MONTANA STATE UNIVERSITY
EXTENSION
Forestry Program

PROJECT LEARNING TREE® MONTANA

Determine the number board feet in your tree

The forester measures the tree diameter and the tree height. From these two measurements a forester can determine how much lumber is in a tree, and thereby predict how much wood is in a particular timber area. The unit of wood that a forester wants to know is called a 'board foot'. A board foot is one foot by one foot by one inch thick.

Vocabulary

board foot (BF): a piece of wood one foot by one foot by one inch.

cubic foot (sq.ft.): a piece of wood one foot by one foot by one foot.

DBH: tree diameter at breast height considered to be 4.5 feet from the ground.

circumference (C): length around a circle.

diameter (D): measure of a straight line segment that passes through the center of a circle.

radius (r): one half the diameter of a circle.

pi (π) : The mathematical constant that is the ratio of the circle's circumference to its diameter or 3.14.

area (A): measurement of a surface.

volume (V): the amount of 3-dimensional space on object occupies.

--DBH - 4.5 feet

Procedure

1. Measure the DBH of your tree. Circumference in inches divided by pi ($\pi = 3.14$) or use a diameter tape (C/π = DBH).

2. Measure the height of your tree in feet.

3. Find the radius of the tree (r = DBH/2). Divide the DBH by 2. Convert the units from inches into feet by dividing by 12 (r = DBH/2/12).

4. Find the area of the cross-section of your tree at DBH (A = πr^2).

5. Find the volume of the tree in cubic feet (V = A x height/4). Note: 4 is used to account for the taper of the tree.

6. Find the board foot volume of the tree. Divide the cubic feet by 12 (BF = V/12). Note: Foresters usually use a conversion factor of 6 or 7 instead of 12 to provide for kurf, loss from saw dust, etc., during the cutting process.

circumference

diameter
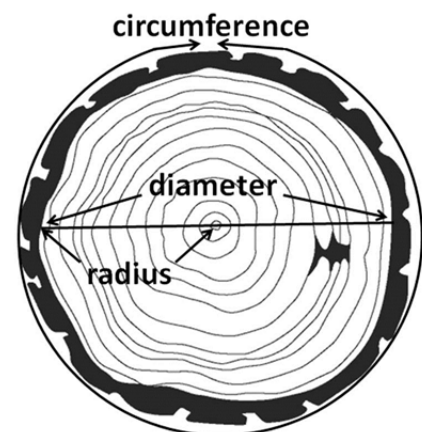
radius

Board Footage Data Sheet

Tree # _____
Tree species: _____

1. Height _____ feet.

2. DBH _____ inches: (DBH=Cπ) = circumference _____ inches x 3.14 = _____ inches DBH.

3. Radius in feet: DBH _____ inches _____ /2 = _____ inch radius/12 = _____ foot radius.

4. Area of tree cross-section: $(A=\pi r^2)$ = 3.14 x (_____foot radius x _____ foot radius) =_____ sq.ft. radius.

5. Volume of tree in cubic feet: (V=Ah/4) _____ sq. ft. radius x tree height/4 = _____ cu.ft.

6. Volume of tree in board feet: (V/12) = _____ cu.ft. x 12 = _____ board feet.

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