

Tree Mapping - Student Field Guide

Quadrant Team _____

Names _____

Task

Work as a team to map trees greater than 15cm circumference on your Carbon Cycle Site.

Materials

- Clipboard (1)
- Pencil (2)
- Tree Data Entry Sheet* (1)
- Tree Mapping - Student Field Guide (azimuth, species ID, distance)*
- Compass (1-2)
- Flexible measuring tape (30-50m) (1)
- Tree identification guide/local species keys (2)
- Species Groups List* (2)

Procedure

1. Your quadrant team (North, East, South, West) is written at the top of the page. All of the following field procedures are to help you map your quadrant.
2. Read the attached field instruction guides and diagrams. Observe how many people should work on each task. Also view the *Tree Data Sheet*. Write down anything that is unclear and discuss it with your team and the teacher.
3. Select a team data recorder. This person should be able to write clearly and record data quickly and accurately. The data recorder will need the *Tree Data Entry Sheet*, a clipboard and one pencil.
4. Divide remaining team members between the Azimuth, Species ID, and Distance groups. The Azimuth group should help orient all other team members to the quadrant (following their initial field guide instructions).
5. When azimuth, species ID, and distance are complete, your team is ready to make tree circumference at breast height (CBH) measurements. (You may also be asked to perform CBH simultaneously with mapping.)

Field Guide Instructions - Azimuth

Azimuth Group - 2 people

Task

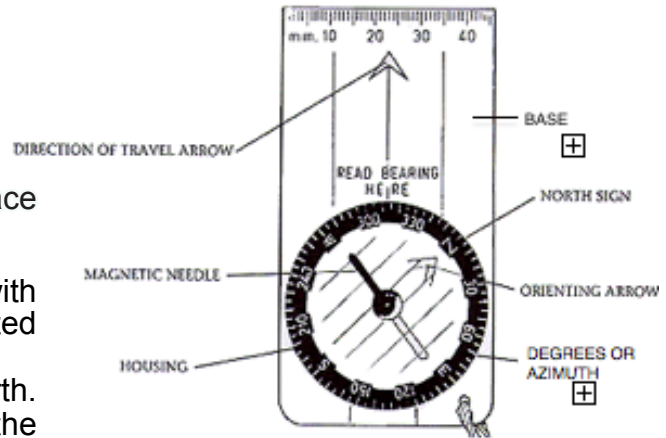
Find the azimuth from plot center to the center of all live trees greater than 15 cm circumference on your Carbon Cycle Site.

Materials

- ☐ Compass

Procedure

- Stand at the center of the plot and face north.
 - Hold the compass in front of you with the direction of travel arrow pointed away from you.
 - Turn your compass housing to north.
 - Turn your body until the red is in the shed.
- Show your Quadrant Team where the cardinal directions are (N, E, S, W) and specifically where the boundaries of your quadrant are located.
- To find the azimuth to the first tree in your quadrant, turn your compass housing to the direction indicated by your quadrant name, as you did for north. Then turn your body until you are facing that direction and red is in the shed.
- Now turn your body clockwise until you are facing the first tree in your quadrant. (Keep in mind it may be far away {15-20m}.)
- Turn your compass housing until red is in the shed.
- Read the number that is lined up with the direction of travel arrow. This is the azimuth from the center of the plot to the tree you are looking at.
- Have the second azimuth group member check the azimuth.
- When you both agree, record the azimuth on the Tree Data Entry Sheet.
- Repeat this process for each tree on the plot.



Field Guide Instructions - **Species ID**

Tree Species Group - 2-4 people

Task

Identify species (or general species group, e.g. pine, oak) for all live trees greater than 15 cm circumference on your Carbon Cycle Site.

Materials

- Clipboard
- Pencil
- Tree Data Sheet*
- Flexible measuring tape (best if 150cm – 300cm)
- Tree identification guide/local species keys
- Species Groups List* adapted from Jenkins et al. paper

Procedure

1. Start with the first tree in your quadrant and work around the plot clockwise, following the azimuth team.
2. Using a species ID key or guide, identify the genus and species (and optional: common name) of each tree.
3. Report species information to the team data recorder to be recorded on the Tree Data Entry Sheet.
4. Repeat this process for all trees in your quadrant.
5. After completing species ID, use the Species Groups List (or similar classification system) to assign all recorded species into species group categories. [This step can also be done during data entry into the computer.]

Field Guide Instructions - **Distance**

Distance Group - 2 people

Task

Measure the distance from plot center to the center of all live trees greater than 15 cm circumference on your Carbon Cycle Site.

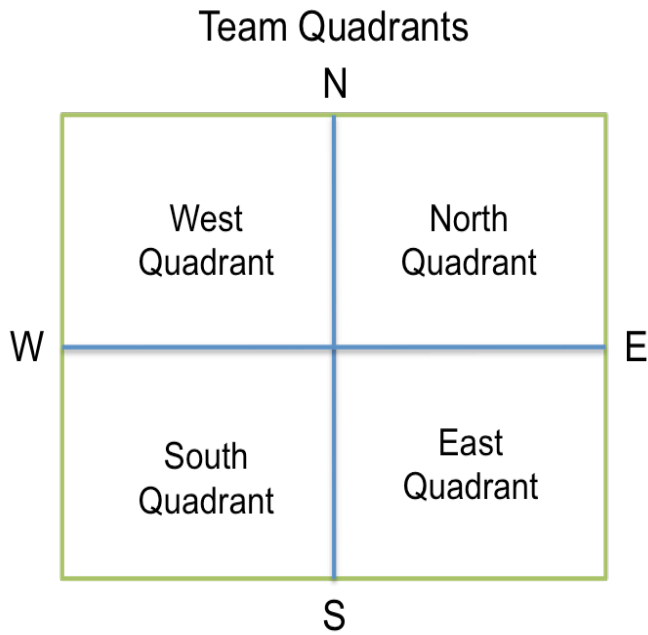
Materials

- Flexible measuring tape (50m)

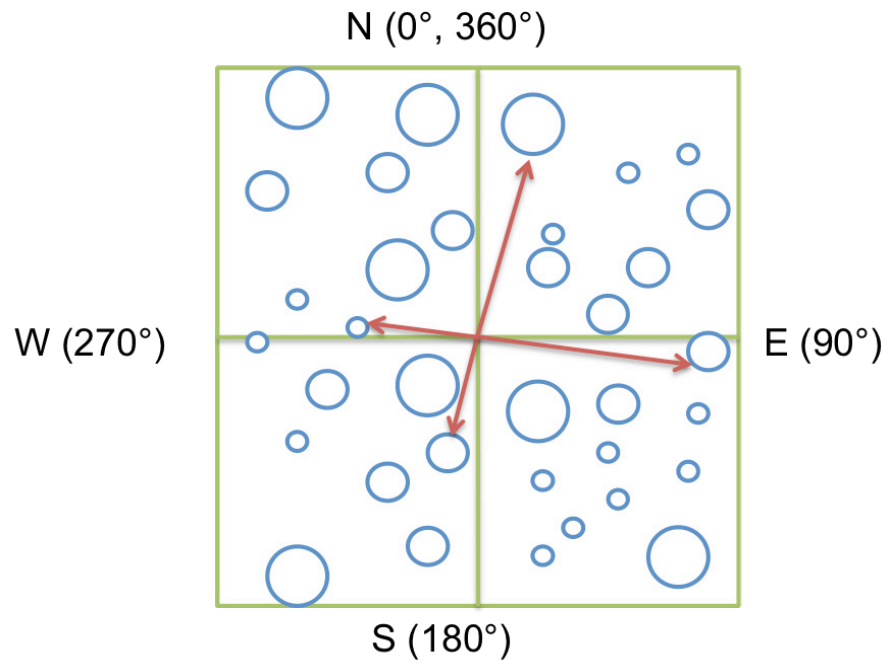
Procedure

1. Person one: Stand at plot center facing the direction of your quadrant name (N,E,S,W) and hold the crank handle of the measuring tape.
2. Person two: Pull the end of the tape out to the first tree clockwise from the direction you are facing.
 - a) Be careful to make as straight of a line as possible between the center and the tree.
 - b) If there is an obstacle in the way measure the distance to that point and then walk to that point and measure from there to the desired tree, remember to add the measurements together to get total distance.
3. Record the distance in meters to the nearest tenth (e.g.13.2m) on the Tree Data Entry Sheet.
4. Have the data recorder repeat the distance back to you after they have recorded it to make sure it was recorded correctly.
5. Repeat the process until the distance to all trees is measured.

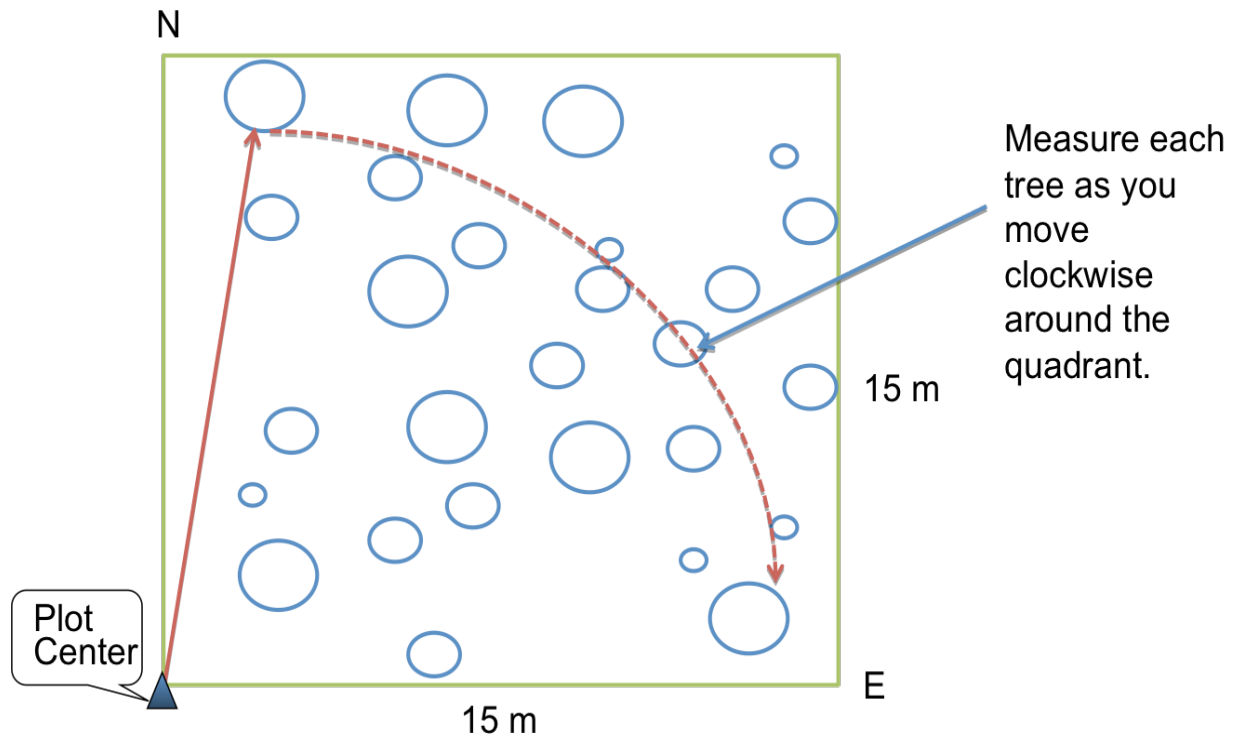
Tree Mapping Diagram 1



Sample: First Tree in Each Quadrant



Tree Mapping Diagram 2



Azimuth	Distance	Species	Notes	Circumference
15°	14m	Acer rebrum (Red maple)		50cm
85°	6.5m	Pinus strobus (White Pine)	Forked, Measured at 1.25m	27cm

Tree Data Collection Challenge – Team Scoring Rubric

Criteria	Developing (Needs improvement)	Proficient (Average)	Exemplary
Tool Use	Tools were used for purposes which they were not designed or were not used correctly	Demonstrated correct tool use after some teacher guidance	Demonstrated proficient use of tools without teacher assistance
Measurements – Precision and Accuracy	Did not follow resource directions for difficult to measure trees, correct units were used occasionally, data did not typically match measurements made during peer evaluation	Followed resource directions, used correct units on data sheet, data mostly matched measurements made during peer evaluation	Closely followed resource directions, double checked difficult to measure trees, used correct units on data sheet, data matched measurements made during peer evaluation
Tree Data Entry Sheet	Data sheet is incorrect, incomplete, or illegible	Data sheet is completed, legible, and notes are filled out where appropriate	Data sheet is completed, legible, and any notes are clear, concise (scientific in nature)
Participation	Some team members are involved in the data collection process.	All team members are involved in some part of the data collection process	Team delegates tasks so each member has an assigned role at all stages of the data collection process
Communication	Team members talk over one another, report data to recorder – but needs to be repeated often, do not seek answers to team questions from the teacher or each other	Team members listen when others are talking, report data to the recorder, ask the teacher questions when difficulties arise	Team members discuss procedures and tasks, report data loudly and clearly, ask each other questions when difficulties arise
Efficiency	Team was unable to work cooperatively to complete tasks, teacher assistance was required throughout the data collection process	Team worked cooperatively to complete tasks quickly and correctly with some teacher assistance on delegation of roles and problem solving	Team worked cooperatively to delegate and complete tasks quickly and correctly, problems were addressed and solved with little teacher assistance

Field Guide Instructions – Tagging (Optional)

Task

Tag all trees greater than 15 cm circumference on your Carbon Cycle Sample Site.

Materials

- Fishing line, scissors and tree tags
- OR** Nails, hammer, tree tags
- OR** Spray paint/tree crayons/paint sticks
- Flexible measuring tape (best if 150cm – 300cm)
- Pencil
- Compass

Procedure

1. Stand at plot center facing north, east, south or west (according to your assigned quadrant). Use a compass if you are unsure.
2. Turn your body clockwise until you are facing the tree closest to that direction, this will be the first ‘tagged’ tree.
3. Use the fishing line to tie a single tree tag around each tree. Be sure to tie it loosely enough to provide room for the tree to grow and not break the line.

OR

4. Use a hammer and nail to attach a single tree tag near the **base** of each tree. Be sure to use long nails and not to pound them in too much leaving room for the tree to grow.

OR

5. Paint a single number on each tree.
6. Work as a team to **continue tagging trees** by moving from the center toward the edges in a clockwise direction. This method will prevent you from missing any trees.
a. NOTE: Do not tag any trees that are already dead.
7. Once tree tagging has begun, one person should move around the plot and mark each tag with a number using a pencil or nail.
a. Number convention should be the name of the quadrant and the tree number, e.g. N1, E20, etc.
8. Repeat the tagging process on all trees greater than 15 cm circumference at breast height (1.35m). If you are unsure if a tree is 15 cm, use the measuring tape to confirm whether it should be tagged.