

Measuring Tree Circumference



Submitted By:

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Overview

Tree circumference is typically measured at 4 ½ feet above ground level. Variations to this standard measurement apply if the tree forks, is leaning, is on a slope, or if other circumstances exist. In this activity, students will use either standard and/or non-standard measurement to determine the circumference of trees being studied in the Phenology Project then compare their measurements.

Grade Levels

K-2

Curriculum Correlation

K: K.CC.4, K.CC.5, K.CC.6, K.CC.7, K.MD.1, K.MD.2 First: 1NBT.2, 1NBT.3, 1.MD.1, 1.MD.2
Second: 2OA.1, 2NBT.5, 2NBT.9, 2MD.1, 2MD.2, 2MD.3, 2MD.4, 2MD.5

Duration

45 – 60 minutes

Location

Indoors and Outdoors

Materials

- Tree Identification Field Guide
- Measuring tape (inches and/or centimeters)
- String, yarn or other flexible material
- Tree caliper (optional)
- Binoculars
- Clipboard
- Recording sheet

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Educators Information

The measurement of tree circumference or girth is the distance around the tree. It would be helpful for students to distinguish between the measurement of circumference and diameter. Circumference is the measurement around the outside of a circle or round object while diameter is the measurement across the center. A tree caliper is a tool used to measure the diameter of a tree. This measurement can then be converted to circumference.



Procedure

ENGAGEMENT

- The teacher will ask students to consider the trees they have “adopted” for their Phenology Project and how they can compare/contrast the different tree species.
- Ask students to think about how the trees are alike/different.

EXPLORATION

- What observations have we been making during our Phenology Project?
- Have students brainstorm a list of observable characteristics of the trees in the study.
- How can you compare the sizes of the trees we are studying?
- Students will work with a partner to determine ways to measure the circumference or girth of the trees in their study.
- What tools would be useful for this measurement activity?
- Provide a variety of suggested tools for students to use when measuring.
- Students will go outside to take measurements of the trees they are observing in their study.
- Students will record and compare/contrast the measurements of trees when they return indoors. A variety of measuring tools such as unifix cubes, rulers, square inch tiles, etc. can be made available for students to make comparisons.

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EXPLANATION

- What does circumference measure?
- Are there any things we need to consider when comparing circumferences of the trees we will measure?
- How can you make sure your measurement technique is consistent from tree to tree?
- If a tree caliper is used to measure the diameter of the tree trunk, how can this measurement be converted to circumference?

ELABORATION

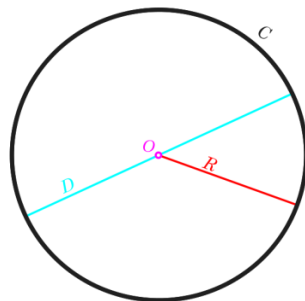
- Introduce students to the following vocabulary:

Standard measurement – uses tools such as a ruler, measuring tape, yard or meter stick to measure objects in units of inches, centimeters, feet, meters, or yards

Non-standard measurement – uses tools such as string, yarn, cubes, etc. to measure objects

Circumference – the distance around a circle or round object

Diameter – the distance through the center of a circle or round object



- Share the links in the resources, displaying the technique to measure tree circumference on a SMART Board.

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The activity can be differentiated for children in grades K-2 as follows:

Kindergarten and first grade students can use non-standard tools such as yarn, string or other flexible material to measure the circumference of the trees. Second grade students can use a measuring tape or tree caliper to measure. If a tree caliper is used, the circumference can be determined using the formula $C = \pi d$ ($\pi = 3.1416$ and $d = \text{diameter}$).

EVALUATION

- Students will compare the measurements of the trees and record which is the biggest and smallest.
- Students using non-standard units of measure such as string, can use snap cubes to measure the length of string. Comparisons can then be made among the number of snap cubes it took to measure each tree.
- This activity could be extended to include a place value lesson where students put the cubes in groups of ten using ten frames with leftovers.
- For second grade students, a line plot could be created to make comparisons among the different tree circumferences.



Extensions

Another way to adapt this activity to align with math standards would be to count the number of flowers and/or seeds on trees. Students could then put them into groups of tens and leftover ones for a place value lesson.

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Resources

- <http://ncforestservice.gov/Urban/pdf/Howtomeasureachampiontree.pdf>
- <http://homeguides.sfgate.com/figure-out-circumference-tree-35761.html>
- <http://www.wikihow.com/Calculate-the-Circumference-of-a-Circle>