GLOBE Biometry: Tree Height and Circumference Data Sheets

on Level Ground

Print the Trees Data Sheet:

- Trees Data Sheet (two pages)
  - Print the number of pages needed to record tree height and circumference for up to five dominant (page 1) and five co-dominant (page 2) tree specimens. Each page has space to record information for two trees.

Or select the alternative data sheet option below:

- Trees with field guide (2 pages)
  - This data sheet has the field guide incorporated with space to record measurements for one tree. Print extra copies of the Trees Data Sheet for other trees you will measure.

Print the Biometry Site Definition Sheet:

- Biometry Site Definition

Print the Table of Tangents, if needed:

- Table of Tangents

GLOBE Biometry: Dominant Tree Data Sheet

Name: _____ Site Name: _____

Date: _____ Time (local): _____

Dominant Tree Species Measurements

Dominant Tree Common Name: _____

Genus/species (if known): _____

Tree # _____

	Clinometer Reading (°)	**TAN Clinometer Reading** (°)	**Distance from Tree** (m)	**Eye Height** (m)	**Tree Height** (m)
1					
2					
3					

Stop and check: Are the heights within one meter of the average? If not, repeat the measurements.

Average Tree Height (m): _____

Circumference: _____ cm Tree Elevation: _____m

Tree Latitude: _____ Tree Longitude:_____

Tree # _____

	Clinometer Reading (°)	**TAN Clinometer Reading** (°)	**Distance from Tree** (m)	**Eye Height** (m)	**Tree Height** (m)
1					
2					
3					

Stop and check: Are the heights within one meter of the average? If not, repeat the measurements.

Average Tree Height (m): _____

Circumference: _____ cm Tree Elevation: _____m

Tree Latitude: _____ Tree Longitude:_____

GLOBE Biometry: Co-Dominant Tree Data Sheet

Name: _____ Site Name: _____

Date: _____ Time (local): _____

Co-Dominant Tree Species Measurements

Co-Dominant Tree Common Name: _____

Genus/species (if known): _____

Tree # _____

	Clinometer Reading (°)	**TAN Clinometer Reading** (°)	**Distance from Tree** (m)	**Eye Height** (m)	**Tree Height** (m)
1					
2					
3					

Stop and check: Are the heights within one meter of the average? If not, repeat the measurements.

Average Tree Height (m): _____

Circumference: _____ cm Tree Elevation: _____m

Tree Latitude: _____ Tree Longitude:_____

Tree # _____

	Clinometer Reading (°)	**TAN Clinometer Reading** (°)	**Distance from Tree** (m)	**Eye Height** (m)	**Tree Height** (m)
1					
2					
3					

Stop and check: Are the heights within one meter of the average? If not, repeat the measurements.

Average Tree Height (m): _____

Circumference: _____ cm Tree Elevation: _____m

Tree Latitude: _____ Tree Longitude:_____

GLOBE Biometry: Tree Data Sheet and Field Guide (page 1)

Name: _____ Site Name: _____

Date: _____ Time (local): _____

Determine the trees you will measure:

1. Determine and record the name of the dominant (most common) and co-dominant (second-most common) tree species using your Vegetative Covers Data Sheet.

Dominant tree species: _____

Co-Dominant tree species: _____

2. For each of these, take measurements of:
   - The tallest tree of that species.
   - The shortest tree of that species.
   - Three more trees that have heights in between.
3. Determine a numbering system for the trees you will measure.

Tree height measurements:

1. Record the tree species and tree number for the tree you are measuring:

Tree species: _____ Tree #: _____

2. Step back from the tree holding your clinometer. Keep moving away until you can see top of the tree. For best results, adjust your distance from the tree so the clinometer reads as close to 30° as possible.
3. Look through the straw to the top of the tree, have your partner record the degree of the angle on the data table on page 2.
4. Use the Table of Tangents to record the TAN of the angle on the data table.
5. Use the 50 m tape to measure and record the distance between you and the tree.
6. Measure and record the height from the ground to your eye.
7. Calculate and record the tree height using this formula:
   - **Height of Tree** = (TAN clinometer reading) x (distance to tree) + eye height
8. Measure the height of the tree twice more and calculate the average of the three heights. **Stop and check:** Are the heights within one meter of the average? If not, repeat the measurements.
9. Repeat steps 2-5 for each dominant or co-dominant tree you will measure.

GLOBE Biometry: Tree Data Sheet and Field Guide (page 2)

Tree height data table:

	Clinometer Reading (°)	**TAN Clinometer Reading** (°)	**Distance from Tree** (m)	**Eye Height** (m)	**Tree Height*** (m)
1					
2					
3					

***Height of Tree** = (TAN clinometer reading) x (distance to tree) + eye height

Stop and check: Are the heights within one meter of the average? If not, repeat the measurements.

Average Tree Height (m): _____

Tree circumference measurements:

1. With a flexible measuring tape, measure from the ground at the base of the tree to the height of 1.35 m up the tree.
2. Measure the circumference (in centimeters) of the tree at this height.

Circumference (cm)	

Tree location measurements:

Use a GPS receiver or phone to determine the exact location of your tree. *(See GPS Instructions in Biometry Site Definition).*

Latitude: _____ Longitude: _____

Elevation: _____ m

Record any comments about your site or data collection:

GLOBE Biometry: Site Definition

Name: _____ Site Name: _____

Date: _____ Time (local): _____

Location

Source of location data: ☐ GPS ☐ Phone ☐ Other: _____

If using GPS, complete the table below using a GPS receiver and recording coordinates once a minute for five minutes. Then transfer the values in the "AVERAGE" row to the spaces below.

If using a phone, leave the table blank.

Minute	Latitude	Longitude	Elevation (m)
1			
2			
3			
4			
5			
AVERAGE			

Latitude: _____ Longitude: _____

Elevation: _____ m

MUC

For aid in determining MUC, use page 3 of the Vegetative Covers data sheet and a MUC Guide.

MUC Code: _____ _____ _____ _____

Site Comments (Metadata):

GLOBE Biometry: Table of Tangents

Your clinometer may have this table printed on the back.

Angle (°)	Tan	Angle (°)	Tan	Angle (°)	Tan	Angle (°)	Tan	Angle (°)	Tan
1	.02	17	.31	33	.65	49	1.15	65	2.14
2	.03	18	.32	34	.67	50	1.19	66	2.25
3	.05	19	.34	35	.70	51	1.23	67	2.36
4	.07	20	.36	36	.73	52	1.28	68	2.48
5	.09	21	.38	37	.75	53	1.33	69	2.61
6	.11	22	.40	38	.78	54	1.38	70	2.75
7	.12	23	.42	39	.81	55	1.43	71	2.90
8	.14	24	.45	40	.84	56	1.48	72	3.08
9	.16	25	.47	41	.87	57	1.54	73	3.27
10	.18	26	.49	42	.90	58	1.60	74	3.49
11	.19	27	.51	43	.93	59	1.66	75	3.73
12	.21	28	.53	44	.97	60	1.73	76	4.01
13	.23	29	.55	45	1.00	61	1.80	77	4.33
14	.25	30	.58	46	1.04	62	1.88	78	4.70
15	.27	31	.60	47	1.07	63	1.96	79	5.14
16	.29	32	.62	48	1.11	64	2.05	80	5.67

Example: Assume you have measured a clinometer angle reading of 34° and the distance between you and the tree is 60.0 meters. From the table, you will see that the tangent of 34° is 0.67. Therefore, the tree height above your eye height is 60.0 m x .67 = 40.2 meters. By adding your eye height above the ground (1.5 m), the total tree height is 41.7 meters.

