



How Tall is Your Tree?

Measuring Tree Height with Different Tools

Participants will investigate and record data about trees by learning how to measure tree height. They will learn how to measure trees using a variety of scientific tools, including a measuring tape, a clinometer, and the GLOBE Observer app.

Purpose

The purpose of this activity is to learn how to collect tree height measurements, which provide information to assist in studying the health of trees, forests, and our planet.

Time

45-60 minutes

Materials

- Build a Clinometer handout and materials
- Paper or journal
- Colored pencils
- Measuring tapes (one per pair of students)
- Smartphone or tablet
 - [Download the free GLOBE Observer app](#) from the App Store or Google Play
- (Optional) Tree identification guide that has good photos and vivid descriptions. For example:
 - *Nature Guide: Trees* by Tony Russell
 - *Ultimate Explorer Field Guide: Trees* by Patricia Daniels
 - *The Tree Book for Kids and Their Grown-Ups* by Gina Ingoglia

Safety

- Locate an area with level ground where you have a clear view of the base and **canopy** of each tree you plan to measure.
- Look for trees with a safe walking path to their base. You may wish to mark the trees with colored ribbon.
- Clear any tripping hazards, look for wasp nests, wear tick protection and appropriate shoes.

Background

Trees cool and moisten our air and fill it with oxygen, thereby helping balance Earth's **carbon** budget. Forests are considered one of the world's largest banks for all of the carbon emitted into the atmosphere through natural processes and human activities. Tree height is the most widely used indicator of an **ecosystem's** ability to grow trees. Observing tree height allows NASA scientists to understand the gain or loss of **biomass** which can inform calculations of the carbon that trees and forests either take in from or release into the atmosphere. Tracking how trees are changing over time can help us estimate the number of trees that make up an area.

What to Do

1. Determine if you wish to measure trees using a clinometer and/or the GLOBE Observer app. You may want to take measurements of the same trees using both the clinometer and the GLOBE Observer app and compare your findings.
2. Watch the [GLOBE Observer Trees Introduction](#) video.
3. Construct clinometers and/or download the GLOBE Observer app.
4. As a warm-up, have each learner use a measuring tape to measure the circumference of their wrist. This may be done with a partner. Have them repeat this 10 times and calculate the average circumference. Have the learners do the same for the circumference of their waist.
5. Have learners make the prediction of how many times larger the circumference of a tree will be than their waist.
6. Measure trees and record data using the data table below. Consider having learners work in pairs and have both pairs measure the same trees multiple times to ensure accuracy.
7. Discuss other observations noted during this activity, such as the types of trees measured and their physical features.
8. Analyze your data table, noticing any patterns or unexpected results.

Questions for Review

1. What can measuring tree height tell us about our local ecosystem?
2. You can determine how precise tree height can be measured by making repeated measurements of the same tree – either by one person, or by several people. How many measurements do you think should be made in order to know if you have a precise measurement? Why?
3. What are the tools for measuring trees and the possible errors between them?

Key Words

Biomass: the total mass of living material above ground measured across a particular area

Biometry: the measuring of living things

Canopy: the branches and leaves of a tree

Carbon: a chemical element found in nature and the atmosphere

Circumference: the distance around something

Clinometer: a tool for measuring the angle or elevation of slopes

Ecosystem: a community of living organisms and nonliving organisms in an environment interacting as a system

Extension Activity

Have each group member predict how tall they are and then measure their height. Make a prediction of how many times taller the tree they measured is than they are.

For a family challenge, estimate how tall the whole family's combined heights would be and compare that to a tree.

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