How to Make a Clinometer

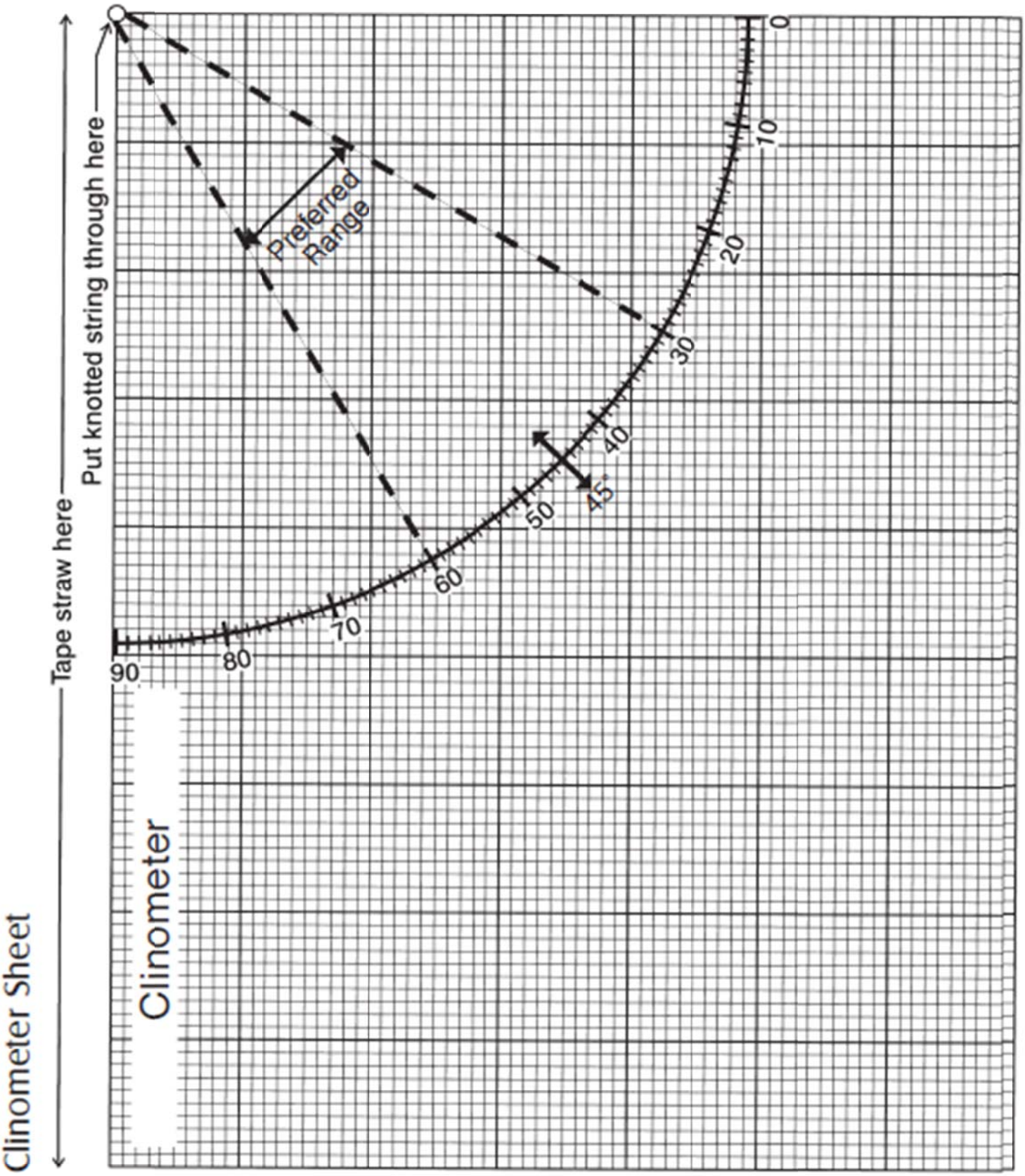
A clinometer is an instrument used for measuring angles. In GLOBE, you use it to find the angle for calculating tree heights. It is also used to determine obstacles at an Atmosphere Study Site. The calculations work by applying the principles based on the properties of right triangles. You construct and use the clinometer by following the directions and using the formula below. The clinometer also lends itself for additional hands-on teaching exercises of trigonometric principles.

Required Material

- Clinometer Sheet and Table of Tangents
- Piece of stiff cardboard at least the size of the sheets noted above
- Drinking straw
- Metal nut or washer
- 15 cm of thread or dental floss
- Glue
- Scissors
- Something to punch one small hole
- Tape

Construction

1. Gather the materials for each clinometer.
2. Glue a copy of the Clinometer Sheet onto a same-size piece of stiff cardboard (cut cardboard if necessary).
3. Glue a copy of the Table of Tangents to the other side of the cardboard.
4. Punch a hole through the marked circle on the Clinometer Sheet.
5. Thread one end of a 15 cm piece of thread through the hole and tie or tape it on the Table of Tangents side of the cardboard.
6. Tie a metal nut or washer to the other end of the thread so that it hangs in front of the Clinometer Sheet.
7. Tape a drinking straw along the designated line on the Clinometer Sheet, to use as a sighting device.
8. *Optional:* The cardboard and both the clinometer and table of tangents sheets can be placed in a sheet protector or laminated to ensure longer life. The straw would then be placed on the outside of the plastic and the hole for the thread with the washer would be punched through the entire instrument (plastic cover, cardboard and sheets).



THE GLOBE PROGRAM

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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 established a baseline distance of 60.0 meters. Assume that you have measured the tree top to an angle of 34°. From the Table, you will see that the tangent of 34° is 0.67. Therefore, the tree height above your eye height

For more information see: http://www.globe.gov/documents/355050/355099/land_prot_instruments.pdf