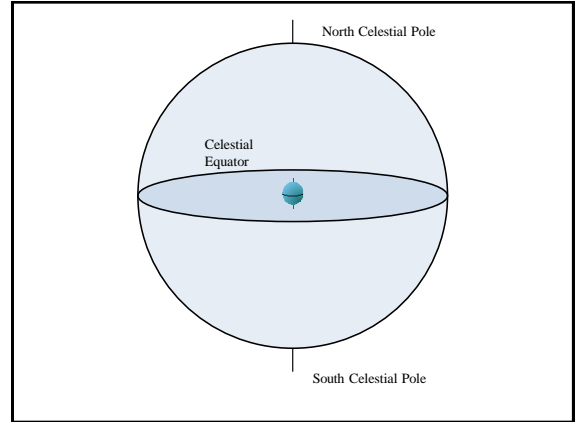
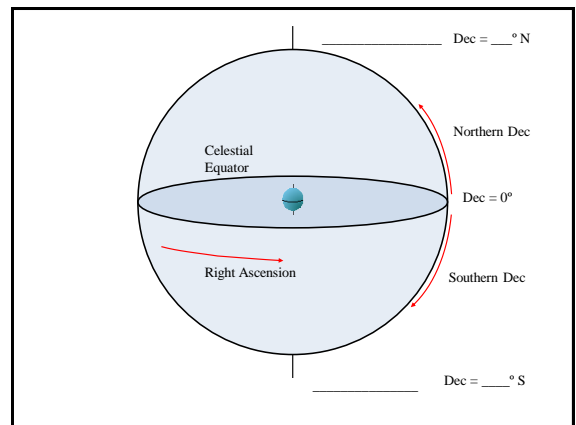
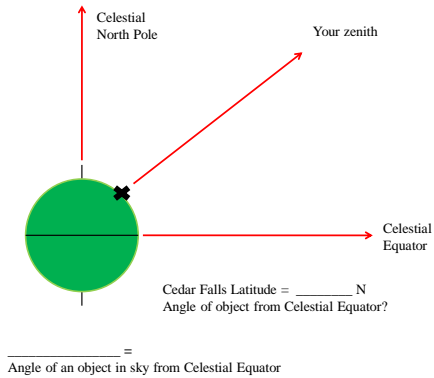
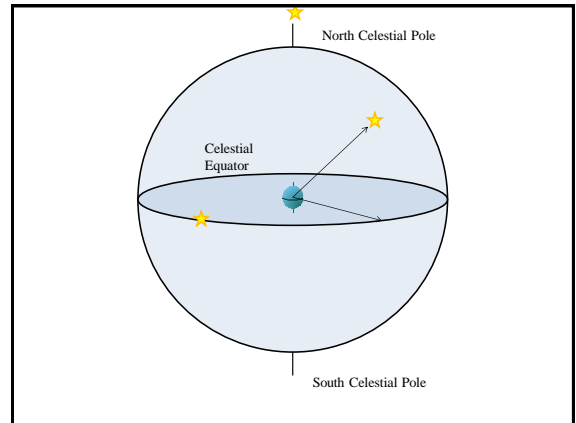


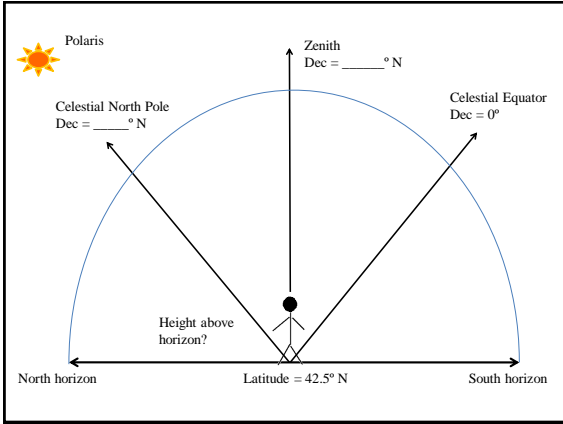
Celestial Sphere

- Useful for mapping the sky
- A Model – NOT REALITY
- Assumption
 - Earth is in the middle
 - Earth does not move
 - Stars at the same distance



- _____ = location directly over your head
90° above the ground
- _____ = where the sky and ground meet
At the ground (0°)
- How do you describe other locations?





Angle problems

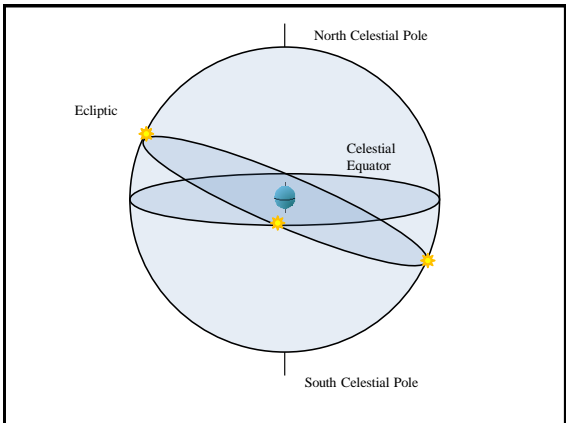
- Your latitude
 - Defines your zenith declination value
 - Places you relative to the Earth's Equator
- Declination of object
- Position relative to horizon

Sun's apparent motion relative to the stars

Over the Earth's equator – Equinox (Vernal and Autumnal)
 March 21 & Sept. 21, Sun's dec. = _____

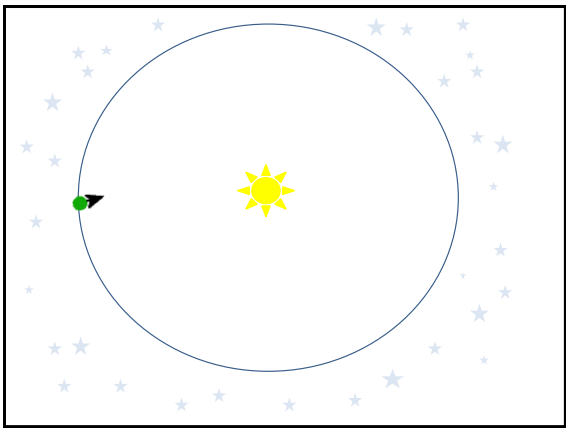
Most northerly point – Summer Solstice – June 21
 "Tropic of _____", Latitude = 23.5° N, Sun's dec. = _____

Most southerly point – Winter Solstice – Dec. 21
 "Tropic of _____", Latitude = 23.5° S, Sun's dec. = _____

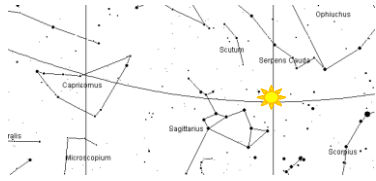


IT IS ONLY A MODEL! NOT REALITY!

- Sun doesn't orbit the Earth – Earth orbits!
- Stars are not on a giant sphere!
- Distances are much greater!
- Motions (real and apparent) sense of time
 - Daily "motion" of stars = 23:56 = _____ day
 - Daily "motion" of Sun = 24 hours = _____ day
 - Rotation of the Earth?



WHAT???



On December 21 the Sun is located above the Tropic of Capricorn?
Why not the "Tropic of Sagittarius"?

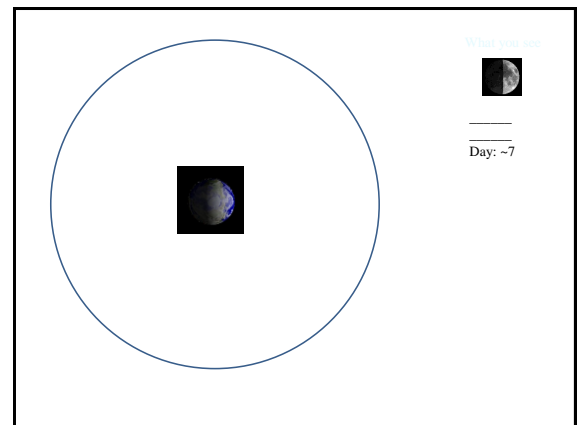
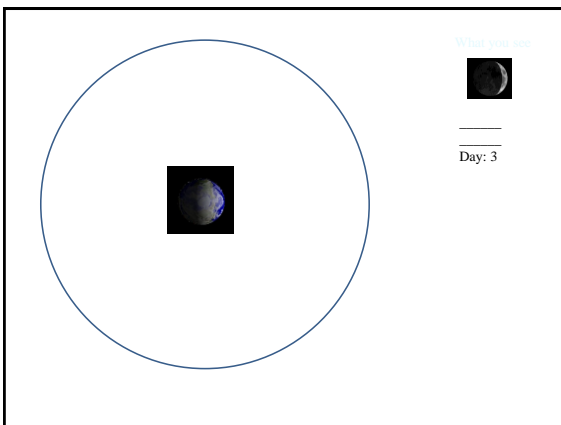
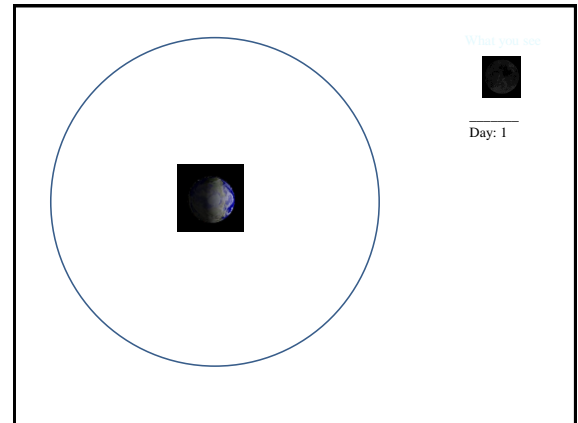
Precession

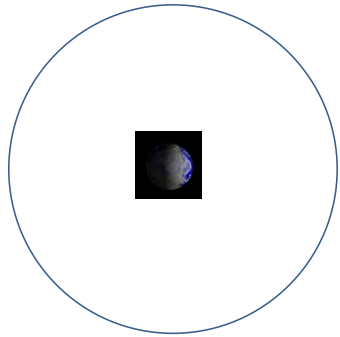
- Alters our alignment to the sky/stars
- Alters our alignment to the Sun
- Alters calendars (until around 1600)
- Most people have the "wrong sign"
- One precession takes _____ years

Phases




- Entire cycle takes 29.53 days
- 4 Major phases
 - New, First Quarter, Full, Third/Last Quarter
- ~1 week between major phases
- Time scale
 - Earth rotates faster (~24 hours versus ~30 days)
 - Moon slowly moves relative to the stars
 - Daily change in position notable

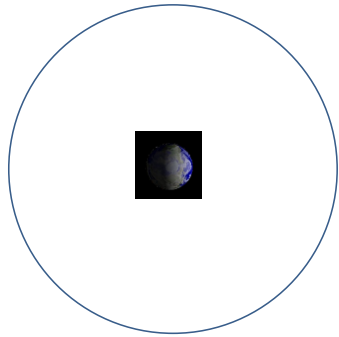





What you see



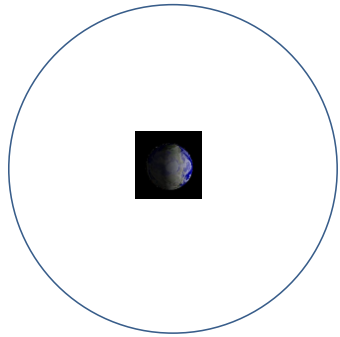
Day: ~11




What you see



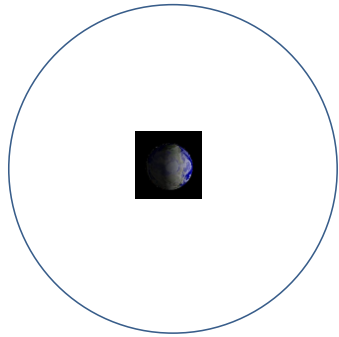
Day: ~15




What you see



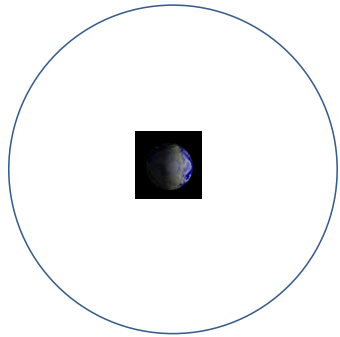
Day: ~18




What you see



Day: ~22



What you see





Day: ~25


When is the Moon visible?

- Depends on phase
- Depends on what the Moon is doing
 - Rising
 - Setting
 - On your meridian (high in the sky)
- Use 6 hour increments (simpler)

First Quarter



Time:  Time:

Time:  Time:

Who is seeing the Moon rise?
Who is seeing the Moon set?
Who has the Moon high in the sky?

