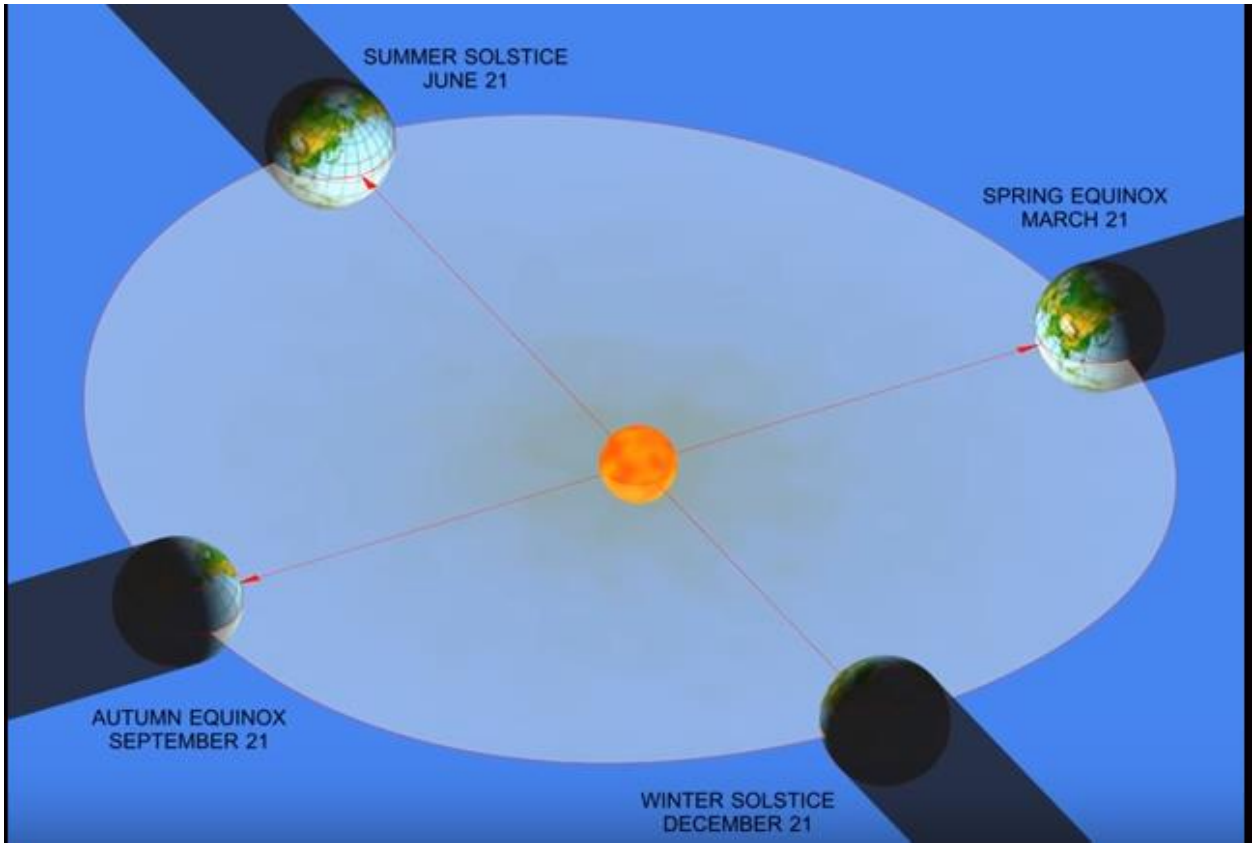
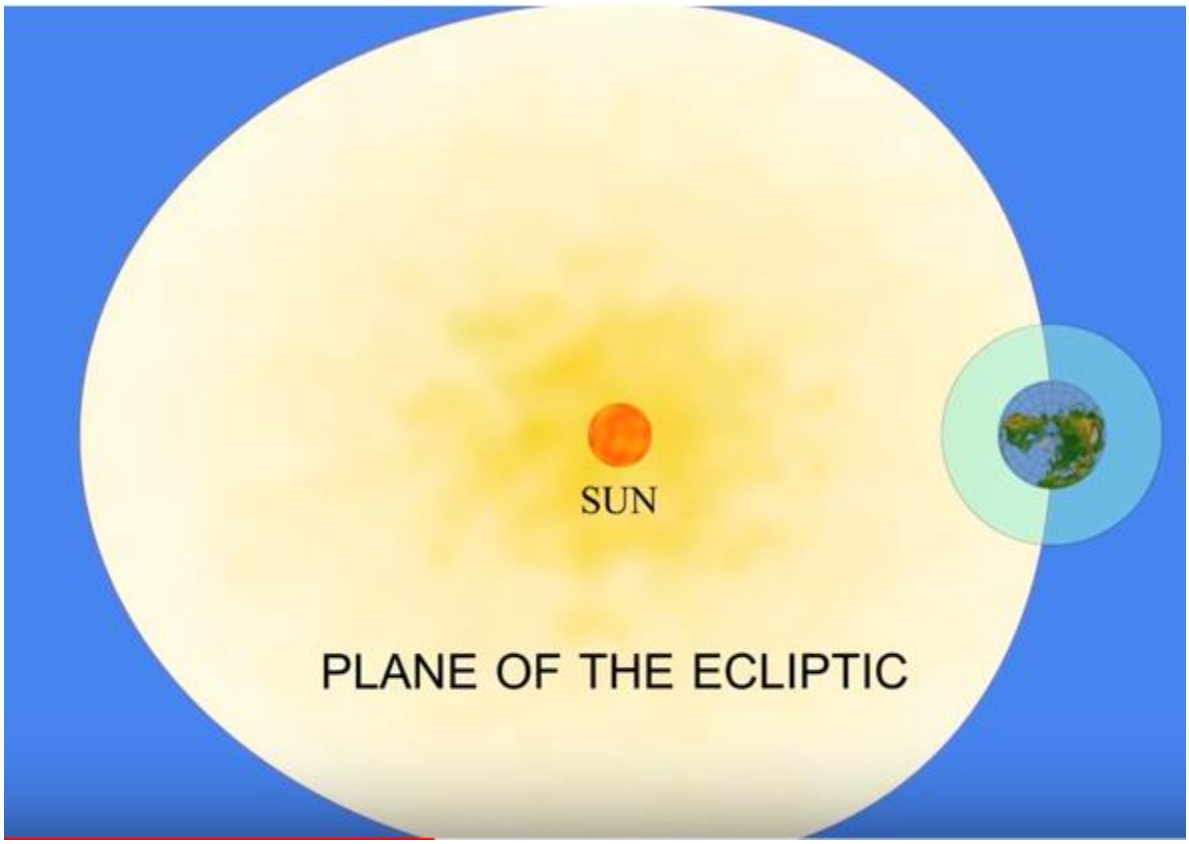
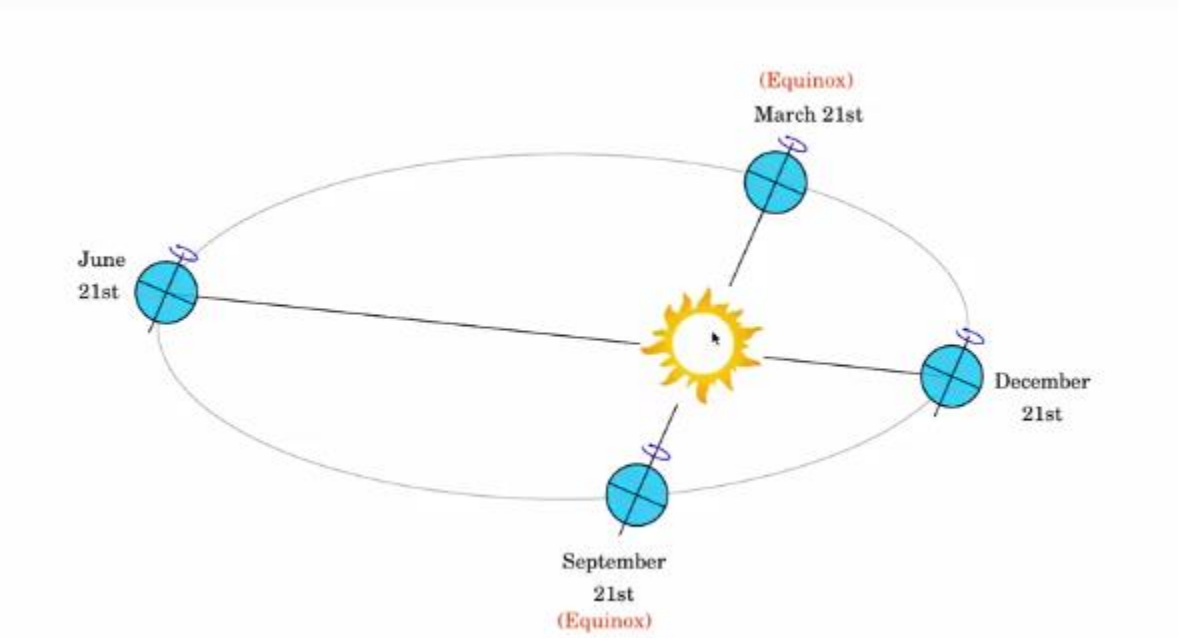
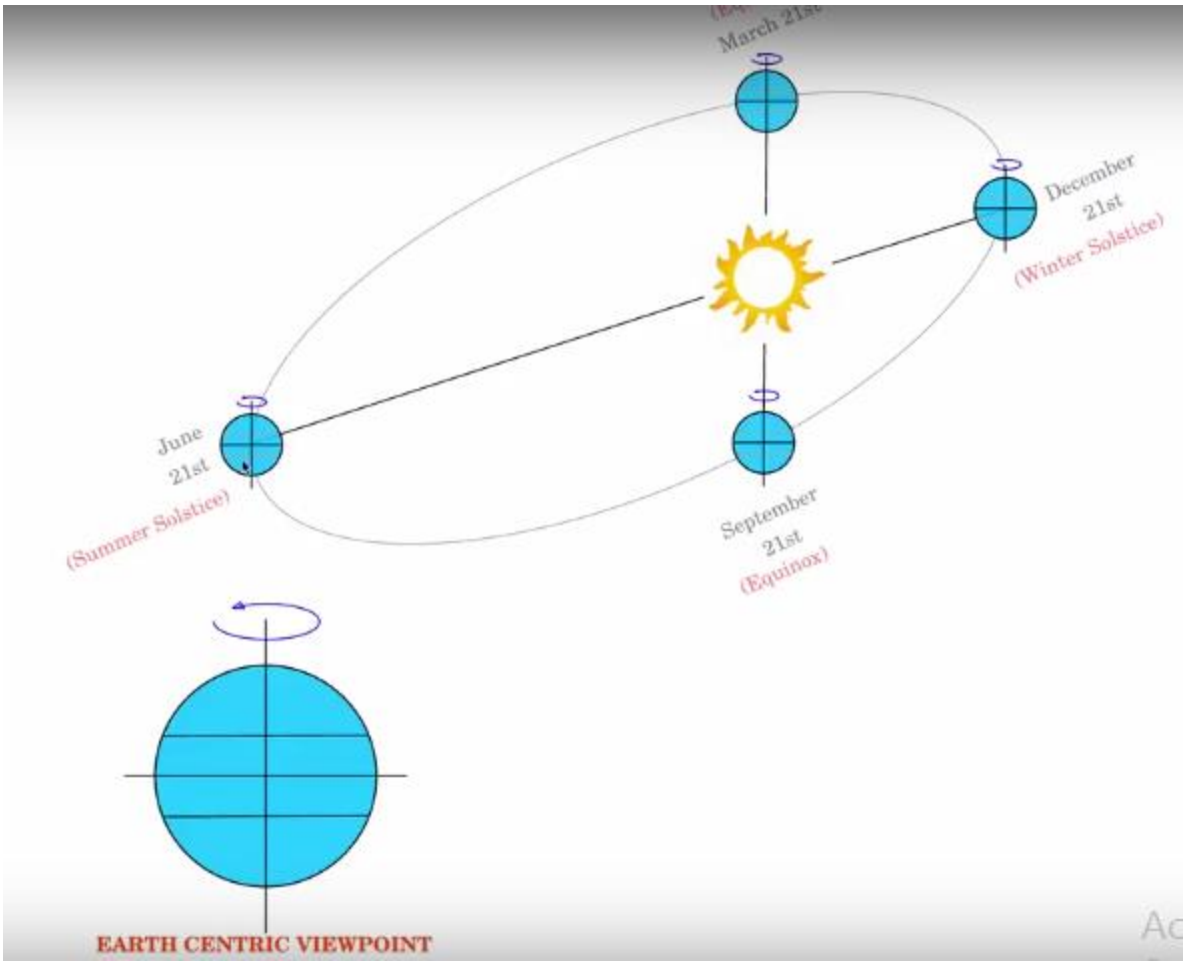
Calculating Noon Sun Angle

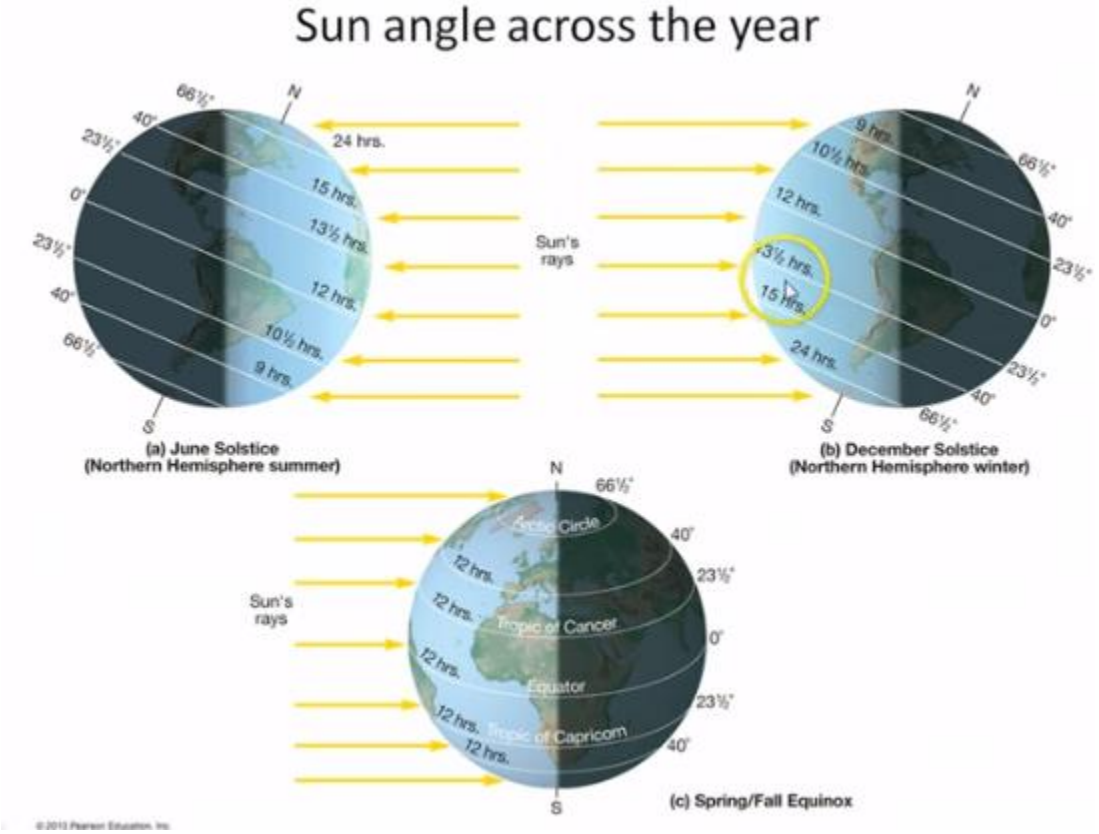



SUN
PLANE OF THE ECLIPTIC


(Equinox)
March 21st
June
21st
December
21st
September
21st
(Equinox)

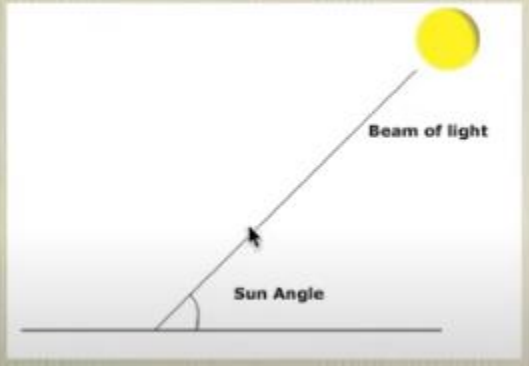

March 21st
December
21st
(Winter Solstice)
June
21st
(Summer Solstice)
September
21st
(Equinox)
EARTH CENTRIC VIEWPOINT

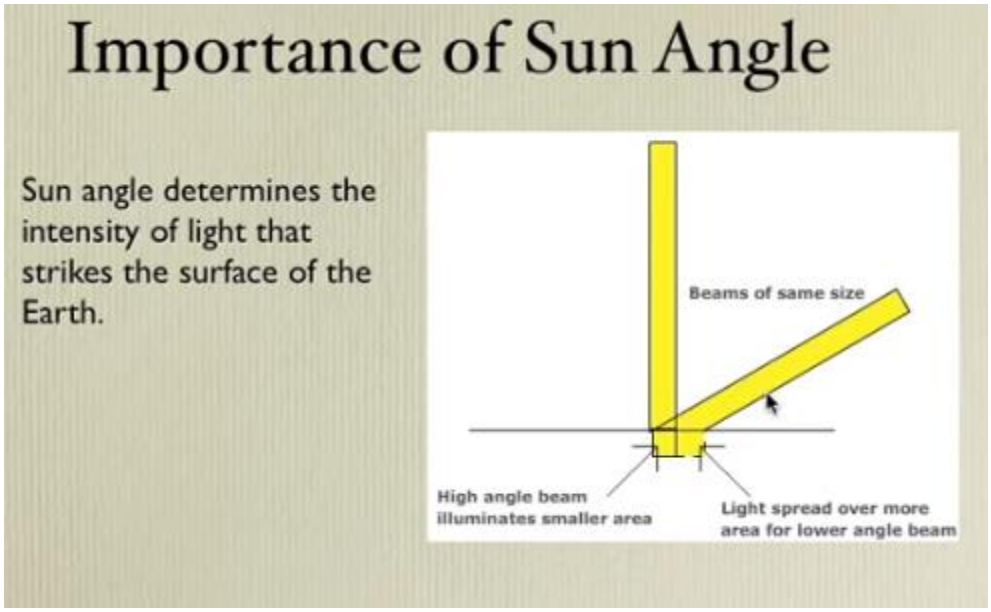
Sun angle across the year



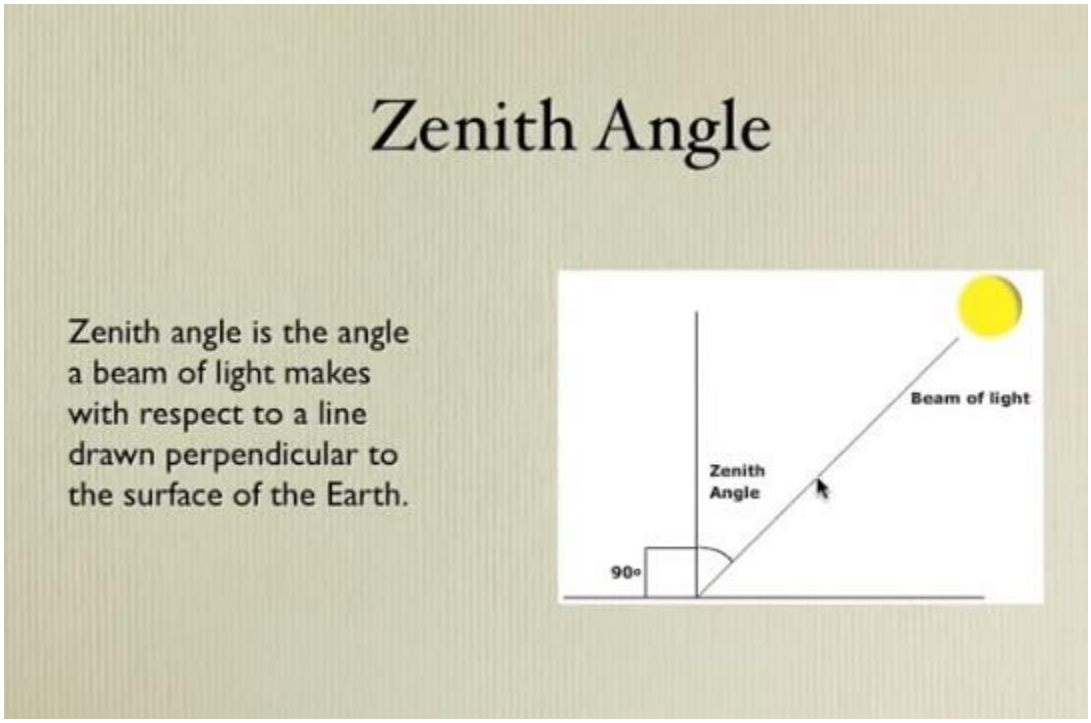
Sun Angle

Sun angle - the angle a beam of light makes with respect to the Earth's Surface



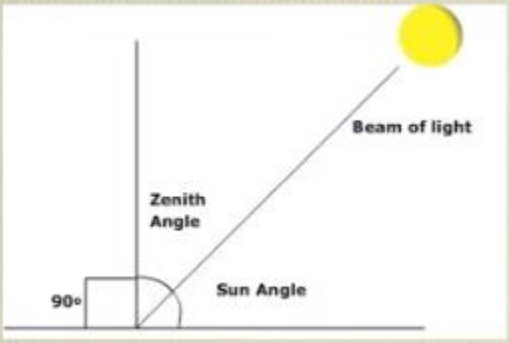


If the sun is at horizon, light is more and the intensity is low. If the sun is in the top (ie zenith is 0 angle) In this case the intensity is more and the light spread is less.



Calculating Noon Sun Angle (NSA)

NSA= 90° - Zenith Angle



Determining Zenith Angle

Zenith angle is the number of degrees of latitude that separate your location from the declination of the Sun.

The declination of the Sun is a measurement of the angle between the Sun's rays and the earth's equatorial plane. It is equal to the latitude where the Sun is directly overhead at noon (i.e. the subsolar point).

Example NSA Calculation

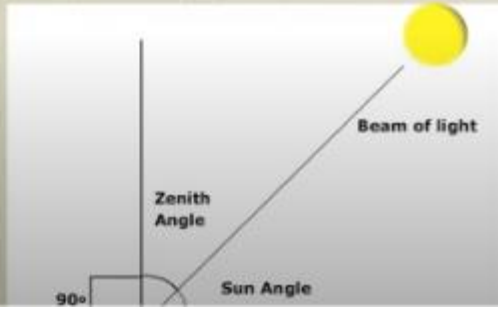
Calculate NSA on June 21st at 44°N

Steps:

Determine zenith angle

Calculate sun angle

NSA= 90° - Zenith Angle

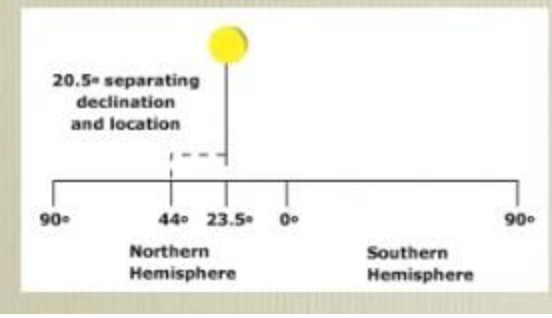


Determining Zenith Angle

Zenith angle for 44°N on June 21st

Declination on June 21st = 23.5°N

Zenith Angle = 44° - 23.5° = 20.5°



Calculate Noon Sun Angle

NSA = 90° - Zenith Angle

Zenith angle = 20.5°

90° - 20.5° = 69.5°

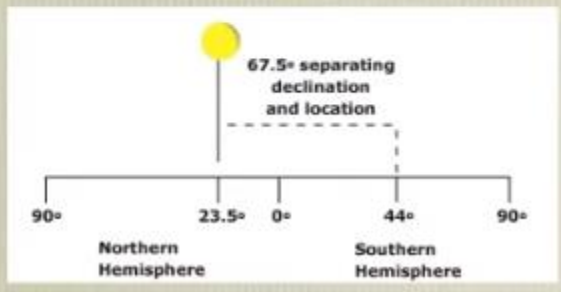
The meaning of the above 69.5 degree is: on June 21st, at 44 degree of northern hemisphere, the sun appear 69.5 degree above the horizon.

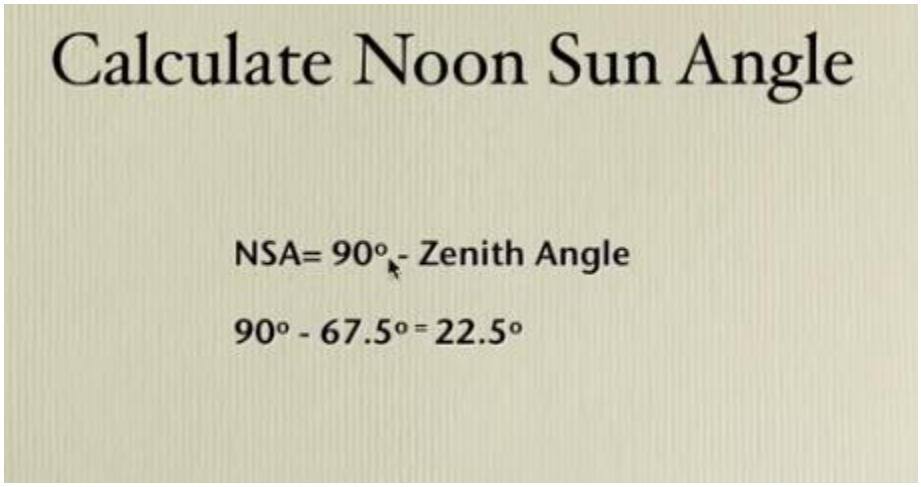
Another Example

Calculate NSA on June 21st at 44°S

Recall, zenith angle is the number of degrees of latitude that separate your location from the declination of the Sun. So,

Zenith Angle = 44° + 23.5° = 67.5°





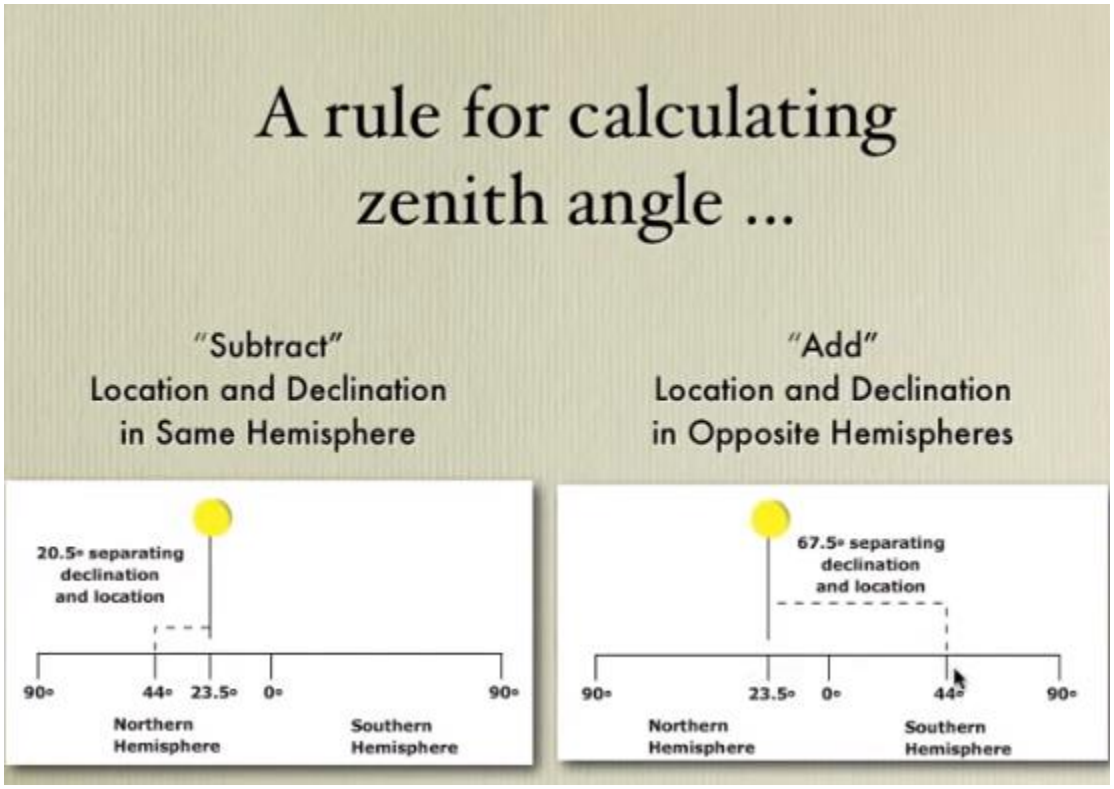
On the same day at 44 degree latitude south is having the sun horizon at 22.5 degree.

We understand that much lower angle , so the sun light is spread over a large area , less intensity , so cool .At 44 degree on June 21 in the northern hemisphere is summer and the same time in the southern hemisphere is cool (winter) .

Example : During may & June India summer (it is in the northern hemisphere) and during the same time the southern part is winter (Australia)

Also in India during summer and winter Delhi is the location reaches most in both extreme (winter and summer)

Also in Australia during summer and winter has both extreme (winter and summer).



If same hemisphere subtract, if it is opposite hemisphere add.