

Title of Lesson Plan	Creating a Basal Area Measuring Tape
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City and State	New Buffalo, Michigan
Grade Level(s)	9-12 Science Applications Course for the Michigan Environthon
Keywords (subjects covered)	Forest Plots, productivity, biomass, board foot calculations, diameter, circumference, basal area, diameter breast height (dbh)
Brief Description	Students will create basal area measuring tapes that they will later use to determine Woodlot Stocking Levels
Total Time Required	72 minutes (one class)
Setting	Students will work in the classroom for the 1 st 72 minute class developing their basal area measuring tapes.
Lesson Objectives/ Goals	<ol style="list-style-type: none"> 1. Students will be able to use diameter and the formula for circumference to design and create a table between them. 2. Students will add a third column to the table with the calculation of basal area. The surface area will be in square feet while the tree diameter will be in inches. This table will allow students to create a measuring tape they can use at breast height to measure tree diameter and basal area.
Materials Needed	Paper, pencil, calculator, 9' long cloth strips and permanent markers.
Standards Addressed	Math Standard
Procedure	<p>Students will be lead through the following inquiry process questions.</p> <ol style="list-style-type: none"> 1. How could you compare two plots of a forest? 2. Could you determine which plot is more productive or profitable? 3. Would the biomass of the forest be related to the profitability of the forest? How? 4. How might you be able to measure the amount of biomass in the forest? 5. Measuring the diameter of a tree would be helpful, but the basal area is the standard for the biomass of a forest. How could we develop a measuring tape that could give both the diameter of the tree for board footage calculations and the basal area in square feet for biomass calculations? <p>Show the students how to develop a table in 1" increments of diameter, the corresponding circumference, and then the basal area in square foot measurements. The conversion $BA = .005454 * d^2$ may be necessary for the conversion to square feet from diameter.</p> <p>Advanced mathematics students will be challenged for extra credit to derive the conversion from know values.</p>
Assessment	Data table and measuring tapes of students will be collected and checked for accuracy and completion.

Literature Cited/References	http://www.sfrc.ufl.edu/Extension/florida_forestry_information/forest_management/site_quality_and_stand_density.html
Forestry Tour	Lake States 2008

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