Interactive Trail *Draft 4*

The trail begins at the Ela Sanctuary Information Station

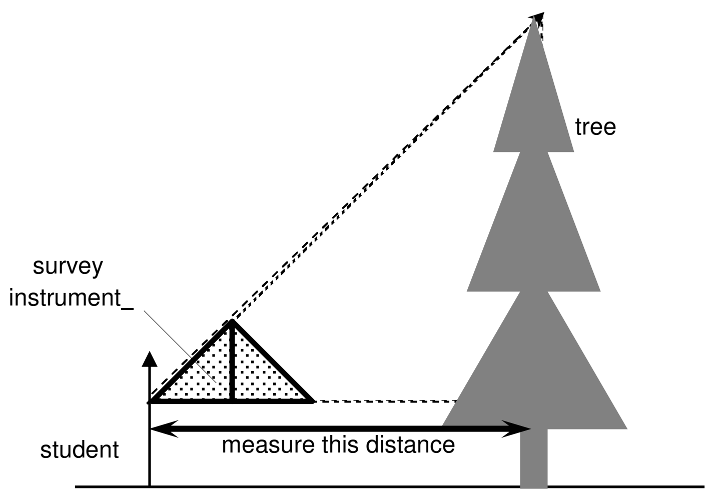
Answer all questions in your notebook.

Exercise 15

Station 9

Measuring Gentle Giants

1. Let's find the height of a tree using the survey instrument and a tape measure. See the diagram below. Holding the surveying instrument level, walk toward the tree in a location where you can see the top of the tree easily. Sight through the tube on the survey instrument and slowly walk forward or backwards until you can ee the top of the tree. A second person will watch the center tube on the survey instrument to see that it hangs straight down making the surveying instrukment level. *(4.102, 5-1.05, 5-4.22)*
2. Measure the distance between the tree and your eye to the nearest foot. This distance equals the height of the tree because the survey instrument is a 45° right triangle.
3. Add the distance between your eye and the ground, to the nearest whole foot, and you will have the total height of the tree. What is the height of the tree to the nearest foot?



4. Change jobs with your partner and take a second measurement and record the hight of the tree.
5. Compare your measurement of the height of the tee with three other people and find the average height.
6. How many feet, taller or shorter, was your measurement of the tree than the average measurement of the class.
7. What is the energy source for the production of leaves and wood in the tree?
8. Name five reasons to *not* cut down the large cottonwood tree. *(4-3.14, 5-3.14)*

9. If you have enough math skills, determine how many 2”x4”x8’ boards could be cut from this tree if we assume there is no waste. To do this determine the volume of wood in cubic feet and divide this number by .44 which is the number of cubic feet in a standard 2x4 that is 8 feet piece of lumber. If you have really good math skills estimate the number of leaves on the tree.
   1. Measure the circumfirence of the tree to the nearest whole foot at eye level. Divide your anwer by Π (3.14) and then by 2 to find the **radius**. C=Π2R. (The radius of a circle is equal to 1/2 the diameter.)
   2. Use the formula below to dtermine the volume.

Volume = π R x R x H

π = 3.14
R = radius in feet found in step 1
H = height in feet

If your math skills are *really* good you can estimate the number of leaves on the tree.

- Determine the crown width in feet by measuring the distance across the widest part of the crown in feet.
- Determine the area of an average leaf in inches. A = L x W
- Crown Width x 144 x 3.14 x 25 x leaf size in inches = approximate number of leaves.
- Where did the materials to make the leaves come from?
- Why are leaves important?
- Why is important to not remove the leaves in the fall?

10. What is the energy source for the production of leaves?
11. Name five reasons to *not* cut down the large cottonwood tree. *(4-3.14, 5-3.14)*

Did you know that the root system of a tree contains just about as much wood as the part of the tree that is above the ground!