Constellation Video Notes 2021:

This video uses the familiar concept of constellations to introduce various terms from our Unit 9 astronomy objectives: declination, right ascension, sextant, measuring distance to stars (parallax, Cepheid variables, luminosity, apparent magnitude, Polaris, precession, ecliptic, Ptolemy, space-based telescopes, Southern Cross, stellar evolution (star life cycle), red supergiant, black hole, galaxies

:30 Compare and contrast declination and right ascension with latitude and longitude?

Latitude and longitude tell the location on Earth, while declination and right ascension are projected into space.

1:30 What is a sextant?

Tool used in celestial navigation. Uses the time and the angle above the horizon.

2:20- Telling the distance to stars is the hardest part of astronomy! Looking at the celestial coordinates alone does not tell me how far away a star really is.

Reference stars are used as guidepost to gauge distance.

5:05 Parallax: apparent shift in an object’s position due to the observer’s change in position.

Look at position, then look again in 6 months. The closer the star, the greater the apparent shift. Even the closest star (Proxima Centauri) doesn’t seem to move much, though…super tough to tell!

7:00 Coast guard uses a lighthouse that has different pulse patterns. Astronomers use a Cepheid variable star (which keeps time – bigger and brighter = slower pulsate). The intrinsic brightness is strongly tied to the period. We compare the intrinsic brightness to the apparent magnitude to determine the distance.

8:30 Luminosity – total amount of E produced by star per second (E output) J/s or Watt

8:40 Apparent magnitude – how bright a star appears from Earth (negative values are brightest)

9:40 Supernova can help determine distance as well. Type 1A Supernova are all the same throughout the universe. Red Supergiant Beetlejuice will explode in a supernova (427 ly) from Earth. They give off the same amount of energy, so we can calculate the distance based off the apparent magnitude.

11:00 Orion nebula – nursery of stars

12:00 discusses pyramid stuff…stars tell when to plant and when to harvest, rising of the Nile,

15:00 Polaris – precession “wobble” will cause Earth’s axis to change

17:35 – the closer the stars are to the poles, the more its position will remain fixed in the sky – circumpolar – visible all year long. The closer to the equator, the more the stars rise and set in the sky.

18:30 – variable star – expands and shrinks as a young star, trying to figure out its equilibrium. Stars outgrow this and settle into equilibrium.

20:40 – ecliptic – path the Earth travels along as we orbit the Sun.

23:00 – naming of stars

24:00 – Ptolemy – catalogued stars

26:30 – space-based telescopes

28:00 – Crux (Southern Cross) smallest constellation and found in Southern Hemisphere

30:36 – white supergiant is a star transitioning from a red super giant to a blue super giant. ??

32:00 - Black hole –

32:40 – Night sky is a calendar ??

35:00 – To astronomers, constellations are a handy map to organize things so you kind of know where things are.

36:00 – Alpha and Beta Centauri are the brightest stars in the night sky. Alpha centauri is the star nearest to the Earth after our Sun. It is a triple star system. More than 60% of the stars you see are multi-star systems.

37:00 – galaxies eat galaxies, lol.

38:35 – the flat plains of the constellations are an illusion.

40:10 – the stars are always moving very fast, though most stars don’t appear to move at all. Constellations change over time. 500,000 years, the constellations would be unrecognizable. They don’t serve the same purpose now they did back when they named.

42:00 Constellations used more today to ponder possible planets