

# Resources for Remote Learning

## Science Explorations: Backyard Forestry



**MUDDY SNEAKERS**  
THE JOY OF LEARNING OUTSIDE

### Backyard Forestry

Before you start, make sure you have these materials handy:

- Journaling supplies
- String
- Tape measure, ruler, or yardstick
- A tree whose shadow you can see and measure

On a sunny day, find a tree whose shadow you can see. Before you collect data about the tree, collect data about yourself! You'll need it later. Measure and record your own height, and the length of your shadow. Depending on your measuring tool, you may want to use your string to help you measure. Next, measure the length of the tree's shadow. Now it's time to crunch some numbers; calculate the height of your tree using ratios. First, enter your numbers into the fractions shown below:

$$\frac{\text{Tree's Height (unknown)}}{\text{Tree's Shadow Length}} = \frac{\text{Your Height}}{\text{Your Shadow Length}}$$

Then, we'll rearrange these numbers so you can do some multiplication & division:

$$\text{Tree's Height (unknown)} = \frac{\text{Your Height} \times \text{Tree's Shadow Length}}{\text{Your Shadow Length}}$$

For these calculations, first multiply **your height** by the **tree's shadow length**. Then, take that number and divide it by **your shadow length**.

Congratulations! You've just estimated the height of your tree! Is it taller than you expected? Shorter? Draw a picture of you and your tree and include your measurements!

Want to build more backyard forestry skills? Keep reading for more measurements and calculations!

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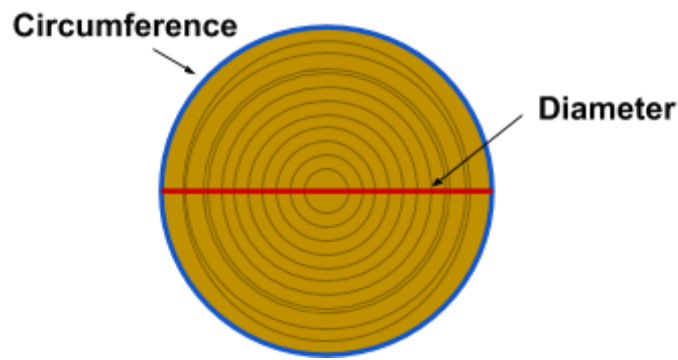
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Another piece of **quantitative data** foresters measure is the **circumference** of trees. The circumference of a tree is the distance around the trunk of the tree. Scientists measure this at 4.5 feet above the ground (or, DBH- Diameter at Breast Height) to keep consistent measurements throughout the forestry community. Measure and record the circumference of your tree.

To understand **diameter**, imagine you removed a horizontal slice of the tree from 4.5 feet above the ground. If you drew a straight line from one edge of the bark, through the exact middle of the tree, and back out to the other edge, the length of that line would be the **diameter**.



To estimate the **diameter** of your tree, we're not going to take a slice out of it. Instead, hold a ruler or yardstick about 25 inches from your eye, horizontal to the tree. You may need a helper to hold the ruler or yardstick out that far away from you. Once your ruler/ yardstick is there, estimate the **diameter** of the tree by lining up one edge of the tree with the start of the ruler, and seeing where the other edge of the tree falls. If your ruler is too short, try using a stick in this same fashion, and then measure its length. That number is your estimate! To check your estimate using calculations, you can take your **circumference** measurement, and divide it by 3.14.

$$\text{Diameter} = \frac{\text{Circumference}}{3.14}$$

Now, journal your findings! Draw a picture of your tree, and include labels to show the **quantitative data** you collected about the **height, circumference & diameter**, and some descriptions of the bark, leaves, or trunk to include **qualitative data**. Get creative and do a bark or leaf rubbing! If you can study the leaves or needles up close, see what data you can collect about them, and add that information to your journal as well.

Check out our Forestry Lab Journal Page for ideas on one way to organize your findings!

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### FORESTRY LAB JOURNAL PAGE

MY TREE Quantitative Data	MY TREE Qualitative Data
<p>Estimated Height:</p>   <p>Circumference at 4.5ft:</p>   <p>Estimated Diameter:</p>	<p>(Draw and label your tree with descriptive words. Add a bark rubbing.)</p>
<p>LEAVES/Needles Quantitative Data</p> <p><u>Leaf 1 (or Needles)</u> Length:</p> <p>Width:</p> <p><u>Leaf 2 (or Needles)</u> Length:</p> <p>Width:</p> <p>How many lobes, if any? If needles, how many needles to a bunch?</p>	<p>LEAVES/Needles Qualitative Data</p> <p>(Draw, trace or use a leaf rubbing. Label the leaf using descriptive words.)</p>