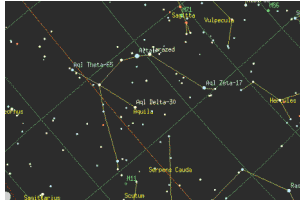


### Lecture 3 -- Astronomical Coordinate Systems



#### Constellation of the Day...Aquila

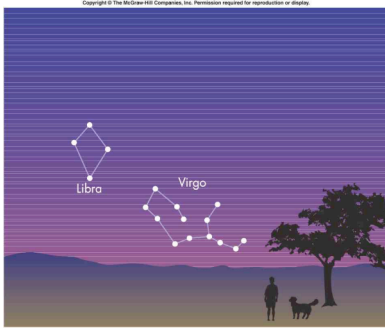
Look at constellation maps on course home page

### Last time: seasonal differences in the sky

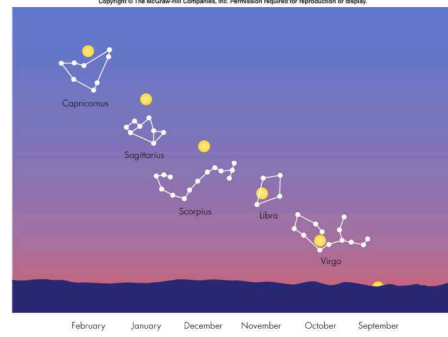
At different times of year we see different constellations in the evening sky, etc. Can be understood as the Sun moving through different constellations

Show illustration with constellations link on home page

### Measuring the position of the Sun against the background stars



### The path of the Sun through the stars



Note that the Sun only moves through certain constellations

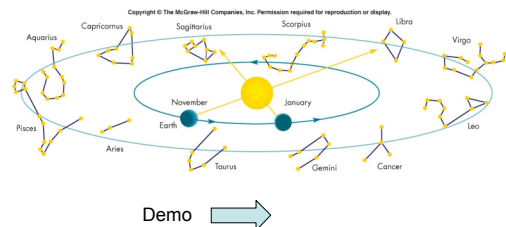
Virgo, Libra, Scorpius, Sagittarius, Capricornus, etc. What is the connection here?



Will return to the significance later

Question: what's causing this?

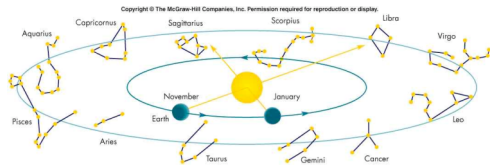
### The "parade of the constellations"



Demo →

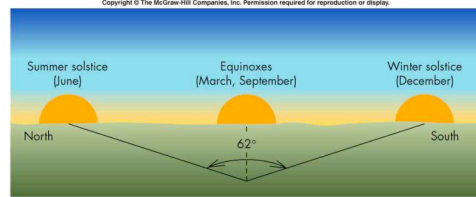
Also look at online animation with the book web site

Last time: Earth's orbital motion (revolution) explains "parade of constellations"

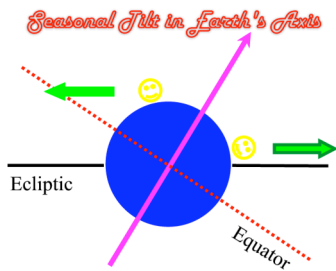


Plane of Earth's orbit around Sun called "plane of ecliptic"

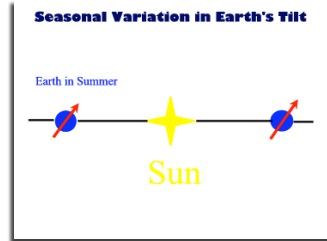
Revolution cannot explain seasonal changes in rising and setting of Sun and Moon



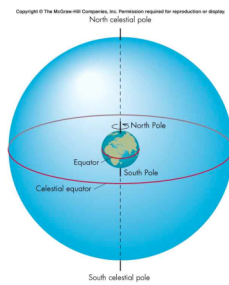
Obliquity of the Ecliptic and the Altitude Angle of the Sun



Explanation of Seasonal Variations: tilt of the Earth's axis: *obliquity of the ecliptic*

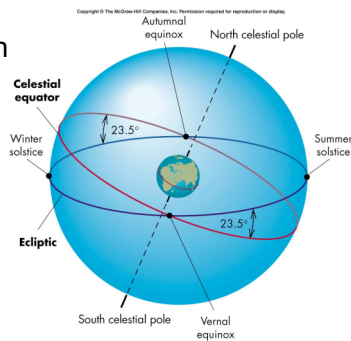


The celestial sphere, the celestial pole, and the celestial equator



Two Lines on the Sky

- The ecliptic
- The celestial equator
- See Figure 2.11



### Astronomical Scientific Terms



- Meridian
- Celestial sphere
- Zenith
- Azimuth and altitude
- Ecliptic
- Celestial equator

### For new purposes, we need a different coordinate system

Analogy: I am riding my bike on a dirt road near Lone Tree, and want to describe to someone in London the location of a radio tower I see in the distance.

Question: what system of coordinates do I use?

### A New Coordinate System: Celestial Coordinates

- The stars “stick together” and define their own reference system. The planets move with respect to them
- Celestial coordinates are Right Ascension and Declination
- Right Ascension ..... Longitude 
- Declination ....latitude 
- <http://sohowww.nascom.nasa.gov/>



Questions