

## Schoolyard Trees- How do they grow?

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

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

**Objectives:** Students will measure the distance from ground to first branch and from ground to the first branch scar. Students will identify growth patterns in tree species. Students will use collected data to analyze and infer about tree growth habits.

**Knowledge:** Define perimeter and describe parts of a tree.

**Skills:** Develop measuring skills to measure perimeter at different heights. Collect and analyze data.

**Value:** Schoolyard trees can be different heights and have different perimeters. Trees can also be affected by human care and management.

Virginia Standards of Learning: Math 3.17, 3.14, 3.9

### Materials

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

**Special Safety:** A day or two before the activity, examine 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 flags.
- Place 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.

### Procedure:

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?
  - a. How high to build a treehouse, if you can build a treehouse on a tree are two awesome examples!  
Where to place their bird feeders or houses to keep squirrels and snakes away!
2. **Discussion:** What 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 of branches? Why measure where the lowest branches are located?
  - a. Landscape planners and gardeners use measurements to design outdoor spaces (like gardens and schoolyards).
3. **Divide students into groups:** This activity works best with adult assistance, so having a helper for each group is great, and you can have as many groups as you do adults. If not, try not to have more than 4 groups. Help students select roles (measurer, quartermaster, recorder, reporter, etc.).
4. **Distribute** data sheets, pencils, permanent markers, tape, and string to each of the groups; have them write



group member names 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 (Math 3.14). Students then will measure in both US Customary and metric (Math 3.9).
6. Once measurements are completed, student groups **graph** and compare (Math 3.17).
7. Next, measure the height of the lowest branch and lowest branch scar on the tree. Record this on data sheet.
8. Transfer this information to the class data sheet. Discuss as a class (does one species have lower branches than another? Why are the lower branches trimmed?)
9. 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 (3.19)?

### Extension

If time permits, students can also measure the heights and lengths of the following parts of the trees (see table).

You can instruct students to work in groups to convert from inches to centimeters.

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



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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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