



Important topics that may or may not be on the exam.

Chapter 1

- Think hard and have a well articulated understanding of what science is and why some things are called science and others aren't.
- Have a rough idea of relative scales of objects and distances in the universe. Different units are appropriate for different scales.
- Understand the celestial sphere and how it's coordinatized.

Chapter 1

- Understand the difference between all the types of days, years, and months, and why they're different
- Know effects related to the tilt of the earth (precession, seasons, rotating of the celestial sphere)

Chapter 1

- Understand moon phenomenology (phases, eclipse seasons)
- Understand parallax

Chapter 2

- Know some history. Including Arab and Chinese contributions to astronomy and science.
- Understand what makes planets look different in the sky than stars
- Be able to explain what phenomena favor a geocentric model of the solar system and what phenomena a heliocentric model.

Chapter 2

- Know the major contributions of Copernicus, Galileo, Kepler and Newton (including Kepler's three laws)
 - Understand the basics of Newtonian gravity
- Be familiar with concepts like escape velocity and different orbits.

Chapter 3

- Know the features of a wave and how they relate to each other (wavelength, amplitude, frequency, speed)
- Know the basics of electricity and magnetism (VERY basics)
 - Get to know the electromagnetic spectrum
(Radio -> Microwave -> IR-> Optical -> UV -> Xray -> γ -ray)

Chapter 3

- Know about black body radiation and how that started the quantum revolution, and how it's used to determine the temperature of stars
- Understand how waves propagating towards and away from you lead to the doppler effect.

Chapter 4

- Know the phenomena of Kirchhoff's laws
- Be able to describe the Bohr model of the atom and how that gives rise to the discrete behavior seen in emission/absorption spectra
- Understand the relationship between the energy of a photon and its frequency, and how that translates to different orbital transitions leading to different emission lines.

Chapter 4

- Know about other quantum phenomena with regards to spectral lines (quantized rotation and vibrational modes)
- Know how to describe the photo-electric effect and its resolution and how that also supports the quantum hypothesis of Planck
- Know what line broadening is, what causes it and what we can learn from it.

Chapter 5

- Know the difference between refraction and reflection telescopes and why we use reflection telescopes mainly today
 - Understand some of the challenges of taking good astronomical data and how we overcome them.
- Know about some of the instruments we use to measure the stars and how they're suited for the particular part of the electromagnetic spectrum that they were designed for.