

Schoolyard Trees- Measuring Trees at different heights

Investigative Question: What are some measurable similarities and differences between and within tree species?

Goals: Student observe and quantify that trees grow in different ways, sometimes impacted by humans.

Objectives

Knowledge: Student measure and define perimeter and describe parts of a tree (trunk, branch, root). Students understand that schoolyard trees can be different heights and have different perimeters.

Skills: Develop measuring skills to measure perimeter at different heights. Students use collected data to analyze and infer about tree growth habits.

Values: Appreciate the variation in tree shape and growth.

Virginia Standards of Learning: Science (2018) 3.1; Math (2016) 3.7, 3.15; English 3.1; Soc Studies 3.6

Materials

- Measuring tools: Meter field tapes, yard sticks, meter sticks, rulers
- String, one spool per group
- Scissors
- Masking tape
- Permanent markers
- 1 field flag for each group
- Calculators (optional)
- Pencils
- 1 data sheet per group
- Clipboards

Special Safety: A day or two before the activity, examine the schoolyard for any tripping hazards. Check for any tree nut allergies in students and for any nut trees in the schoolyard.

Set Up:

- Mark 4-5 different trees with the field flags.
- Place a set of materials at each tree (meter stick, ruler, scissors, masking tape, string, permanent marker, pencil, data sheet on clipboard).
- Activity time is 40 minutes. Extension ideas can add another 45 minute class period.

Instructional strategy:

1. **Introduction** to measuring trees. Why would you want to know how big a tree is? Why would you want to know how long the branches are?
Potential answers. Can I build a tree house in this tree? How high should I build my treehouse? Where should I place my bird feeders or houses to keep squirrels and snakes away?
2. **Discussion:** What types of things can we measure on trees? Why do we measure around the tree at different heights? (to see how the trunk is shaped) How can we compare how big around



different trees are? Why measure the spread/length of branches? Why measure where the lowest branches are located?

Potential answers. Landscape planners and gardeners use these types of tree measurements to design outdoor spaces (like gardens and schoolyards). It's important not to plant a tree that will grow too large for your yard!

3. This activity works best with adult assistance, so having a helper for each group is great, and you can form as many groups as you have adults. If adult supervision is limited, try not to have more than 4 groups. Help students select roles (measurer, recorder, reporter, etc.).
4. **Distribute** data sheets, pencils, permanent markers, tape, and string to each of the groups; have them write group member names on the data sheet immediately. Assign each group a tree and instruct them to write their tree # on the data sheet.
5. **Model** how to measure trees.
 - a. **Measure** at the base of a tree and then at one-foot intervals to a height of 4 feet. For each interval, students measure the trunk by wrapping string around and cutting the string to the tree's perimeter. Using a strip of masking tape, label each string length with the tree number and height from the ground so students can compare their circles. Students then will measure in both US Customary and metric units.
6. Once measurements are completed, student groups **graph** and compare.

Extension

If time permits, students also can measure the heights and lengths of other parts of the trees (see table). You can instruct students to work in groups to convert from inches to centimeters.

1. Measure the height of the lowest branch (starting from the ground) and the lowest branch scar on the tree. Record this on data sheet.
2. Transfer this information to the class data sheet. Discuss as a class (does one species have lower branches than another? Why do you think the lower branches are trimmed?)
3. Do you notice any pattern(s) in the way the branches are arranged on the trunk OR the way the leaf scars are arranged on the twig/branch?

Tree _____	Measure Height	
	in	cm
Distance from ground to first branch		
Distance from ground to first branch scar		
Length of branch from trunk to tip/end		

Example of data sheet for extension



Schoolyard Trees: How do they grow?

Tree Number _____

Researchers' Names _____

Tree _____	Measure Trunk Perimeter
At ground level (0 feet)	in
At 1 foot	in
At 2 feet	in
At 3 feet	in
At 4 feet	in

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