Required Journal Content (ASTR 337)

updated March 17, 2020

Quantitative Measurements:

angular diameter of your fist
your eye's limiting magnitude using Cassiopeia
your eye's angular resolution
plotting the Sun's position:
  on the transparent Solar hemisphere
  sunset azimuth and time as seen from Steward/s roof
sundial time using correction based on the Equation of Time
altitude, azimuth of celestial objects and track their motions versus time
the Sun's diameter via pinhole measurements in the cardboard tube
number of stars you can see in the Pleiades via naked eye and binoculars from different locations
cardboard telescope: Focal length, resolution (arcminutes and vs. our eye), magnification
measurement of the Sun's luminosity with wax and light bulb (coming this week)

Stellarium Simulations

Observations:

Atmospheric optics (day & night):
- "Belt of Venus"
- colors of objects at different times (contrails, haloes, rainbows, …)
- "crepuscular rays"
- haloes (Sun & Moon)
- "Sun dogs"
- heiligenschein
- lunar eclipses
- twilight and colors
- twinkling vs. altitude
- Spring Equinox shadows at sunset/sunrise (March 19) (take pictures!)

Human eye (yours!):
- limiting magnitude of your eye under various lighting conditions and times
- angular resolution of your eye
- any personal impressions about dark adaption, averted vision, …

Moon:
- "Earthshine"
- tracking motion across the sky from day to day
- phase changes

Pinhole imaging:
- indoors through holes in screens, curtains, etc.
- outdoors (under trees, etc.)

Planets: motion of Venus in the nighttime sky

Satellites:
- International Space Station (AZ/EL cords)
- general satellites from heavens-above.com

Shadows:
- umbra and penumbra of Sun from poles, sides of buildings, etc.

colors of shadows

Spectra:
- use handmade spectrometer coupled to cell phone:
  - record observations of different light sources and the Sun
- try observing and recording the Fraunhofer lines in the Sun's spectrum:
  - with your cardboard spectrometer
  - with Flandrau's spectrometer (during class)

Stars and constellations:
- constellations learned: Cassiopeia, Orion, Perseus
- specific stars: Aldebaran, Algol, Betelgeuse, Polaris, Rigel, Sirius
- measure AZ/EL for Sirius throughout the semester at a specific time

Sun:
- sundials(s):
  - use your paper sundial to measure noon vs your watch
  - Flandrau's sundials: Use the Equation of Time to determine local time
- try observing and recording the Fraunhofer lines in the Sun's spectrum
- changes in altitude of the Sun at noon during semester (transparent hemisphere)
- images from pinholes through leaves of trees of different heights
- location and time of sunset on the western horizon from the roof of Steward observatory
- luminosity measurements of the Sun with wax and light bulb
- Spring Equinox shadows at sunset/sunrise (March 19) (take pictures!)

Telescopic observing:
- Moon
- Venus
- stars: Sirius B (white dwarf)
  - double, clusters, nebulae, galaxies

Your "Galileo" cardboard telescope:
- Measure the focal lengths of the two lenses
  - and calculate the magnification.
- Measure the telescope's resolution.

<u>Personal Interpretations, Photography, Impressions, Predictions Relating to the Above Items</u>