Stargazing

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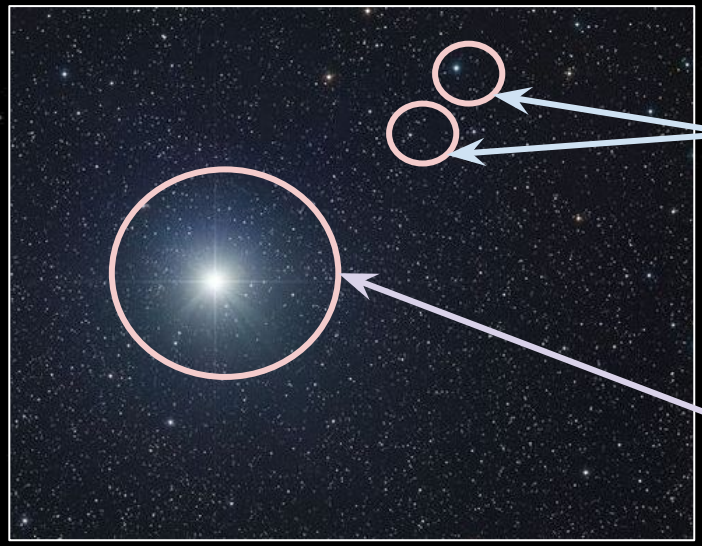
There are a *lot* of stars

- Look up! (or ahead)
- A few thousand stars are visible to the naked eye

They're different colors

They're not all the same brightness

- Faint stars are more common
  - Not all stars are the same brightness
  - Distance affects the brightness

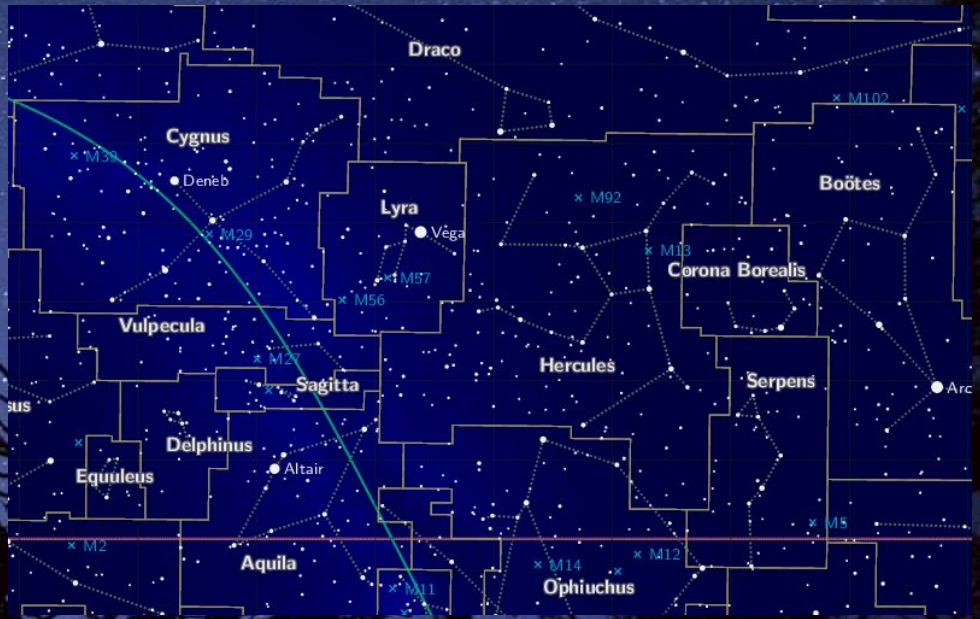


<u>Magnitudes</u>

- Ranked by brightness
- Brighter stars → lower magnitude
- Fainter stars → higher magnitudes

They aren’t scattered evenly across the sky

- Stars are sectioned off into patterns they form in the sky
- Constellations help us locate a specific star



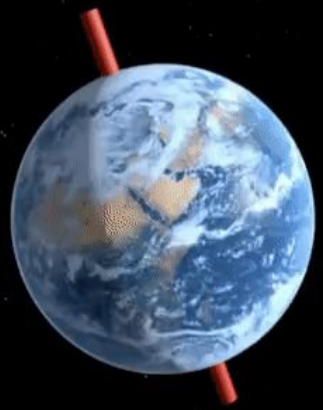
Not all of the lights are stars

- Planets!
- Twinkling occurs because turbulent air dstorts incoming light to make it appear like it’s shifting

Artist's concept

The stars appear to move over time

- Rise in the East and set in the West
- Closer to the equator = more movement
- Closer to North or South Pole = less movement
- **Sky's motion is a reflection of Earth's motion**

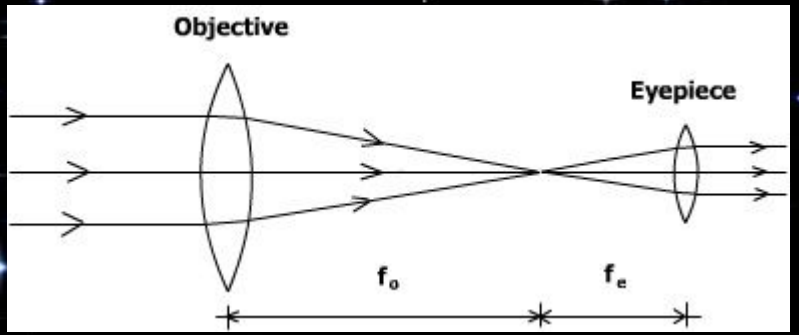


Telescopes

- **Purpose**: Makes things easier to see
- Works by gathering light
  - Bigger the area → more light collected → better view
- Changes the direction of light

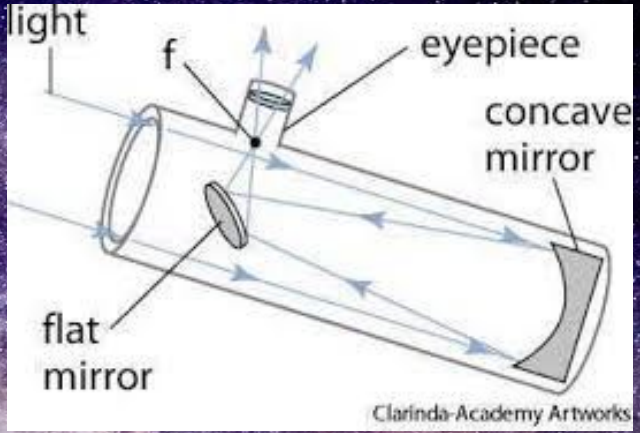
Refracting telescopes

- Bends light into a cone shape → the image flips
- Advantages-
  - Magnify objects
- Disadvantages
  - Big lenses are very fragile and hard to make
  - Bends different frequencies of light by different amounts

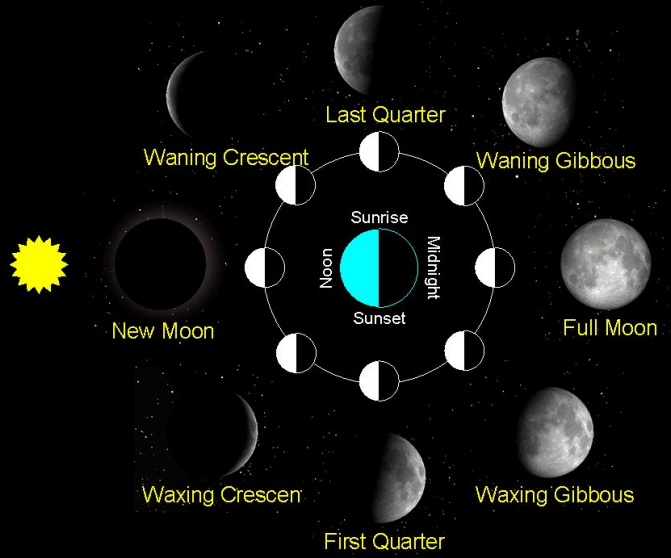


Reflecting telescopes

- Uses curved mirror
- A solution to refracting telescope disadvantages
- Advantage
  - Only need to polish one side of the lens
  - Easier to make bigger lenses for a cheaper price



The Moon



Waxing = getting bigger

Waning = getting smaller

Light starts on the right of the moon after New Moon = waxing

Darkness starts on the right of the moon after full moon = waning

The Moon

- All people on Earth see the same phase of the moon on a day
- People in the Southern Hemisphere see an upside down version of the phase of the moon in the Northern Hemisphere

Moon Rising

New Moon	sunrise
Full Moon	sunset
First Quarter	noon
Third Quarter	midnight

The moon is up 50% in day and night

Eclipses

Solar: Moon blocks sun; Earth in moon’s shadow

Phase: new

Path of totality: small

Lunar: Earth blocks moon; Moon in Earth’s shadow

Phase: full

Path of totality: large

These don’t occur every month because the moon’s orbit is slightly tilted, so it is rare that the moon will be in perfect alignment with the Sun and Earth

Determining distance

- ★ He found the size of the Earth by the shadows it cast and the phases of the moon
- ★ “The orbital period of a planet squared is proportional to its average distance from the Sun cubed” - Kepler’s Third Law
- ★ To use KTL, use the Astronomical Unit, the average distance from the Earth to the Sun
- ★ Use radio telescopes to find this

1 Au = 149,597,870.7 km is the meterstick of the universe

Determine the distance of

- • predict the motion of bodies in space
- Launch our probes into space
- access the information held by the stars

Parallax (it’s a matter of perspective)

- ★ The apparent difference in position of an object when viewed from different positions
- ★ Baseline is the distance between your eyes, or your two “perspectives”
- ★ The further away an object, the bigger baseline you need to find its distance
- ★ Use this on the Earth to measure the distance of the stars by changing your location on Earth