

Title of Lesson Plan	Calculating Volume in the Forest
Prepared By	Vincent Marchese
City and State	Boonton, New Jersey
Grade Level (s)	8
Keywords (subjects covered)	Diameter, cylinder, volume, Biltmore stick
Brief Description	Students will learn that calculating the volume of cylinders does indeed have definite real life applications. Using their previous knowledge of calculating volumes students will be asked to apply this knowledge in calculating the volume of trees.
Total Time Required	80 minutes
Setting	Classroom/Outdoors
Lesson Objectives/Goals	<ul style="list-style-type: none"> • Students will be able to calculate the volume of cylinders using the given formula of $v = \pi r^2 h$ • Students will be able to identify why calculating the volume of cylinders is needed by a forester.
Materials Needed	Biltmore Stick, How to Measure Tree Instructions
Standards Addressed	NJCCCS: 4.2E3, 4.2E4, 4.5A1, 4.5A2
Procedure	<p>Introduction</p> <ol style="list-style-type: none"> 1. Students will initially be given a set of 3 reinforcement practice problems on calculating the volume of a cylinder. 2. Problems will be discussed and gone over as a class. 3. Students will then be asked when else would they ever need to find volumes of cylinders outside of the classroom? (Discuss) <p>Exploration</p> <ol style="list-style-type: none"> 1. Students will finally be told that foresters calculate volume when determining how much wood can actually be used from a cut down tree. 2. Students then will be given a table citing instructions on how they actually do this. 3. Directions will be discussed in depth so students know precisely how to measure diameter at breast height on the tree's high side, as well as how far they must stand away and how to hold the Biltmore stick. 4. When outside measuring the trees students will be asked to measure both the diameter and height of the tree using the Biltmore stick into inches (1 unit on stick = 16 feet). 5. They must measure at least 2 trees and diagram each tree providing important information including the radius, diameter and height as well as their final answer for volume.

	<p>Conclusion</p> <ol style="list-style-type: none"> 1. Students will come together as a class and answer a series of questions. 2. They will identify the formula for volume as well as an explanation of how the formula is actually used. Students will then relate how volume is an important tool for any forester.
Assessment	Students will be given paper with a tree drawn on it and its height and diameter given to them. Students will calculate the volume of the tree and then using their table they will identify how much board feet can be derived from the tree.
Literature Cited/References	Measuring Instructions http://ohioline.osu.edu/for-fact/0035.html
Forestry Tour Attended	Northeast 2008