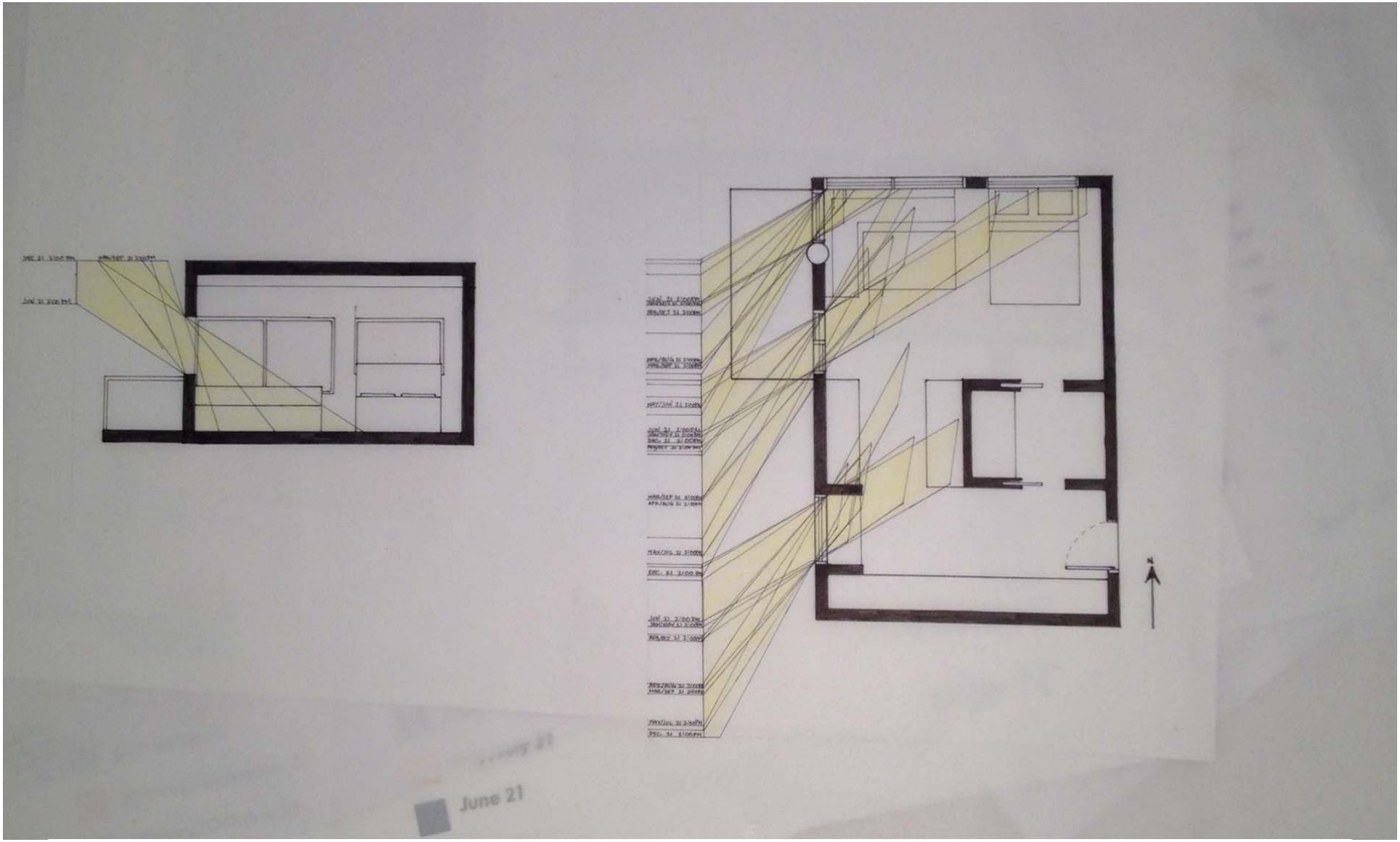
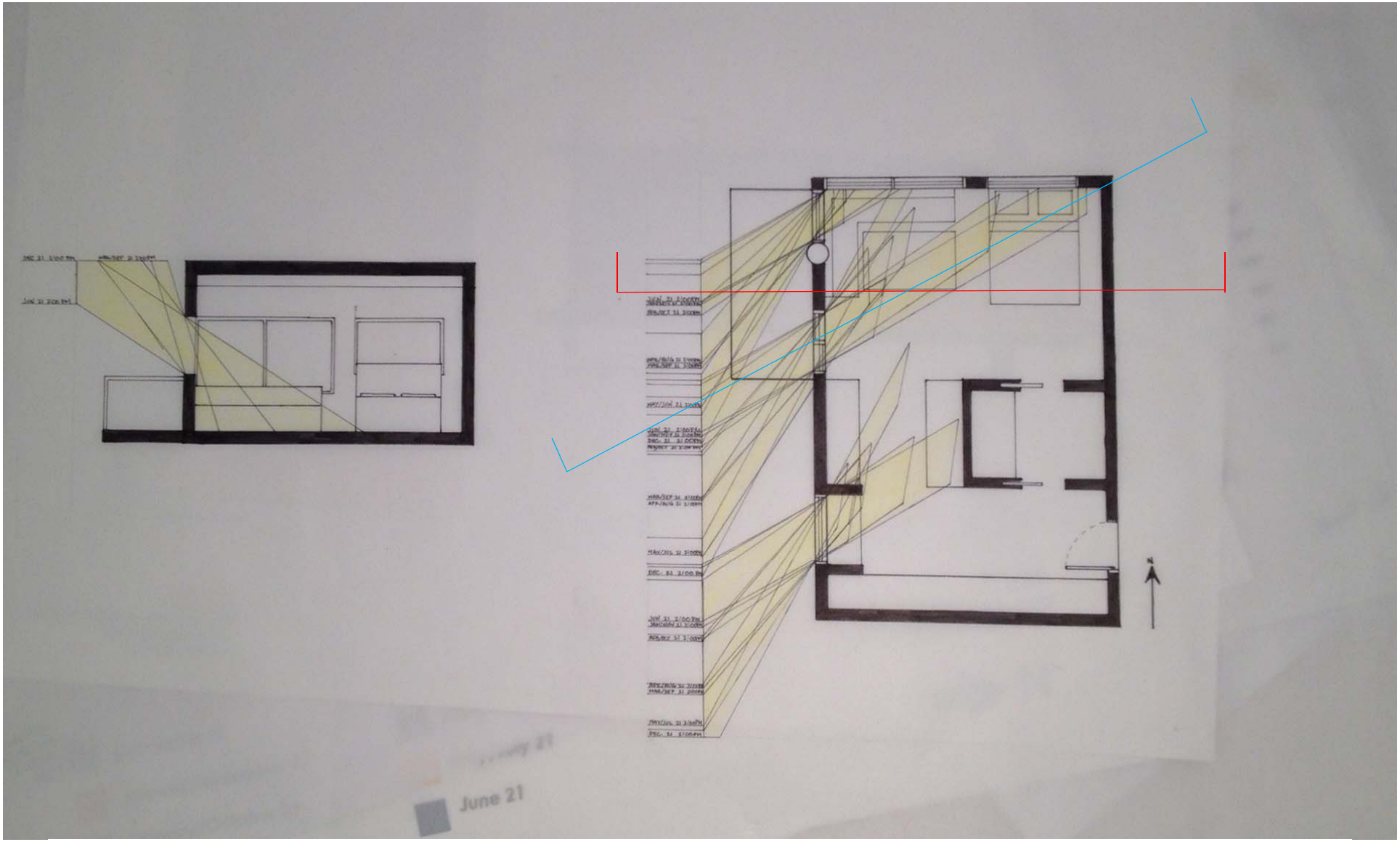
Sun Diagram Tutorial

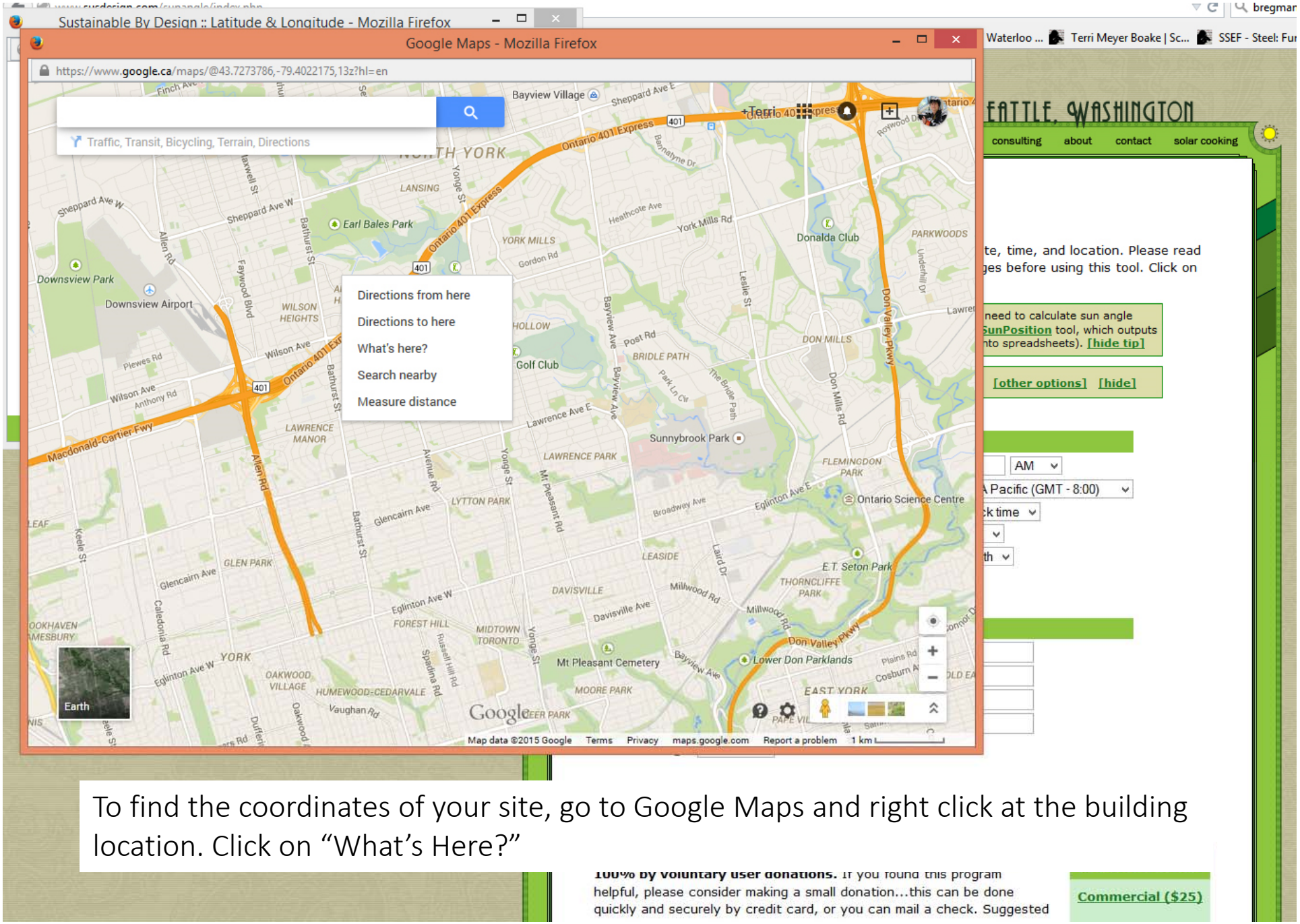
Arch 125



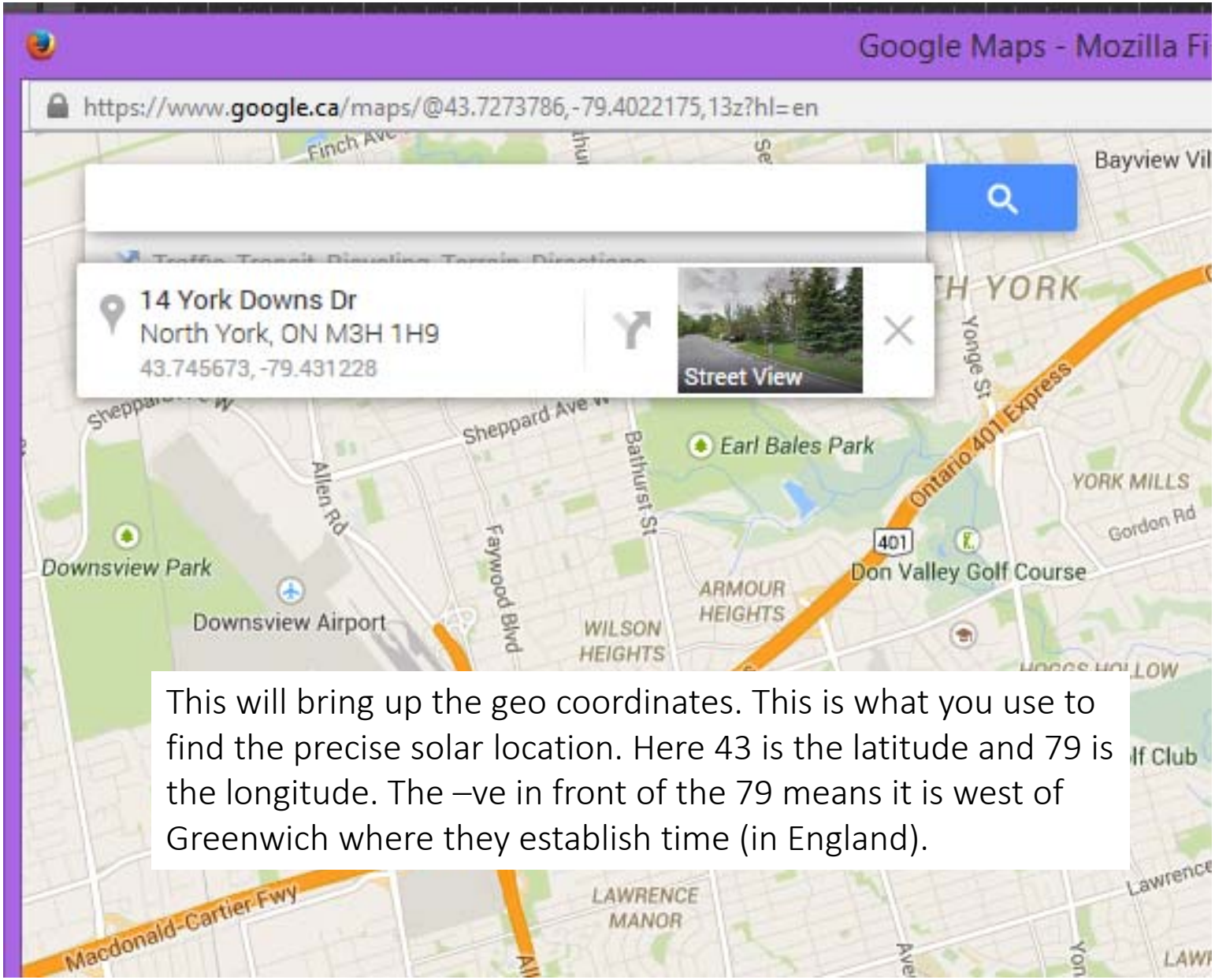
This is sort of what you are trying to create, but with a bit more showing in the variation of the section. Suggest using colour to make the patterns distinct. This student also seems to have their windows all going to the floor on the plan view, so you need to be sure to include the shadow from the portion of the wall below the window.



Technically if you plot your plan you can simply cut your section through it where it seems to make the most graphic or useful sense rather than constructing it. It does not necessarily need to be taken at right angles to the wall if that view does not show anything useful for the nature of the solar penetration.



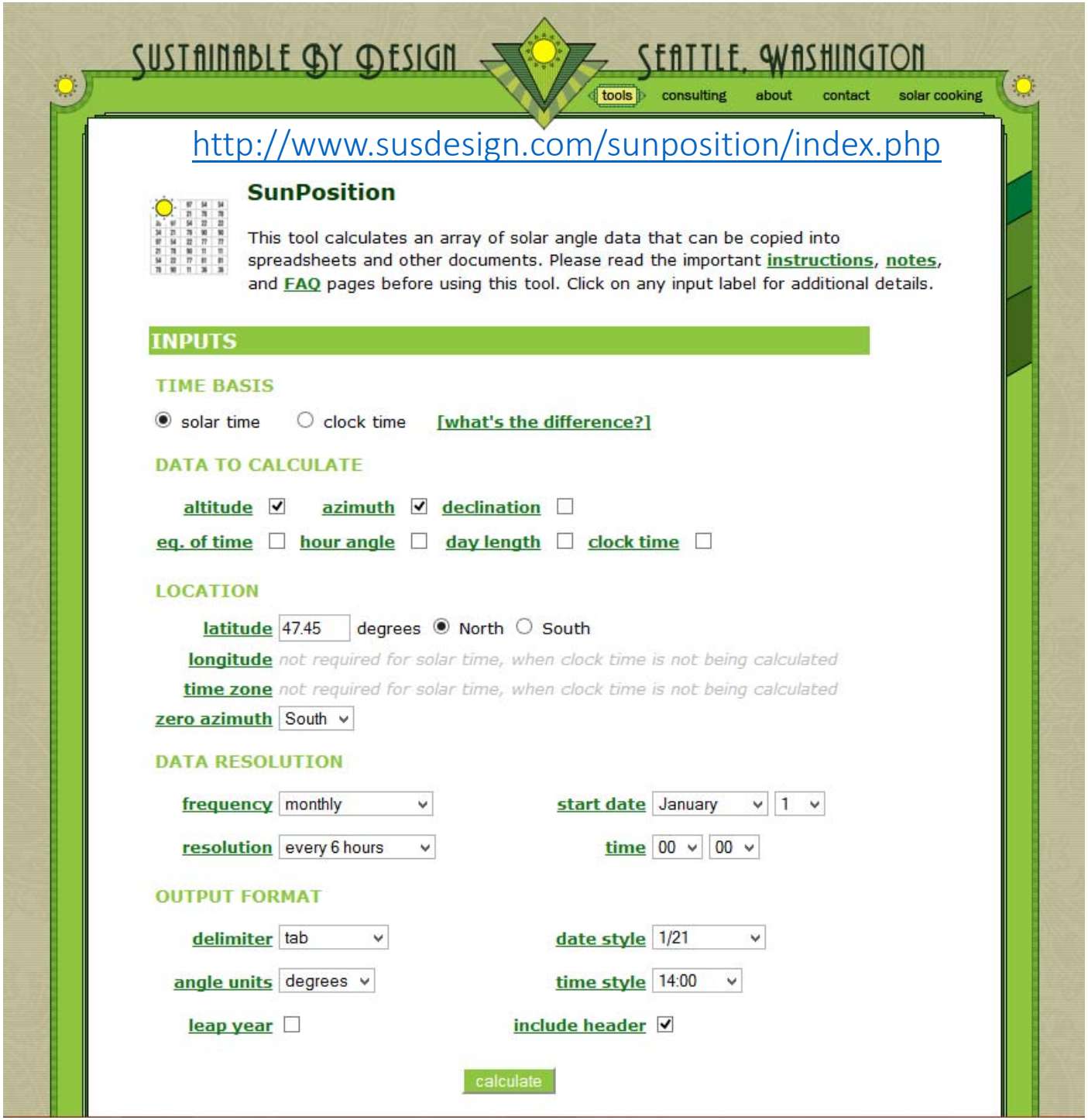
To find the coordinates of your site, go to Google Maps and right click at the building location. Click on “What’s Here?”



This will bring up the geo coordinates. This is what you use to find the precise solar location. Here 43 is the latitude and 79 is the longitude. The –ve in front of the 79 means it is west of Greenwich where they establish time (in England).

Step 1:
Go to the main page

We are using the SunAngle and Sun Position features first



Step 2:
On SunPosition

Fill in the sheet but we will be modifying the defaults a bit as per the next slide

Step 3:

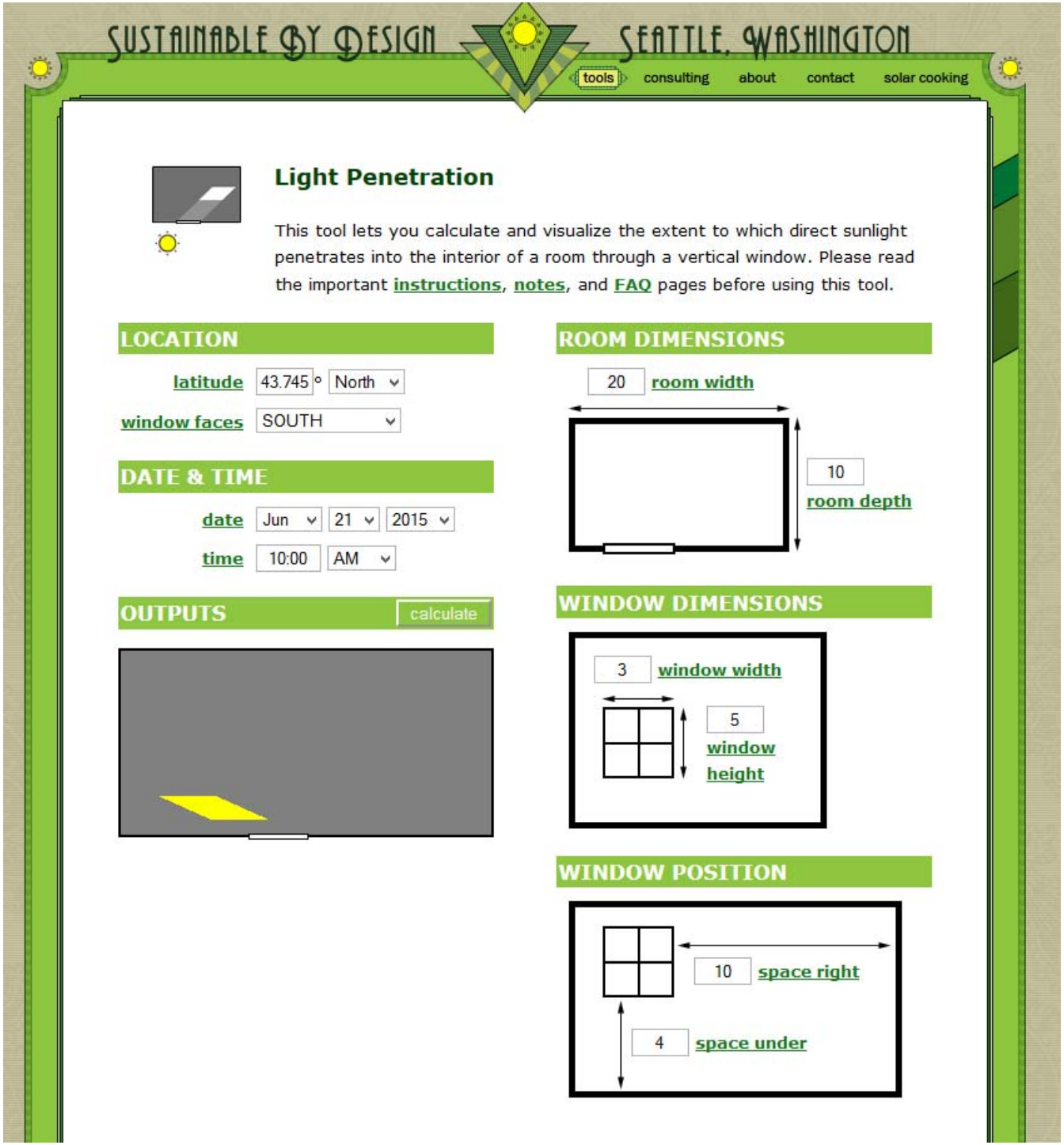
- Find your latitude
- Change the date to the 21st so you are matching the equinox and solstice dates
- Ask for monthly (you will only be using the data for the 4 months I requested)
- Ask for hourly (you will only need the hours I asked for)
- Calculate

Step 4:

- Select the data you will be working with
- So pick the hours and dates and discard the rest
- If you email it to yourself it might be easier to work with
- Note that you get negative altitude angles for times before the sun comes up as it is just generating numbers and is not very sensible!

Step 5:

- The altitude angle is the angle the sun makes with the earth
- The azimuth is the deviation from due south in degrees



In plan what we are trying to get is a set of these for the 4 times of year and multiple times of day to see the path and penetration of the sun. You can input your latitude and window and room sizes to see what this looks like to check if you are correct in what you are plotting.

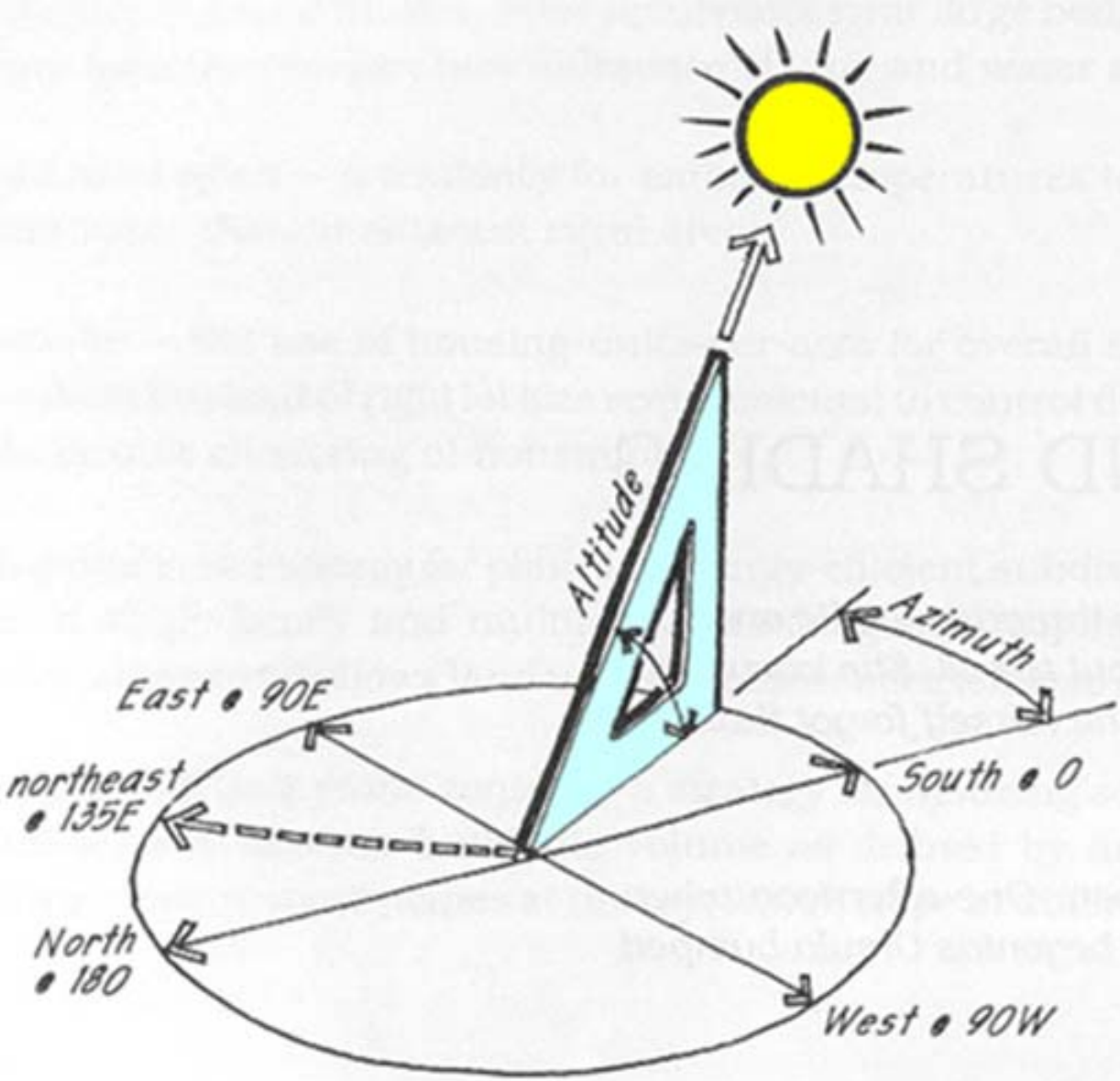
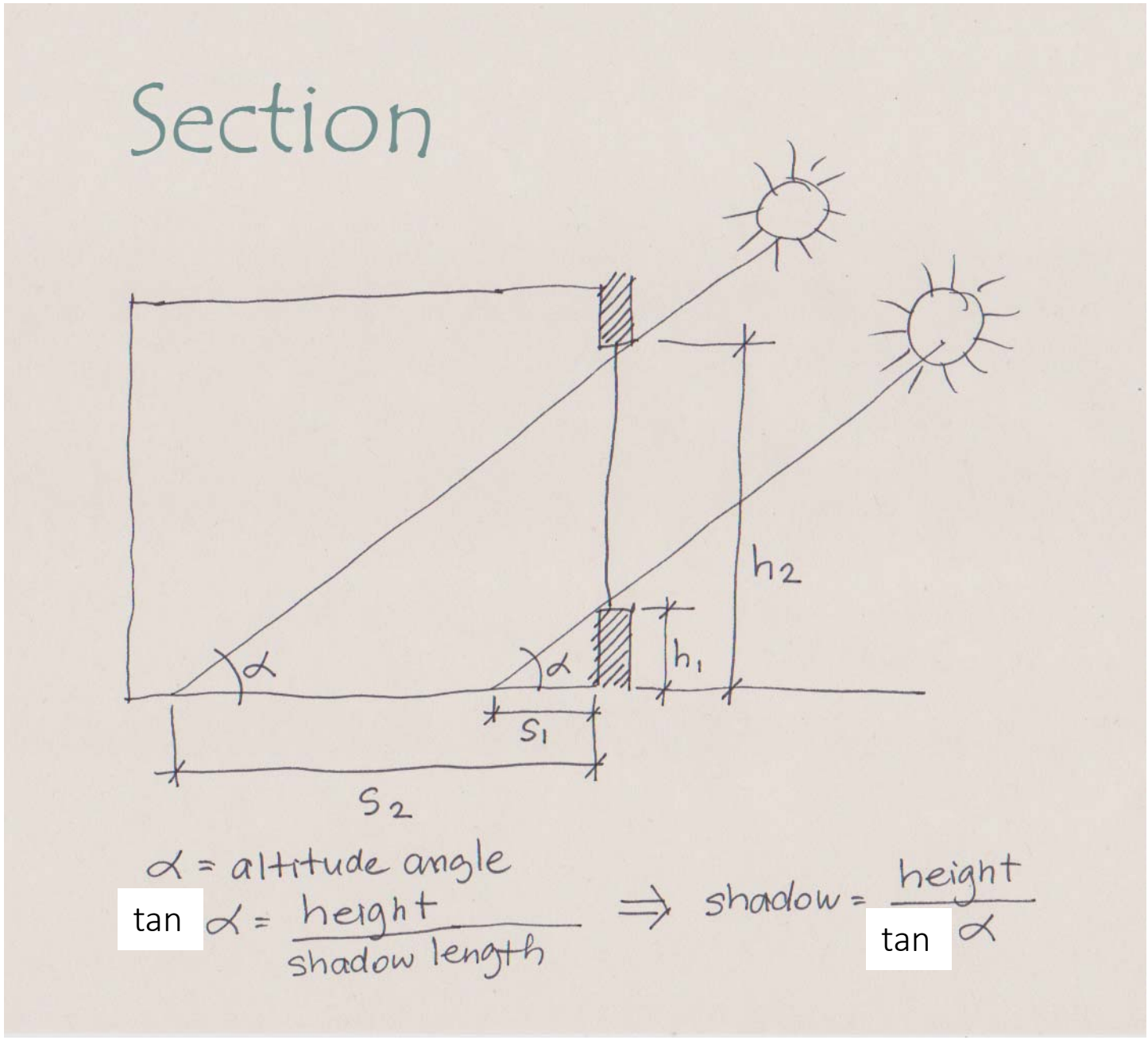
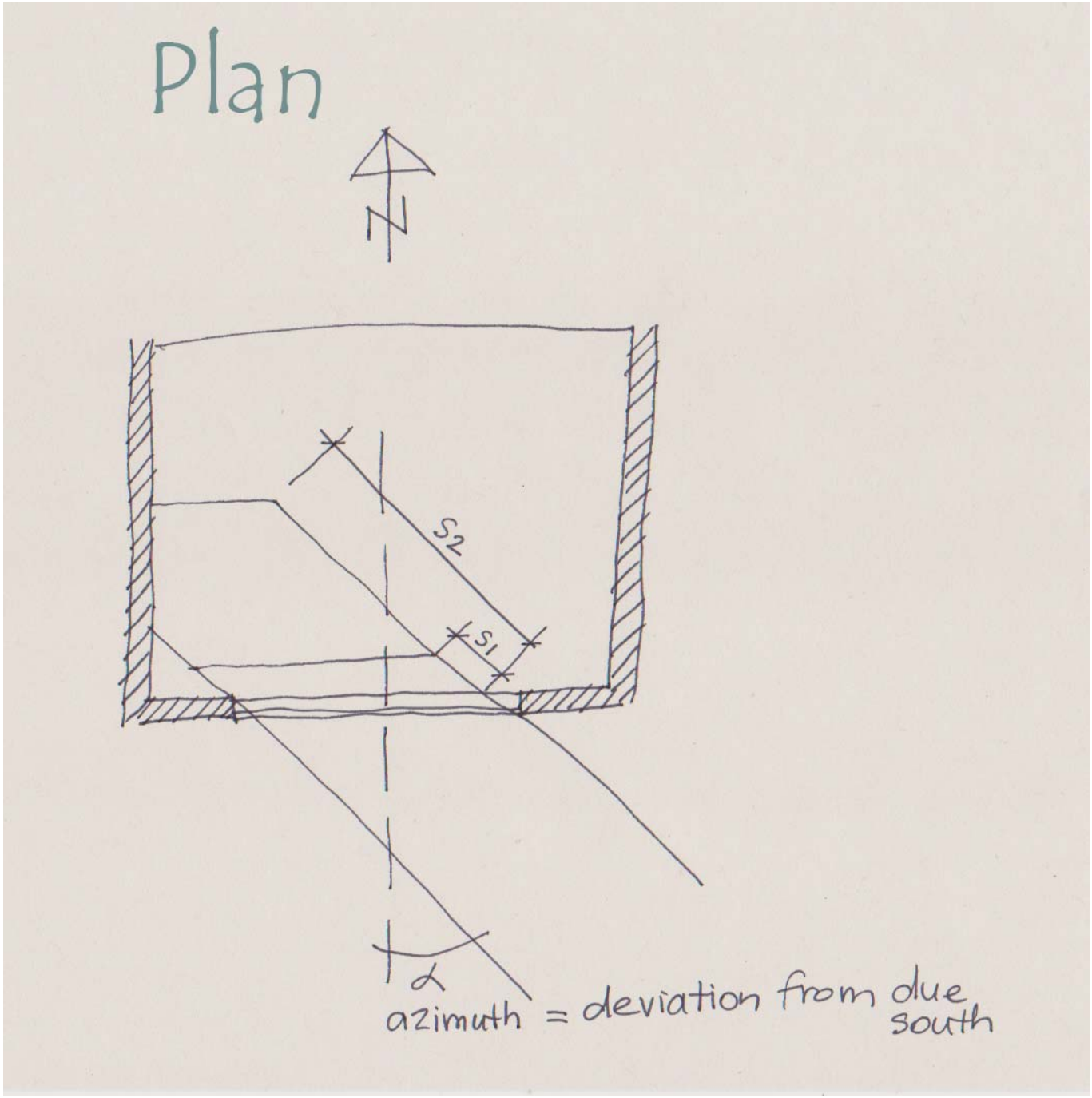


Figure 5.1: Solar azimuth and altitude angles. *Azimuth* angles are measured in each direction from south (for example, northeast = 135° E). *Altitude* angles are measured vertically from the horizon. *(Reproduced from Moore, 1985, by permission.)*



You need to create your own co-efficients as you are not likely able to use the charts I supplied in class as they are only for 43 north latitude.

Use basic Trig to get the values.



The previous section diagram for the geometry applies ALONG the shadow line.

So use the azimuth angle to set out the line of the shadow, and its length corresponds to the line you found in the previous section.