

TIMBER RESOURCE LEADER'S GUIDE

OBJECTIVES:

After completing this activity students will be able to:

- List several reasons why trees are important
- Describe what trees need to grow
- Explain the concept of tolerance as it pertains to trees
- Describe succession and be able to hypothesize (imagine) how forest areas change with and without active management
- Use forestry tools to measure trees
- Calculate tree volume per acre by sampling
- Determine the timber resource value
- Discover how they can use math and science skills to practice forest management

Context for this activity: The students should have studied vocabulary terms (DBH, succession, tolerance, etc.) and discussed the sampling process as part of their classroom preparation for Forest Field Day. While at this station, the students should learn what trees need to grow well, how the trees are presently growing, and how the forest changes over time. They will collect the data needed to estimate the volume and value of the timber growing on their recently inherited property. They will use this data back in the classroom to complete several worksheets and ultimately develop their management plan.

PROCEDURE:

(Feel free to vary the suggested order for the discussion topics, but be sure each is covered during the 50-minute session.)

1. Ask students why they think trees are important? (2-3 minutes)
*Clean the air, beauty, provide food and shelter for animals, shade, medicine, wood for thousands of products .
Emphasize that trees are renewable — we can grow more trees.*
2. Ask students what trees need to grow? (1-2 minutes)
Water, sunlight, nutrients, carbon dioxide
3. Ask students what kind of trees they think the big trees are. What about the little trees in the understory? (3-5 minutes)
Points to make:
 - a) *Most of the big trees are Douglas-fir which need plenty of sunshine to grow well. Trees in the understory are likely hemlock and others that can tolerate the shade — Douglas-fir can't. If there is a suppressed DF seedling near your plot, point out the poor growth.*
 - b) *Different types of trees grow in different places — different trees, like different animals, can tolerate different environmental conditions.*
 - c) *If the students choose to harvest trees as part of their management plan, they will have to replant — it's the law!*
4. Ask the students what they think this place might have looked like 70 years ago when Grandma Petersen was their age. (3-5 minutes)
 - *The Bauman property was purchased by the family in the 1940s. The timber stand which students are measuring was once a hay field, but now contains trees about 25 years old.*
 - *Point out that forests are continually changing. Ecologists call this change succession.*
 - *Because the forest is always changing, so are the types of animals that live in the forest.*

If the students choose to harvest trees soon they must replant, which will insure they have a forest like this by the time they get to be Grandma's age. With good management, the trees can be even bigger.

5. Have the students use a sample plot and measure the trees to find out how big they are and how well they are growing. (25-30 minutes)

Select a pre-designated plot center (*aim for 12-15 trees on your plot*).

A. On a 1/10 acre circular plot (37.2 feet radius):

- 1) Show the students how to use a diameter tape. Have them measure the diameter of each tree on the plot. They should record DBH to the nearest whole inch on their datasheet, page 8, #2a. If you have time and/or a good math student with a calculator in the group, have them calculate the average diameter of the trees on the plot. (*This can also be done back at school.*)
- 2) Be sure they record the number of trees on the student datasheet, page 9.

B. Help the students select an “average looking” tree as one-tree sample of height.

- 1) Height - measure 100 feet horizontal distance and show the students how to use a clinometer to measure tree height. (*Many students will have a hard time looking through this tool. They aren't used to keeping both of their eyes open.*) Record the tree height on the datasheet, Page 9. (*Sample follows*)
- 2) Age - show the students the increment borer and demonstrate how it is used. Count the rings and record the age on the datasheet, 9. (*On several of our FFD sites, the owners have asked that we not bore the trees. If that is the case, use a chunk for your “boring” demonstration.*) Show how the number of rings tells the tree's age; the size of the rings tells about the environment in which it grew and is growing. Show students that rings start in the middle and that the current year's ring is next to the cambium just inside the bark. Light rings = spring growth; darker rings = summer growth
- 3) If available, show two tree “cookies” of the same age, but different sizes. Ask what may have caused what they see (*competition for water, light, nutrients, climate, insects, or fire.*)
- 4) Relate this back to what trees need to grow. Introduce the idea that trees compete with one another for resources and that the bigger ones get more “goodies ” and dominate the area. The little trees die — this is nature's way of thinning. Foresters often thin trees out to keep the remaining trees healthy and growing well. Point out self thinning if it is occurring on the site.
- 5) Explain that when they figure out how much their forest was growing, they could harvest the amount it grows each year and continue to do that forever!

Spend the last few minutes discussing the forest ... (5 minutes)

SAMPLE STUDENT'S ACTIVITY SHEET

OBJECTIVES:

Students will be able to:

- Describe what trees need to grow.
- Explain the concept of light tolerance as it pertains to trees.
- Describe how succession works.
- Use forestry tools to measure trees.
- Calculate tree volume per acre, and the per value of those trees.

Because it is usually not practical to measure every tree in a forest, foresters take samples and make estimates. The sample plot is a 1/10th of an acre (radius=37.2 ft.) To be able to calculate the volume of the tree we need to count the number of trees and measure the height and diameter of the trees.

1. The dominant tree species is _____

2. How many trees per acre?

_____ **guess**

_____ number of trees in 1/10 acre plot

x _____ (number of plots per acre)

= _____ number of trees per acre

3. What is the average DBH (*Diameter Breast Height measured at 4.5 ft. above the ground*)

_____ **guess**

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____

8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 13. _____ 14. _____

15. _____ 16. _____ 17. _____ 18. _____ 19. _____ 20. _____ 21. _____

Total DBH _____ / _____ # of trees = _____ Avg. DBH

4. Height of average tree

_____ **guess**

Actual height _____

5. Age of average tree

_____ **guess**

_____ years (from core sample)

6. Count the years it took to grow an inch in the last radial.

Rate of growth _____

7. Board Feet per tree _____ (*using avg. DBH and tree height use Volume Table*)

8. Volume of the plot

_____ # trees

x _____ BF per tree

= _____ BF per plot

x _____ BF per acre

9. Value of all the trees on the plot/acre

_____ BF per plot

x \$0.50 per BF (\$500/MBF)

= \$ _____ for the plot

x _____ (#of plots per acre)

= \$ _____ per acre

10. Write your comments on the forest that you see.

a. When Grandma Petersen was my age this area looked like....

b. A suppressed tree is the _____ age of the trees around it, and it is _____. Eventually it will _____.

c. What are some of the management possibilities for this forest?