

2013-14 Barge Astronomy 1st Semester Final Review Questions

Use the chapters in the textbook *The Cosmos: Astronomy in the New Millennium* by Pasachoff & Filippenko as a resource, either 2nd or 3rd edition.

Sun Earth Moon System (Handouts; Cosmos chp4)

What causes the different seasons we experience in Chicago?

How do the times the Sun rises and sets change over the course of a year in Chicago?

How do the locations on the horizon where the Sun rises and where it sets change over the course of a year in Chicago?

How would the length of a day be different at the north pole over the course of a year?

How is the ecliptic related to the zodiac (zodiac constellations or commonly referred to as zodiac signs)?

What causes us to see different phases of the moon throughout a month?

Why is the moon sometimes visible during the day?

Can you identify the nine phases of the moon by name and picture? Can you put the phases of the moon in order from a new moon to a new moon?

Can you complete the chart of rise time, zenith time and set time for the moon phases?

Why aren't the same constellations visible at night all year long? Why are there different constellations visible during different seasons? What does this have to do with the orbit of the earth around the Sun?

In Chicago, how do stars appear to move across the sky? From the equator? The north pole?

In what direction would you look to see the Sun at noon in Chicago? In Australia? At the equator?

Can you define the following terms? Orbit, revolution, rotation, zenith, meridian, equinox, winter, solstice?

Constellations (Chp 1; Chp 4 pg 63-67; A Walk Through the Sky (small textbook); Star Charts)

Why aren't the same constellations visible at night all year long?

Why are there different constellations visible during different seasons?

How are stars' brightness measured (magnitude)?

What does this have to do with the orbit of the earth around the sun?

From Chicago, how do stars appear to move across the sky?

Be able to identify on a star chart and describe where in the sky (northern sky or southern sky) you can find the following constellations and their brightest stars:

Fall

Summer Triangle – Cygnus (Deneb), Lyra (Vega), Aquila (Altair)

Cassiopeia, Ursa Major, Ursa Minor

Winter

Orion (Betelgeuse, Alnitak (east), Alnilam (center), Mintaka (west), Rigel), Canis Major (Sirius), Canis Minor (Procyon), Gemini (Pollux, Castor), Auriga (Capella), Taurus (Aldebaran), Cassiopeia, Ursa Major, Ursa Minor

Telescopes (Chp 3; Handouts from class)

Can you explain the basic differences between a refracting telescope and a reflecting telescope.

Can you explain the difference between the objective lens or mirror and the eyepiece in a telescope?

Could you trace light rays as they move through the following telescopes?

Reflecting, refracting, catadioptric (combination)

What is the difference between a Galilean telescope and a Newtonian telescope?

Can you explain Chromatic aberration?

Who was the first person to record the use of a telescope on the sky? What did he discover?

Who invented the refracting telescope? Why?

How did the telescope convince Galileo that Copernicus was correct in his heliocentric viewpoint?

Can you explain how a ccd camera takes a telescope picture and how that picture is unique – what information is embedded in the pixels?

Light (Chp 2 pg 21-23; Chp 3; Chp 5; class notes)

Can you explain what light is. Can you use the following terms correctly to explain the electromagnetic spectrum?

Magnetic & electric fields; energy; frequency; wavelength; photon

Can you name the different types of electromagnetic energy in order from most to least energetic?

Can you explain why ionizing radiation (ultraviolet, x-ray, gamma) is dangerous?

Can you explain what a light year is?

Can you describe how the following people contributed to the knowledge of the electromagnetic spectrum?

- a. Isaac Newton
- b. William Herschel
- c. Johann Ritter
- d. Thomas Young
- e. Hans Christian Orsted
- f. Michael Faraday
- g. James Clerk Maxwell
- h. Henrich Hertz
- i. Wilhelm Roentgen
- j. Ernest Rutherford & Paul Villard

Can you describe the atmospheric window?

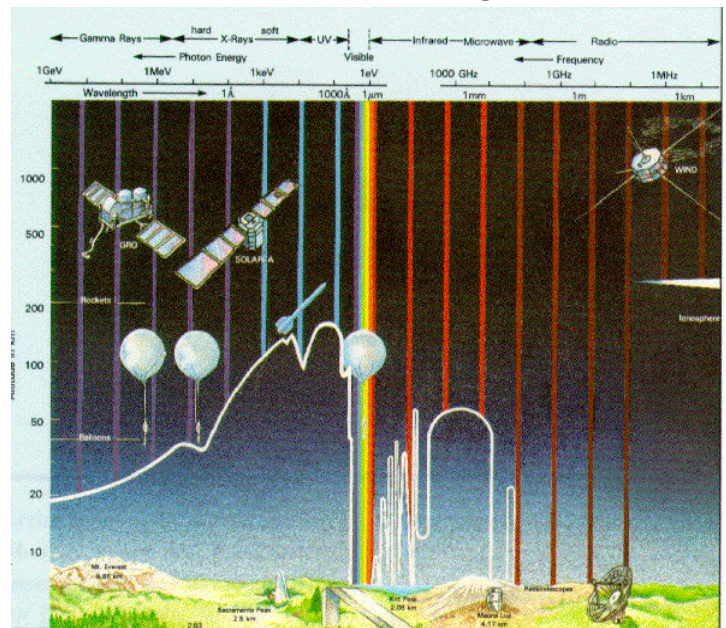
(What does this picture mean? →)

Can you explain the following terms in terms of how light interacts with matter?

Reflection; transmission; absorption; emission

Can you draw a picture that shows what those terms in the previous question mean?

Can you describe why an astronomer may want to take an image of an object with infrared light and also visible light? What would be the use of looking at something with both kinds of light?



Exoplanets (Handouts; Cosmos Chp 9 pg 214-221)

Can you compare/contrast the wobble method and the transit method of exoplanet detection?

Can you determine if a light curve shows evidence of an exoplanet?

Can you determine the following properties of an exoplanet from its light curve data?

An exoplanet's size (relative to its star) Type of transit Time of transit

How is the time of an exoplanet's transit related to its distance from its star?