Chapter 1:

The Cycles Of the Sky

Astronomy

Chapter 1: The Cycles of the Sky

Topics

1. **The Celestial Sphere**
   - Constellations
   - Daily Motions of the Sun and Stars
   - Annual Motion of the Sun
   - The Ecliptic and the Zodiac
2. **The Seasons**
   - Solstices, Equinoxes, and the Ecliptic's Tilt
   - Tracking the Sun's Changing Position

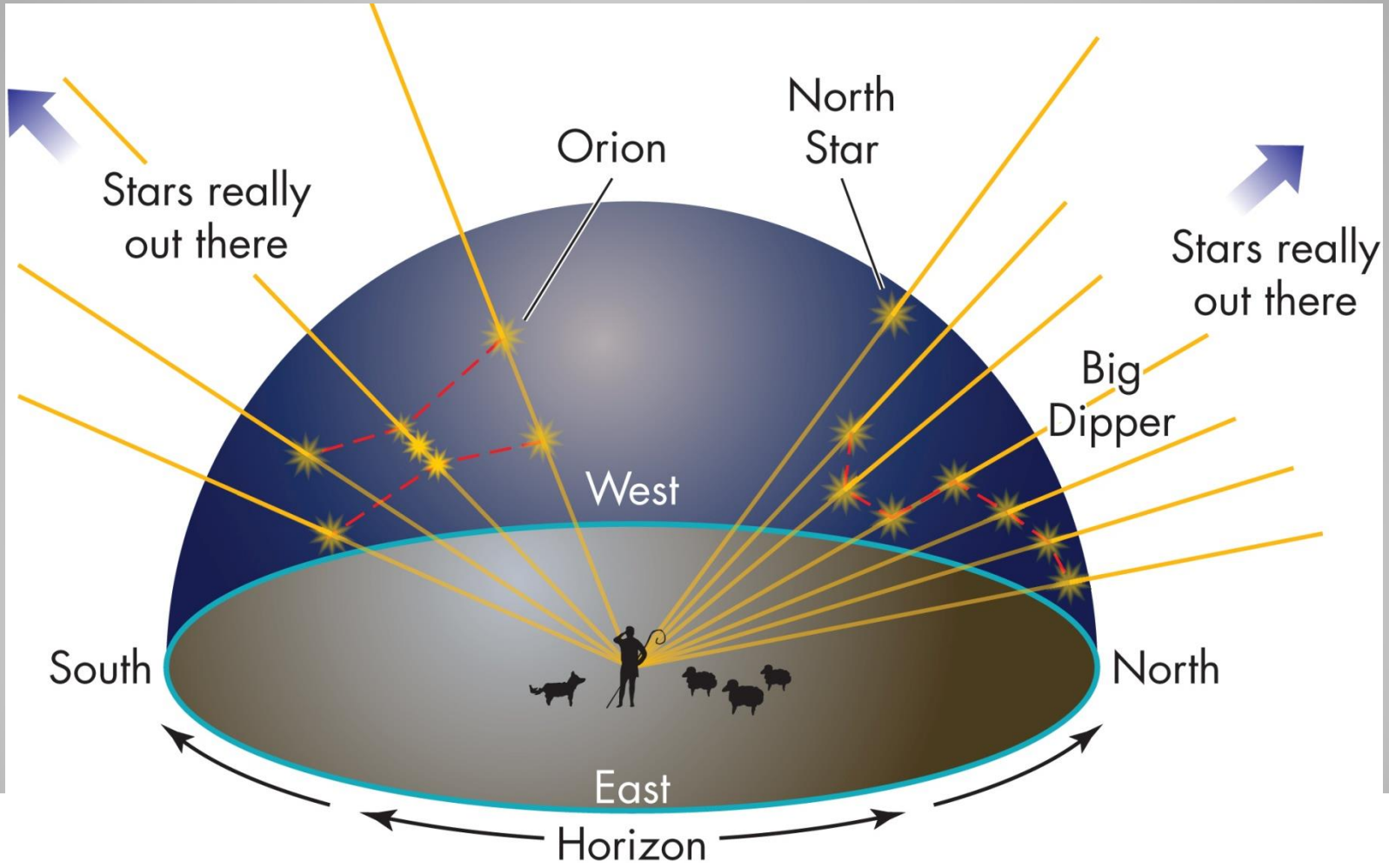
1. The Celestial Sphere

Introduction

- Remember, _____ are huge _____ away that we can't get any sense of their true _____ arrangement in space when we view them
- When looking from _____ and studying the sky, we can simply _____ they're all the same _____ away (for now)
- The _____ above can be seen as a "_____ "
- _____– where the _____ meets the ground along a _____ circle

1. The Celestial Sphere

Introduction



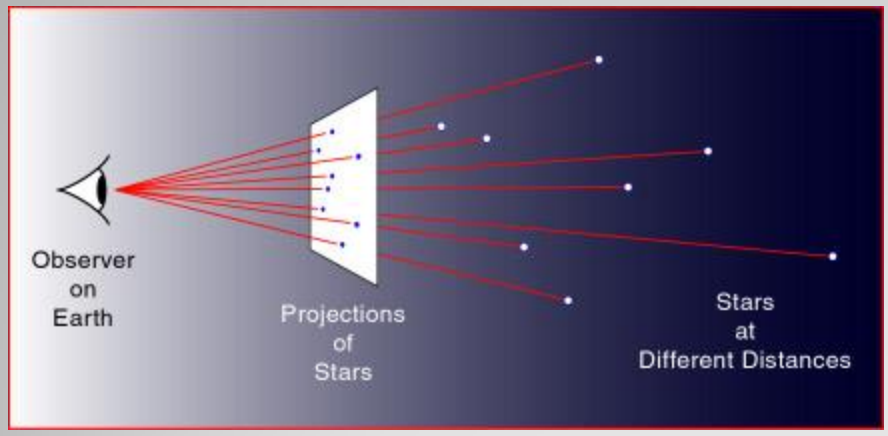
1. The Celestial Sphere

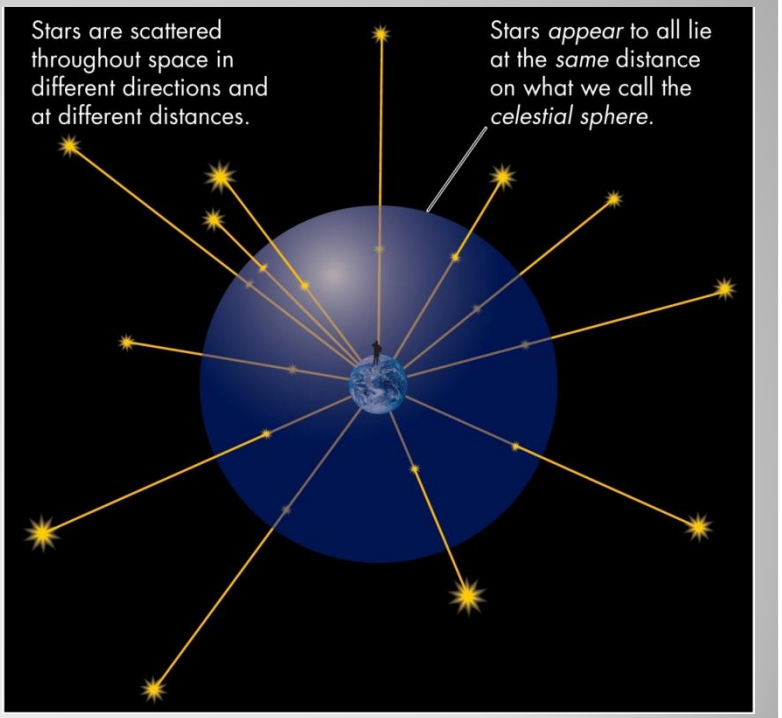
Introduction

- _____ Sphere – an _____ sphere surrounding the _____ representing the _____
  - _____ means "_____" or "_____"
  - We only see _____ of the _____ sphere at one time
    - The _____ blocks the other half
  - Our "_____" is our half of the celestial sphere
- _____ is that stars are at all different _____ from _____, but we see a _____ prospective, making them all seem the same _____ away from Earth's surface

1. The Celestial Sphere

Introduction





1. The Celestial Sphere

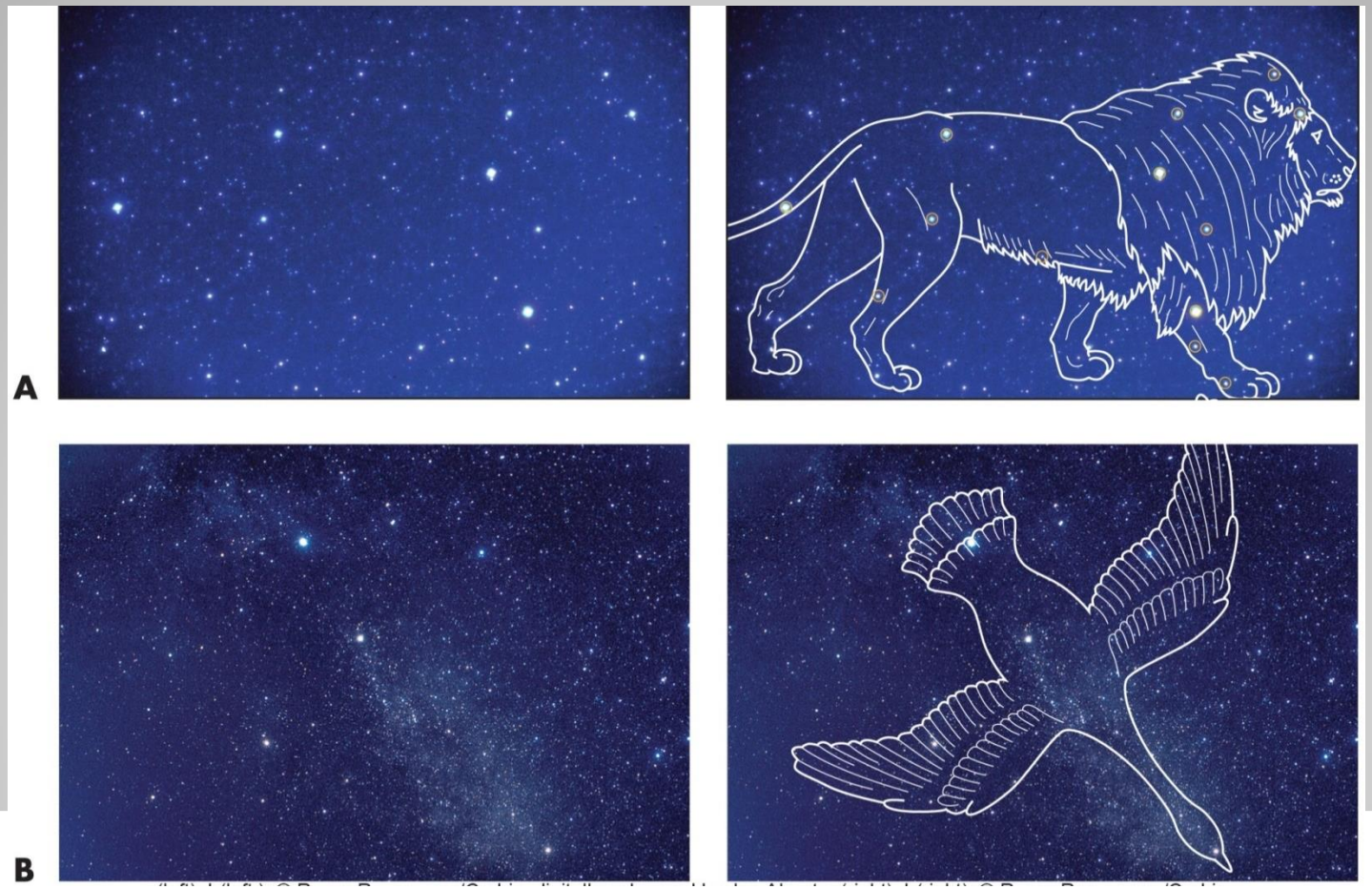
Constellations

- Naturally, we _____ seek order or look for _____ in what we see
- When _____ people looked at the sky, they noticed that the _____ form fixed _____ on the _____ sphere
- _____– a grouping of _____ in the night _____ from one _____
- Astronomers of the _____ divided the night sky into _____ constellations
  - Some of these resemble _____ and other mythological _____, but others are not _____ by their _____ and _____ combo

1. The Celestial Sphere

Constellations

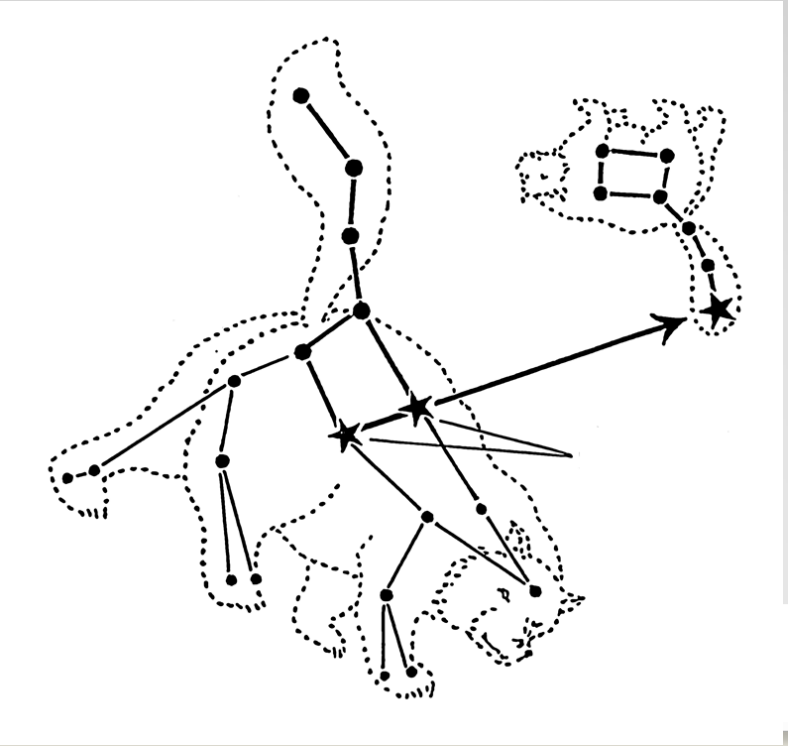
Constellations _____(A) and _____(B)



1. The Celestial Sphere

Constellations

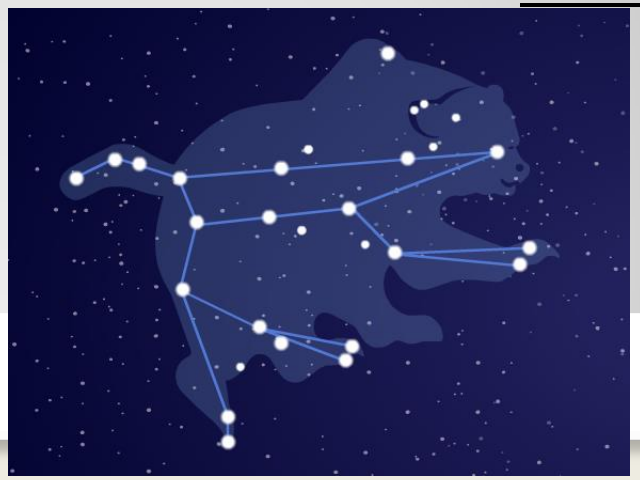
- _____– less formally defined group of _____ in a _____
  - Ex: the _____ _____!
  - It's part of the constellation Ursa _____



1. The Celestial Sphere

Constellations

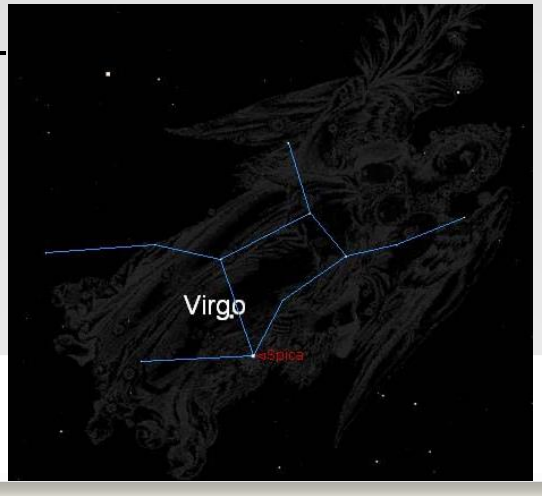
- All _____ move through _____, but as seen from _____, their _____ change very _____
- This takes _____ of _____ of years to make any noticeable shift in _____ in the _____
- When we _____ the _____ sphere, we assume they don't _____
- The _____ we see today are the same as the _____ seen by ancient _____

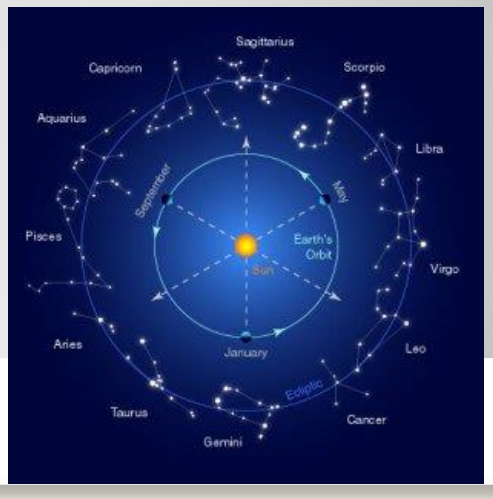


1. The Celestial Sphere

Constellations

- Some were named based on _____ and _____ seasons
  - Ex: _____ and _____ are two constellations visible to sailors at the beginning of the _____ _____ months so they were named based off of those dangerous _____
  - Ex: _____(named after the goddess *Proserpine*) was named as it was for the harvest season as it looked like she was holding a sheaf of _____





1. The Celestial Sphere

Daily Motions of the Sun and Stars

- When you _____ in the night sky, stars will _____ along the _____ horizon, move across the _____, and set over the _____ horizon just like the _____ does
- _____ will rise and set in their fixed _____ just like the individual stars
- This movement is a big optical _____
  - Earth is the one _____, not the _____ or _____ in the sky
  - Very similar to driving down the highway in the car
    - The trees and view outside zips past your window making it seem like it's moving behind you really fast when in reality it's not moving, you are and in the opposite direction

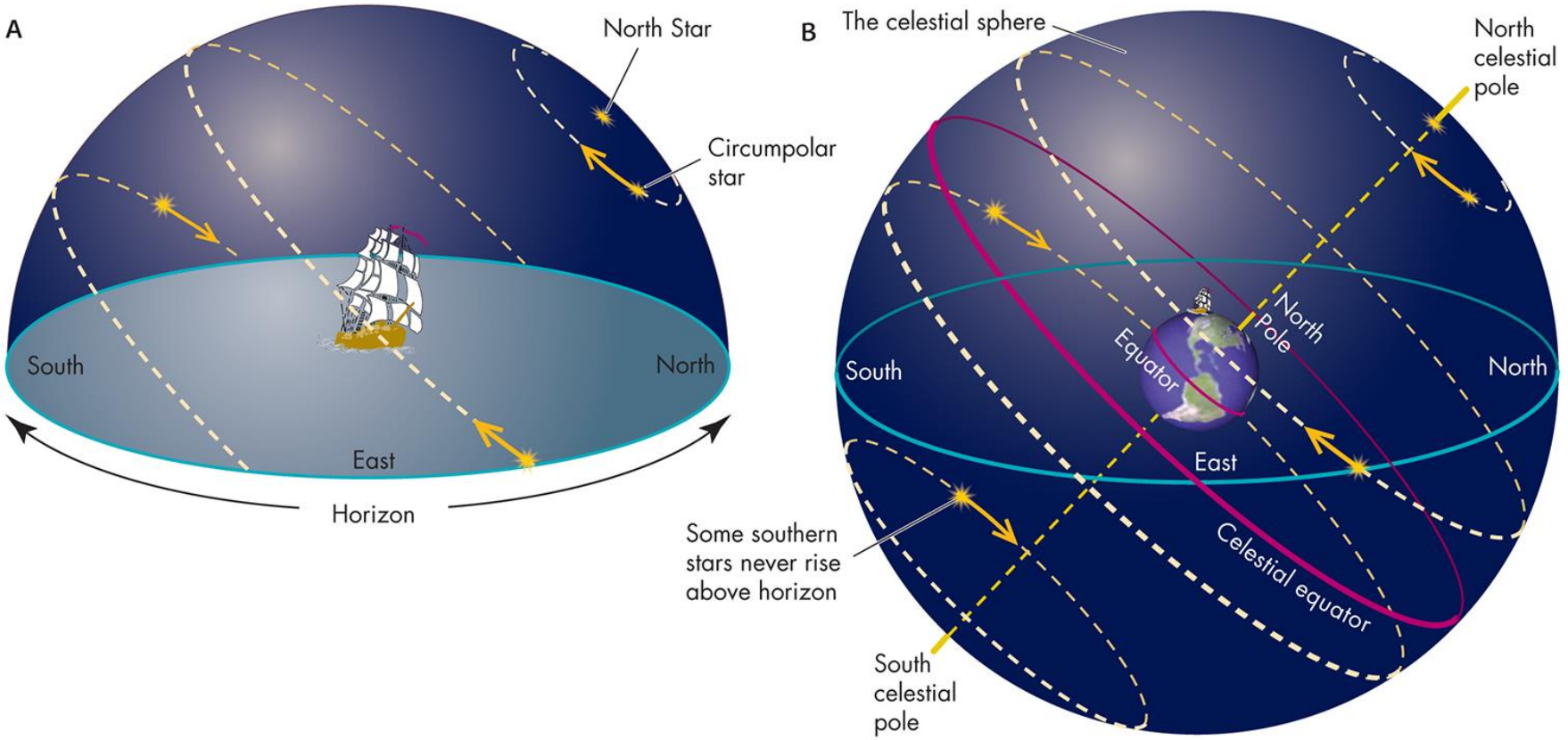
1. The Celestial Sphere

Daily Motions of the Sun and Stars

- There are _____ points that don't move on the _____ sphere: _____ poles
- _____ Pole – an _____ point on the _____ sphere directly _____ the Earth's _____ or _____ Pole
  - We can "_____ " the _____ celestial pole, the _____ one we cannot
- The Earth _____ (spins) on it's _____ that runs through the poles… This is why the celestial ones don't move
- Because of how we _____ , the sky and stars in it move _____ around the north celestial pole
  - It's backwards, just like the driving example
  - Or… the sky moves westward because we move eastward

1. The Celestial Sphere

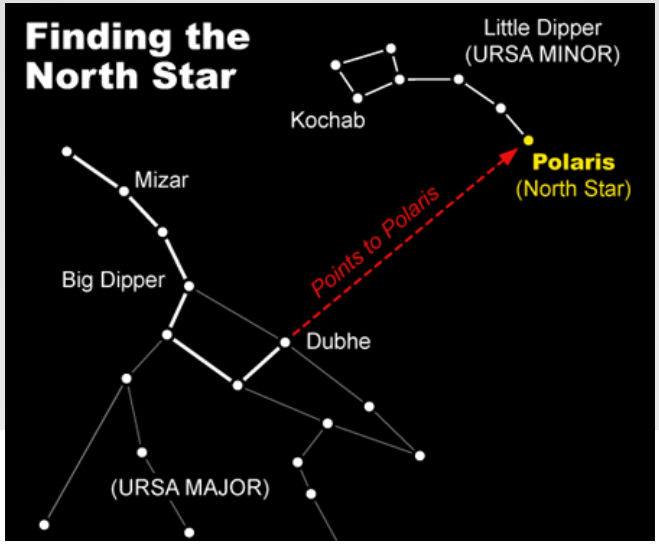
Daily Motions of the Sun and Stars



1. The Celestial Sphere

Daily Motions of the Sun and Stars

- Because the _____ celestial pole is above the _____ Pole, it sets the direction for the true _____ (or cardinal _____) direction
  - A fairly bright star, _____ , sits very close to it and because of that is commonly known as the _____ _____
  - The _____ celestial pole _____ have one



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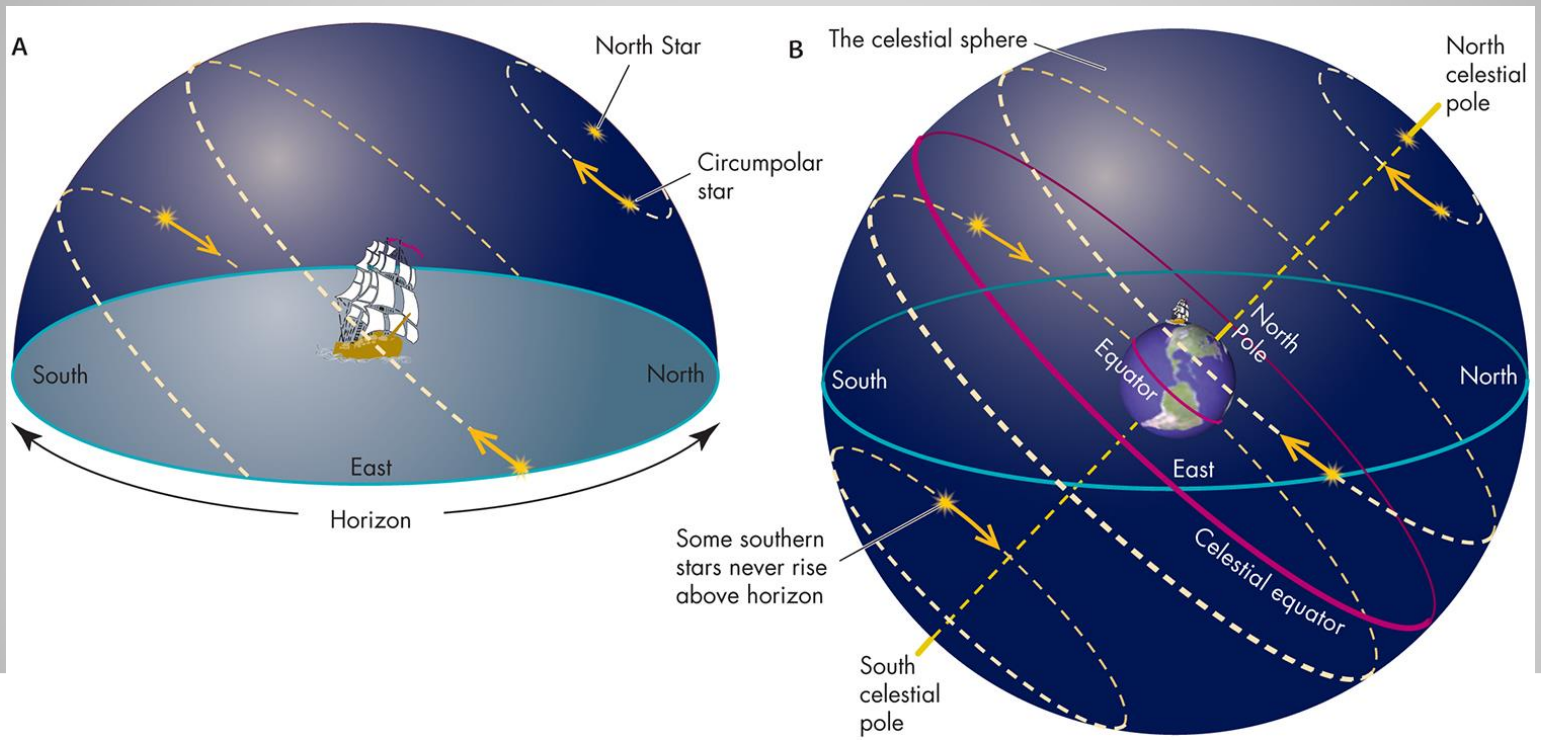
Daily Motions of the Sun and Stars

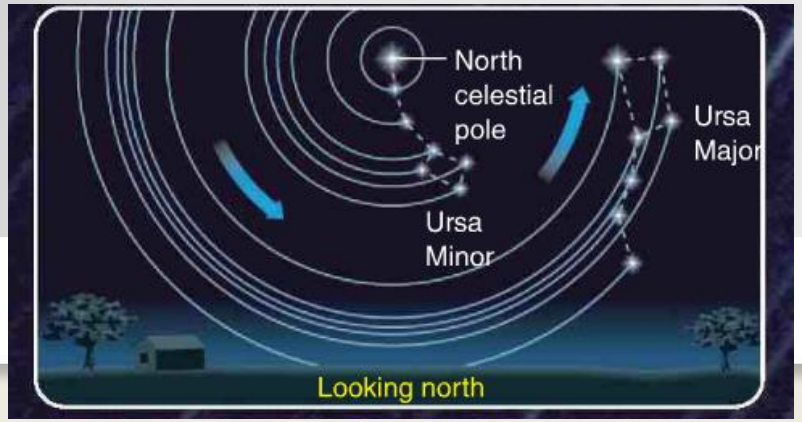
- _____ Equator – an _____ line on the _____ sphere lying exactly _____ the Earth's _____
  - This divides the _____ and _____ hemispheres

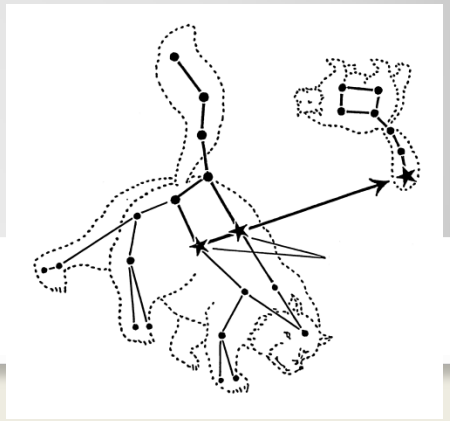


1. The Celestial Sphere

Daily Motions of the Sun and Stars

- _____ Constellations – _____ and _____ that circle around a _____ pole and never _____ or set _____ the horizon
  - Ex: Ursa Major and Ursa Minor are two of the northern circumpolar constellations
- From the _____ hemisphere there are _____ circumpolar constellations we will _____ see
  - same with the southern hemisphere, they'll never see the _____

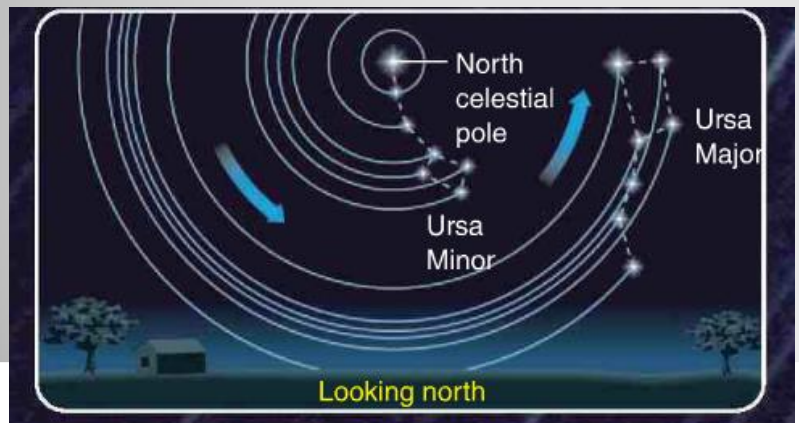




1. The Celestial Sphere

Daily Motions of the Sun and Stars

- _____ Trails – _____ that show the _____ stars traveled in our vision of the _____
  - _____ star trails are _____ generated in most cases…
  - Depending on where stars are in our line of sight will depend on how _____/ _____ they travel throughout the night
    - Stars closer to the celestial poles won't travel as far as those near the celestial equator



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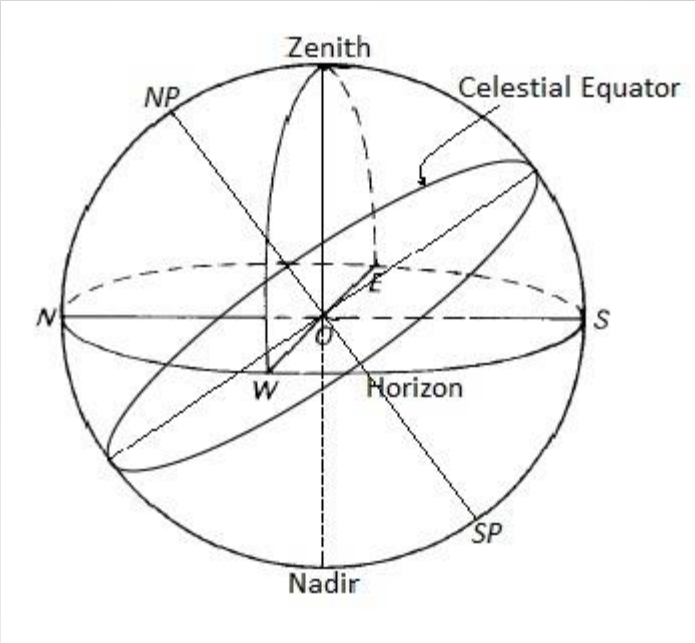
Daily Motions of the Sun and Stars

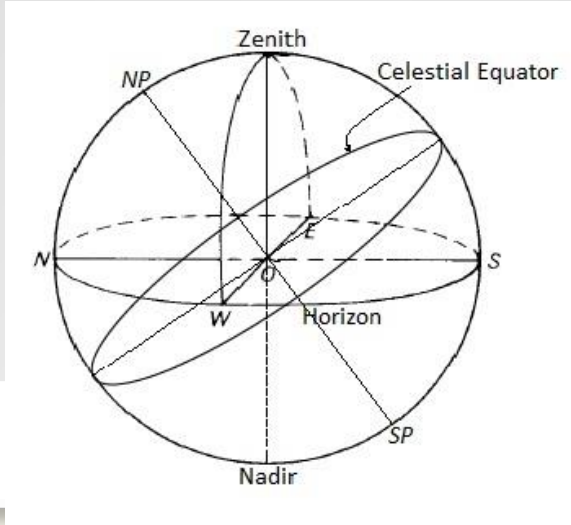
- _____– the _____ on the celestial sphere that lies directly _____ at _____ location
- _____– the point _____ of the _____
  - We can't see this



1. The Celestial Sphere

Daily Motions of the Sun and Stars

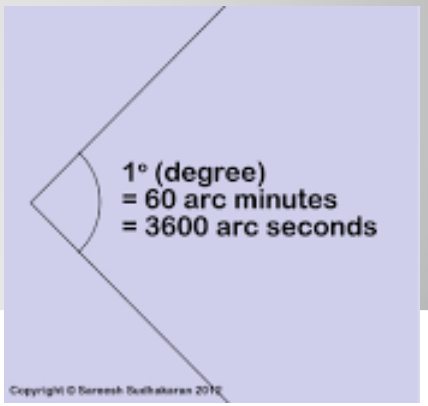
- _____ Point – point on the horizon closest to the _____ celestial pole
- _____ Point – point on the horizon closest to the _____ celestial pole
- _____/ _____ Points – points that are _____ between north and south where the _____ meets the _____



1. The Celestial Sphere

Daily Motions of the Sun and Stars

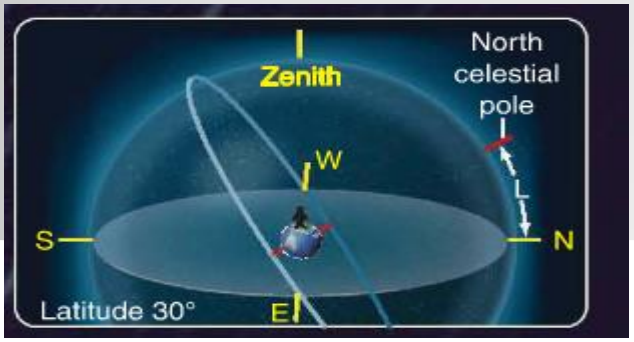
- _____ measure _____ distances across the sky as angles and express them as:
  - _____
  - Arc _____
  - Arc _____
- _____ Distance – the _____ between two _____ extending from your _____ to the two objects
  - _____ is the standard
  - Arc _____ – _____ of a degree
  - Arc _____ – _____ of an arc minute

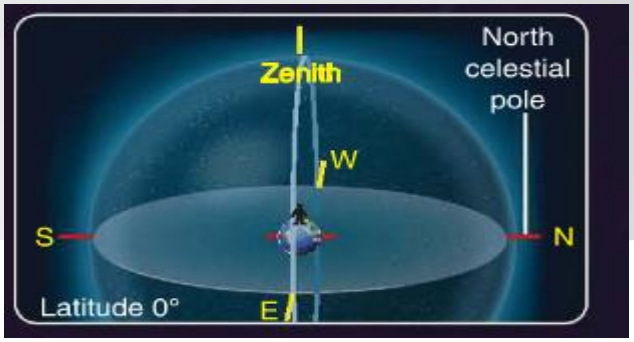


1. The Celestial Sphere

Daily Motions of the Sun and Stars

- What you see in the sky depends _____ on your _____
- The _____ distance of from the _____ or _____ celestial pole will always equal your _____
  - Ex: 40° latitude = a 40° _____ from the location of the _____ celestial pole to the _____ point on the _____
  - Ex: 0° _____ = the equator where there would be a 0° _____ between the _____ poles and the points on the _____

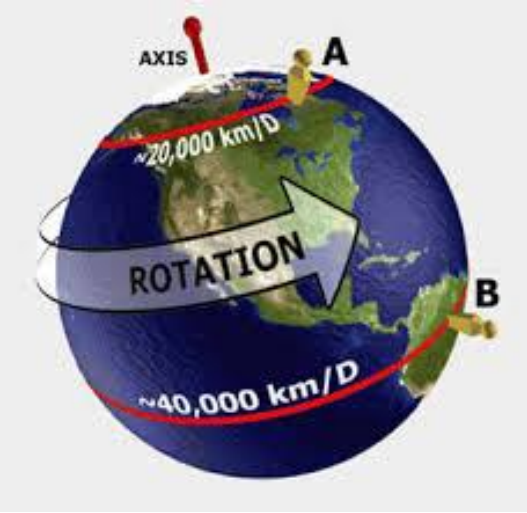


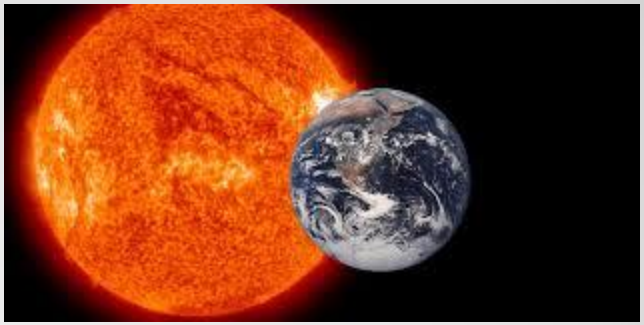


1. The Celestial Sphere

Annual Motion of the Sun

- _____– turning of a _____ on its _____
  - Earth spinning on its axis in _____ hours
- _____– the _____ of a _____ around a point _____ of that body
  - Earth moving around the _____ or the Moon moving around _____

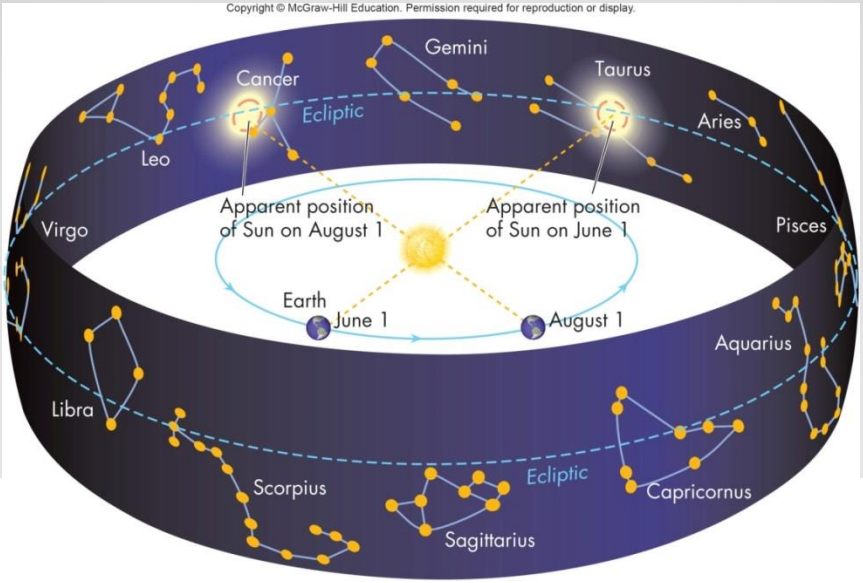




1. The Celestial Sphere

Annual Motion of the Sun

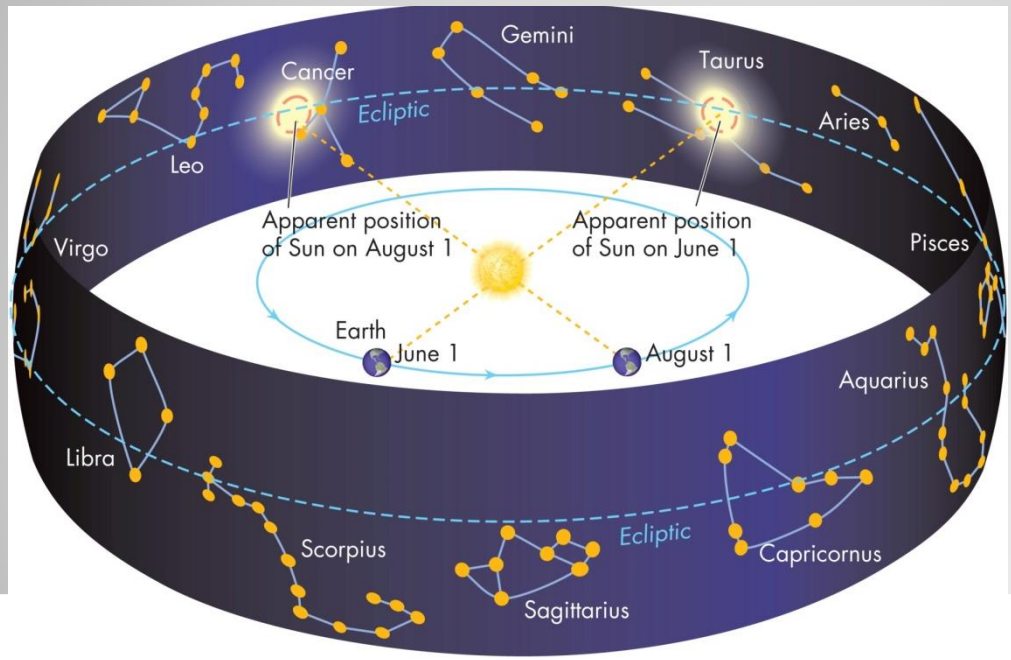
- If you _____ the sky at the same _____ each _____ for a few months, you'll see that different _____ are visible
- This is caused by the Earth's _____ around the _____ throughout the year

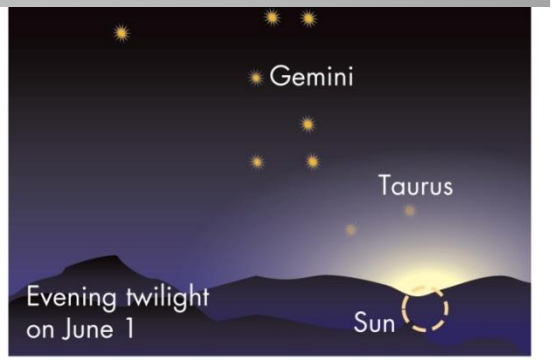


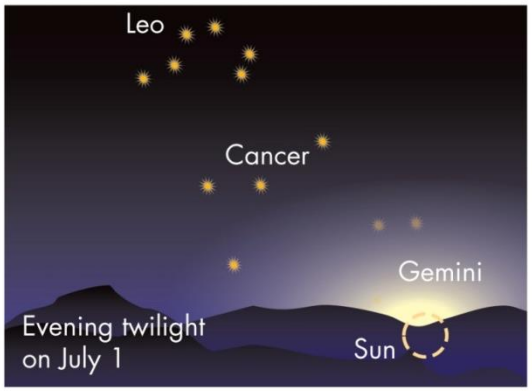
1. The Celestial Sphere

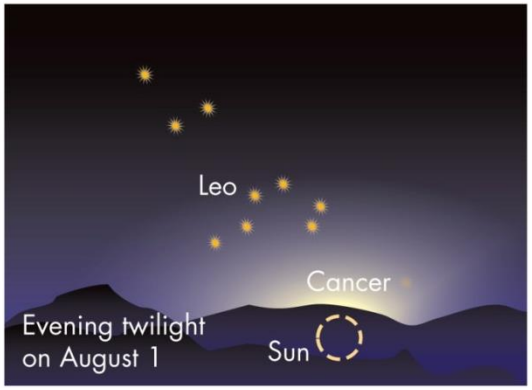
Annual Motion of the Sun

- Stars rise almost _____ earlier than the _____ before due to this





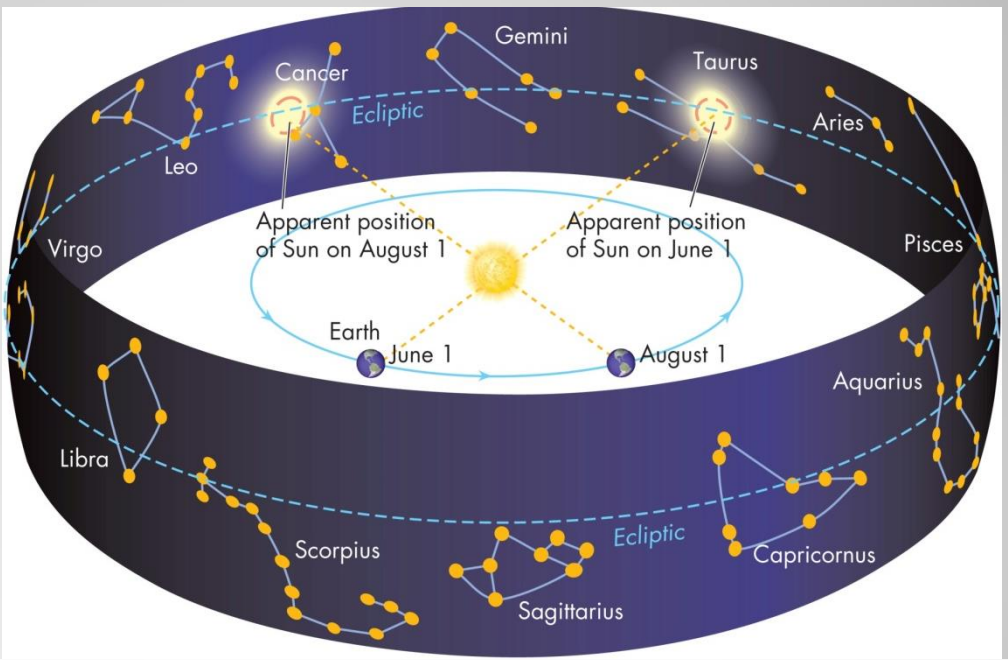




1. The Celestial Sphere

The Ecliptic and the Zodiac

- _____– the _____ that the _____ appears to make around the _____ sphere as the _____ moves along its orbit
- This ecliptic is where the zodiacs came from
- The Sun passes through _____ main constellations… the _____
  - Aries
  - Taurus
  - Gemini
  - Cancer
  - Leo
  - Virgo
  - Libra
  - Scorpius
  - Sagittarius
  - Capricornus
  - Aquarius
  - Pisces



1. The Celestial Sphere

The Ecliptic and the Zodiac

- The _____ fall under _____ which is defined as a _____ and _____ affiliated with astronomy
  - Sorry horoscope people…
  - It was thought that _____ characteristics were associated to which constellation figure was in the sky at the time
  - Stars do move and shift over _____ of years so the original dates of the horoscopes and _____ are, in fact, _____ (sorry again)