Once each group has measured out their tree species, compare the largest tree heights.

7. <u>Discussion & Conclusion</u>: Compare the tallest dogwood to the tallest chestnut oak. Why is the dogwood tree so much smaller? It is adapted to live in the understory or a lower layer of the forest. It can be the largest or tallest of its kind even though it is small when it compares to different tree species. Does a bigger seed mean the tree will be bigger? Compare the dogwood seed to the acorn seed to the dawn redwood seed.

8. <u>Optional</u>: If time permits, ask each group to share something interesting about their tree that they learned or observed.

*Modification for the Classroom:
A. If you have trees in your schoolyard, determine the species of the trees to generate a list from the Big Tree online database. http://bigtree.cnre.vt.edu/
B. Use your schoolyard trees and the data to modify the Big Trees table on the student data sheet.
C. For seeds and sapling/seedlings, consult with a nursery, local park/arboretum/museum to ask if they will loan or donate seeds and saplings.

Big Trees of Virginia

Name(s) _____

Common Name	Scientific Name	City or County	Height (feet)	Perimeter (inches)
Ginkgo	Ginkgo biloba	Loudoun	103	182
Hackberry	Celtis occidentalis	Fairfax	124	167
Buckeye	Aesculus flava	Tazewell	104	202
Dogwood	Cornus florida	Middlesex	47	67
Chestnut Oak	Quercus montana (syn. Quercus prinus)	Fairfax	146	222
Dawn Redwood	Metasequoia glyptostroboides	City of Falls Church	122	130

http://bigtree.cnre.vt.edu/bigtree/

Tree Name		
Measure the seed	In	Cm
Draw the seed		
Height of sapling/seedling	In	Cm
Height of tallest of <u>your type</u> in VA (Look at the 'Big Trees' table)		Feet
Perimeter of the largest of <u>your type</u> of tree in VA	In	Cm

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