

- **The Big Picture**
- First: Distance Scales (light travel time)
 - Moon = 1 ¼ sec, Sun = 8 1/3 min, Mars = 1-20 min, Pluto = 5 ½ hr
 - Closest star: Alpha Centauri system (triple) = 4.3 ly
 - Brightest night time star (Sirius in Canis Major, the Big Dog) = 8.6 ly
 - Big Dipper Stars ≈ 80 ly
 - Distant, faint naked eye stars ≈ 10,000 ly
 - Center of our galaxy = 30,000 ly distant
- Galaxies:
 - cf spirals, ellipticals, irregulars
 - Images
 - Milky Way Galaxy = Barred Spiral
 - 100 billion stars, rotates in 250 million years, 90,000 x few thousand ly
 - Andromeda Galaxy (M31) = 2 ½ million light years (naked eye)
 - Virgo Cluster = 60 million light years (visible with powerful binoculars)
 - Super Clusters: e.g. Virgo Supercluster
 - Visible edge of Universe = 14 billion light years away
- Web Tour of Universe
- Star Magnitudes (brightness)
- Our location in Milky Way Galaxy
 - Milky Way band of light and explanation
- Navigating the Sky
 - Star Charts @ S&T
 - Planisphere (How to orient and read)
 - Planetarium Programs
 - Sagittarius and Scorpius ('downtown')
 - Teapot, Scorpion, Antares = Red Super Giant
- Sun (a normal star)
 - Sunspots
 - photosphere (6000 K), sunspots (4300K), last days to weeks, 11 year cycle, solar filters
 - Energy Production
 - $4\text{H} \rightarrow 1\text{He} + \text{E}$
 - 10 million degrees