



# MEASURING A TREE WITH A STICK

Students will calculate the height of trees using simple trigonometry ideas, by only using a stick, their bodies, and a measuring tool.

## MATERIALS NEEDED

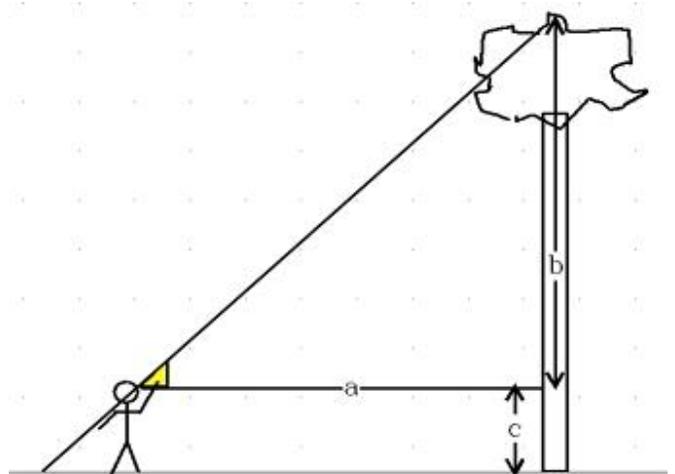
Meter stick, measuring tape, calculator, paper to write calculations.

## PRIOR TO ACTIVITY

Review right angles and the concept of a right angle triangle.

## THE ACTIVITY

1. Get a stick that is equal in length to the distance from your eye (cheekbone) to your fingers when your arm is fully extended in front of your face. Break off part of the stick or mark it at the correct length if you don't find one that is exactly right. (Can also use meter stick)
2. Grasp the stick by the tips of the thumb and index finger and hold it out in front of you with your arm fully extended. The stick must be held vertical.
3. Walk toward or away from the tree until the tip of the stick is visually lined up with the top of the tree and the bottom of the stick is lined up with the bottom of the tree. Your line of sight to the tree base should be as close as possible to horizontal. In sighting to the top and bottom of the stick





rotate your eye rather than your head.

4. Take one giant step back to account for your height to lessen the scientific error in the height of the tree.
5. The distance from your feet to the base of the tree is equal to the height of the tree. Measure this distance with a measuring tape.

*Applications: Science and Math.*

### Specific Questions:

- How would you adapt this to a 30-60-90 triangle?
- What if the tree is leaning toward or away from you or to one side?
- What are the possible sources of error?
- Should everyone doing this end up the same distance from the tree (yes), or will it depend on their height or the length of their stick (no)?
- What if you can't get level with the base of the tree?
- What else could you measure the height of using this technique and how?
- Could you measure width?

If you are interested in sharing your project's results, or would like more ideas on teaching outside at your school, please contact FortWhyte Alive by email at [education@fortwhyte.org](mailto:education@fortwhyte.org).

