



# TREE TRAILS

# 1-3

★ SECONDARY ★

## ★ TREE MEASUREMENT ★

Tree measurement is fundamental to the practice of forestry. Foresters count trees and measure trees. With just a few basic measurements, we can assign values to trees and compare them to each other.

### Goal and Objectives

**Goal:** Students will measure trees and explain how measurement is used to place value on trees and forests.

**Objectives:** Students will

1. Apply the forester's tree measurement process to measure a tree.
2. Determine the measurements and condition of their trail trees and enter on the Tree Trails website.
3. Construct the relationship between tree measurement and tree health and value.

### Materials

General

- Tablet(s) or computer(s) with internet access
- Projector and screen
- GPS unit or phone/tablet with location application
- White board or chart paper and markers
- Tree Trails Portfolio, Student Learning Log/Journal

Handouts

- Tree Trails Data Sheet
- Tree Measurement Guidelines

Activity Materials

- Flexible tape measure
- Yard stick
- (Optional) Cameras or camera phones

### Time and Internet Links

Instructional Time: 2-3 sessions, 45 minutes each

- Tree Trails  
[www.treetrails.org](http://www.treetrails.org)



# Instructional Procedures

## I. Engage/Excite

1. Conduct a discussion about measurement. Ask students to name various professions that must use exact and precise measurement to assure their work is exercised without disastrous results. The list may include physicians, transportation engineers, construction workers, aircraft specialists, architects, petrochemical employees, etc. Expand the discussion to include different measurement standards used by different professions. Lead students to generalize that each profession depends on its particular type of measurement design.

*Teacher Tip: Share with students how people once used their bodies (hand and/or arm spans, body height) to measure. Students may have heard that horses may be measured by hand span.*

2. (Optional) Students may have fun generating an illustration, a paragraph, a riddle, etc. about a person who used the wrong measurement for a project. Let students share.
3. Generate a conversation about what type of measurement they think professional foresters use and how they use these instruments for measuring trees. List what they *Know* on a chart/whiteboard or have them add to their Learning Logs.

## II. Explore

1. Inform students that, like other professions, foresters measure trees using a standard process and they will use this same standard to measure their trail trees.
2. Provide each student with the Tree Measurement Guidelines handout. Project the guidelines and have them watch or follow along on their tablets/laptops.

*Teacher Tip: Foresters round down in tree measurements instead of rounding up, because the tree has not yet reached the higher measurement. They keep to whole numbers because of the relative accuracy of repeatability – roughed up bark and even relative humidity can make small differences, as can having the tape measure less than perfectly perpendicular to the centerline of the trunk.*

*Teacher Tip: It may be helpful to practice measuring a tree, circumference, diameter, height and crown spread, before presenting the guidelines to students.*

3. Have students to read the guidelines and watch the demonstration videos on the Tree Trails website. Then follow with a question and answer session.

*Teacher Tip: Students may demonstrate circumference using a cylindrical object. Using the same object, demonstrate diameter and describe how the two measurements are related by the constant, pi.*



### III. Explain

1. Ask why foresters measure trees. List the responses. Coach students to provide as many reasons as possible. Ask students to check their responses to determine if their reasons included: a. tree size as it contributes to its value and benefits; b. continuous measurement over time allows foresters to monitor a tree's rate of growth; c. a tree's condition is an indicator of the tree's response to its environment; d. measurement is used to plan harvesting, make management decisions and calculate timber yield. Have students Include all the reasons why measurement is important in their Learning Logs.

### IV. Extend/Elaborate

1. Have each student retrieve their Tree Trails Data Sheet from their Portfolio and locate the Circumference, Diameter, Crown Spread, Height, and Condition Rating columns. Move the students into their Tree Trail groups. Provide each group with measurements tools. Have students bring their Tree Trail Data Sheet and the Measurement Guidelines with them when they go outside to measure their trees.
2. Ask each group to measure their trail trees as specified in the guidelines and record the information in the appropriate column on their Tree Trail Data Sheet. Have students return to the classroom.
3. Provide the pairs with a laptop/tablet and have them follow along as each step is demonstrated on the projector. Once these steps are completed, closing the data window saves information for the tree.
4. Ask students to notice the left hand side of the screen which lists the annual benefits of the selected trail or tree, either the entire trail or individual trees. This is automatically calculated when the data is entered. Conduct a discussion about the value of their trees. Students may list responses in their Learning Logs.

*Teacher Tip: Module 3 further investigates the annual benefits of trees.*

### V. Evaluate

1. Have students use another method to measure height of a tree. Then compare this method to the first method.

*Teacher Tip: Find links to other methods on the Tree Trails Lesson page.*

2. Conduct a discussion about what they found, *Learned* and enjoyed.



## VI. Extra Mileage/Attention

**Extra Mileage:** Have students work in pairs to write a mathematical word problem related to two or three dimensions of their trail tree and give to another pair to solve. Ask student pairs to analyze how they answered the problem, what helped and what deterred them from getting the answer.

**Extra Attention:** Appoint peer students to accompany students while they take measurements of their trees with their hands and/or arms and let these students present their new measurements in terms of hand span and arm span measurements.

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