

PART 2 · REFERENCE

Sun height, shadow length, day length

Find the row nearest your latitude (from the desk survey). **Shadow ×** is the length of a noon shadow cast by an object one unit tall. Multiply by any object's height to get its noon shadow length.

Latitude · example city	December 21			March / September 21			June 21		
	Noon sun	Shadow ×	Day	Noon sun	Shadow ×	Day	Noon sun	Shadow ×	Day
25°N · Miami	42°	1.13	10.4 h	65°	0.47	12 h	88°	0.03	13.6 h
30°N · Houston, New Orleans	37°	1.35	10.1 h	60°	0.58	12 h	83°	0.11	13.9 h
35°N · Albuquerque, Memphis	32°	1.63	9.6 h	55°	0.70	12 h	78°	0.20	14.4 h
40°N · Denver, Philadelphia	27°	2.00	9.2 h	50°	0.84	12 h	73°	0.30	14.8 h
45°N · Portland OR, Minneapolis	22°	2.53	8.6 h	45°	1.00	12 h	68°	0.40	15.4 h
50°N · (southern Canada)	17°	3.36	7.9 h	40°	1.19	12 h	63°	0.50	16.1 h

Calculated from solar geometry: noon sun height = 90° – latitude + solar declination (–23.4° in December; 0° at equinox, +23.4° in June). Shadows on flat ground; day length is sunrise to sunset over a flat horizon (actual daylight runs a few minutes longer because of atmospheric refraction). Morning and afternoon shadows are longer than noon shadows.

Worked example

At 40°N, a 30-ft oak stands 25 ft south of the vegetable garden.

Dec noon shadow = 30 ft × 2.00 = 60 ft

June noon shadow = 30 ft × 0.30 = 9 ft

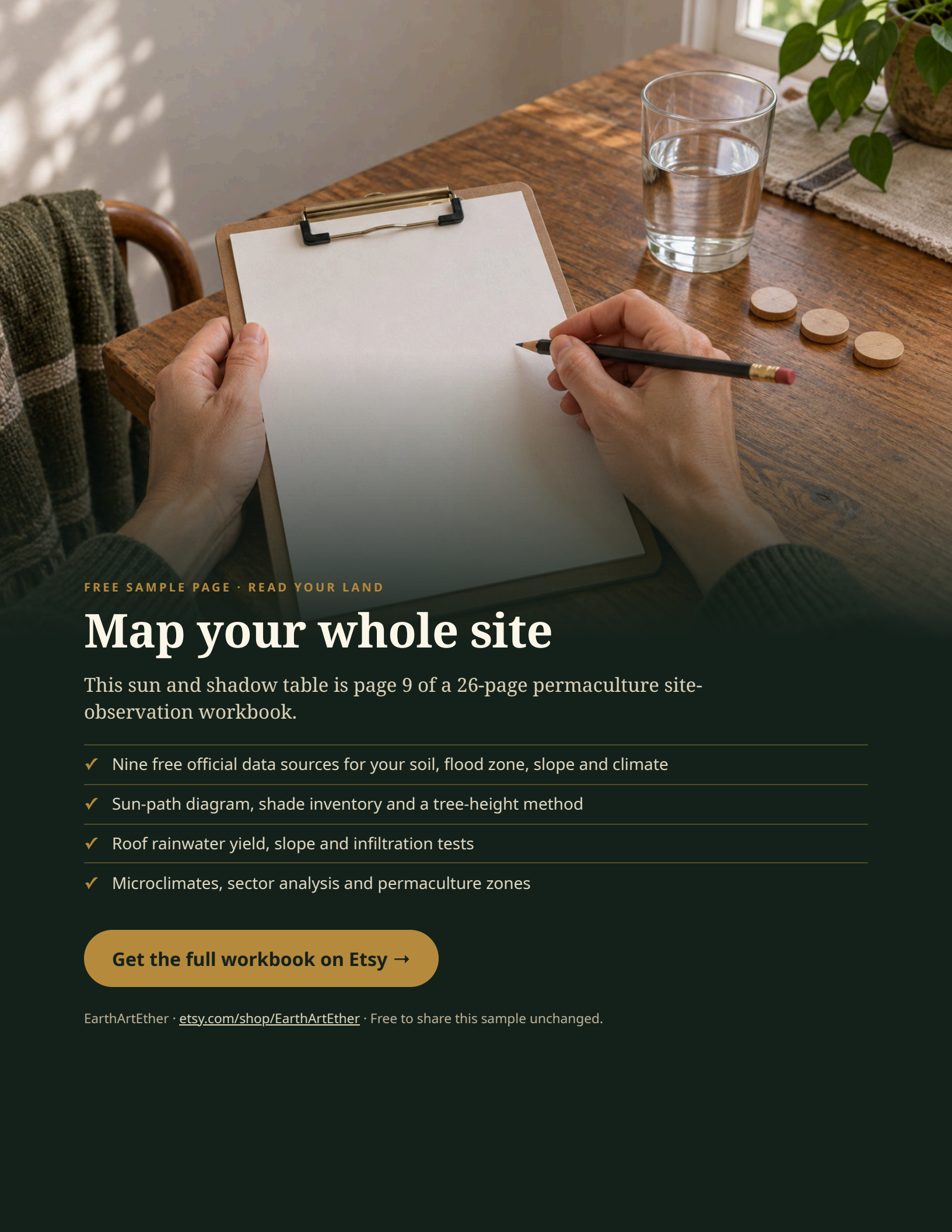
In summer the bed is in full sun at noon. From October through February, it sits in the oak's shadow at midday. That's fine for a summer garden. A winter greenhouse in that spot would struggle.

Measure a tree's height

On a sunny day, measure your own shadow and the tree's shadow at the same moment.

Tree height = tree's shadow × (your height ÷ your shadow)

Example: you're 5.5 ft tall and cast an 8 ft shadow; the tree's shadow is 48 ft. Tree height = 48 × (5.5 ÷ 8) = 33 ft. Record trees' **mature** height too. The young maple you're measuring may reach 50–70 ft.



FREE SAMPLE PAGE · READ YOUR LAND

Map your whole site

This sun and shadow table is page 9 of a 26-page permaculture site-observation workbook.

- ✓ Nine free official data sources for your soil, flood zone, slope and climate
- ✓ Sun-path diagram, shade inventory and a tree-height method
- ✓ Roof rainwater yield, slope and infiltration tests
- ✓ Microclimates, sector analysis and permaculture zones

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