
These are the definitions and concepts you have to know:

Chapter 19: Our Galaxy

- Milky Way: Observable in summer, center obscured by dust clouds
- Our Galaxy: Parts, sizes, location of solar system
- Stellar Orbits: in disk and in halo
- Mass inside Sun’s orbit from Kepler/Newton’s laws
- Star-gas-star cycle; ways gas is returned to interstellar medium from stars
- Star formation from molecular clouds
- Observation of star-gas-star cycle
- Locations for star formation: molecular clouds, ionization nebulae, spiral arms
- Differences between halo and spiral arm stars
- Formation of our galaxy, why spiral arms?
- The center of our galaxy: various observations, stellar orbits
- Conclusion: a giant black hole

Chapter 20: Galaxies

- Types of galaxies, describe and recognize
- Components of types of galaxies
- Hubble’s galaxy classes
- Groups of galaxies
- Measurements of distances to galaxies: know the methods, in particular the period-luminosity relation ("Leavitt’s law")
- Booth strapping distance measurements in the universe, standard candles
- The “spiral nebulae” debate
- Hubble’s law: relation to age and size of the visible universe
- How can the universe be finite but have no boundaries?
- Cosmological principle, cosmological horizon
Chapter 21: Evolution of Galaxies

- Looking into the distance and looking back in time
- Methods of studying galaxy formation: observations and simulations
- Why do galaxies end up looking so different? Initial density, initial spin, galaxy collisions
- Paths of evolution; why does an elliptical become elliptical, etc?
- Why do galaxies collide frequently?
- Starbursts
- Galactic winds
- Quasars: nature, location, and source of energy
- Spectrum, luminosity and redshift of quasars
- Supermassive black holes: locations, masses
- Quasars for studying intergalactic matter