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FINDING TRUE NORTH Using the Solar Noon Shadow Method

To design or install a sundial, you need to determine True North (not magnetic North). **Do NOT use a magnetic Compass.** Finding True North using this method is easy and extremely accurate. You will use the sun to show you True North by looking at the shadow cast from a vertical string at Solar Noon (also called “Local Apparent Solar Noon”). At Solar Noon, the sun is exactly due south and will cast a shadow on the ground directly towards True North.



To find True North you will need the following:

A sunny day
A thick string or cord about 8 ft. long.
A plumbob or heavy weight
A glass filled with water
A free standing ladder 5 or 6 feet tall
A broom handle or stiff board about a yard long
Duct tape or clamps
A piece of plywood or fiberboard (at least 2' x 2')
A large sheet of white paper (legal size or larger)
A level
Shims
A straight edge ruler
A pencil
An accurate time source (clock, watch, or computer. Do not use a cell phone which can be inaccurate).
A Solar Noon Calendar (see below)

Instructions

1. Setup plumb bob: First attach a broomhandle or stiff board horizontally to the top of the ladder with ducttape or clamps. Tie the end of the string or rope with a plumb bob to the end of the broomhandle so that the plumb bob hangs just above ground level. Place the ladder off to the side so that it is not in the way and so that it won't shade the plywood board. If it's a windy day, you can keep the plumb bob from swinging if you place it in a glass of water to dampen the movement.

2. Setup plywood projection screen: Tape a sheet of white bond paper to the plywood or fiberboard. Place the plywood on the ground to the north of the plumb bob so that the string's shadow is visible on the paper and level it with shims and a level. The shadow cast onto the board by the rope will point to True North at Solar Noon.

3. Determine the exact Watch Time of Solar Noon for the current date:

*Solar Noon does **not** occur at the same watch time every day and is different at different locations!* This website will tell you the exact time of Apparent Solar Noon at your location and date (but you need to correct the value it gives you for Daylight Saving Time is it's in effect): <http://www.solar-noon.com/> If you have questions, contact John Carmichael.

4. Mark the North/South line: Looking at your accurate time source, at the moment of Solar Noon, quickly mark the position of the plumb bob string's shadow on the paper with a pencil and straight edge ruler. This line is a true North/South line.

5. Rebar Placement: Tie a string between two pieces of rebar and position the string directly above the North/South line on the plywood board. Pound two rebars into ground beneath the string separated by at least six feet so that you will know where the North/South line is after you remove the board and string. When positioning the sundial to True North, use this string. You can measure off a line that's parallel to the string between the two rebars.