

Review 4

Chapter 22

Vocabulary

Neutron Star	Pulsar	Lighthouse Model
X-ray Bursters	Millisecond Pulsars	Gamma Ray Bursts
Black Hole	Theory of General Relativity	
Schwarzschild Radius	Event Horizon	Spacetime
Equivalence Principle	Gravitational Redshift	Time Dilation
Singularity		

- Know what you have left after Type I and Type II supernovae
- Know what happens to the protons and electrons in a Type II supernova
- Know what a neutron star is and how big it is
- Know what happens to the rotation of a neutron star
- Know what a pulsar is and why it pulses
- Know that the most famous pulsar is in the Crab Nebula
- Know what an X-ray burster is and why they occur
- Know that some neutron stars have jets expelling material into space in a binary system
- Know what a millisecond pulsar is and why they exist
- Understand that as a pulsar draws material off a companion star, the mass increases and it spins faster
- Why are planets around a pulsar so unusual?
- Know what a gamma ray burst is
- Know how many GRB's we see per day and where they are
- Know what 2 things must happen to find the object associated with the GRB's
- Know the 2 models that try to explain a GRB
- Know what a black hole is and why it forms
- Know what mass you must have left over to form a black hole
- Understand that when we approach the speed of light we use the theory of general relativity
- Know the 2 key facts of relativity
- Know why nothing can escape the black hole
- Know what the Schwarzschild Radius is
- Know what is meant by the event horizon
- Know what spacetime is
- Know what is meant by the equivalence principle
- Understand that matter tends to warp space around the mass
- Know how the tidal forces affect objects flowing into a black hole
- Know why the light on the robot we send to the black hole appears to be redshifted
- Know what happens to time as an object approaches the event horizon as seen to an outside observer
- Know what the singularity is and why it forms
- Know how they use stellar transits to find black holes
- Know how we try to find black holes in binary systems

- Know what Cygnus X-1 is
- Know that supermassive black holes are thought to be found in the cores of all major galaxies

Chapter 23

Vocabulary

Galaxy	Galactic Bulge	Nucleus
Galactic Halo	Spiral Galaxy	Variable Stars
Intrinsic Variables	Pulsating Variable Stars	RR Lyrae
Cepheids	Period-Luminosity Relationship	
Thick-Disk Component	Population I Stars	Population II Stars
Spiral Density Waves	Self-Propagating Star Formation	
Dark Halo	Dark Matter	Gravitational Lensing
Proper Motion	Disk	

- Know what a galaxy is
- Know the name of our galaxy
- Know the shape of our galaxy
- Know why we look carefully at other more distant galaxies like our own
- Know that the Andromeda Galaxy is much like our own
- Know what the galactic halo and the galactic bulge are
- Know what is meant by a face on galaxy and an edge on galaxy
- Know how big our galaxy is and where we lie in the galaxy
- Know why we can't see more than a few kpc in our galaxy
- Know what a globular cluster is
- Know what the spiral nebulae really are and where they are found
- Understand that originally it was thought that everything that we could see was in our galaxy
- Know why variable stars are so important to our distance calculations
- Know what the RR Lyrae and Cepheids stars are and why they are important
- Know what is meant by the term intrinsic variables
- Know how the period-luminosity relationship works
- Know how we can determine distance to distant stars
- Know where the globular clusters in our galaxy are found and why that was important
- Know how we have studied the halo
- Know what kind of telescopes we need to see the galactic center
- Know that after a star is born it tends to drift away from the plane of the galaxy
- Know what is special about the thick disk component
- Know how the thickness of our galaxy varies from the galactic bulge outward
- Know what kind of galaxy we now believe our galaxy is
- Know what parts of our galaxy contains most of the dust and gas
- Know why the disk is so much bluer than the rest of the galaxy
- Know what color most of the stars in the bulge and halo are
- Know the difference between Pop I and Pop II stars
- Understand the motions of stars in the 3 main parts of our galaxy

- Understand how astronomers think our galaxy formed
- Know what happened to the galaxy when it contracted
- Know how the 21 cm wavelength was used to map our galaxy
- Know why our spiral arms are still there
- Understand what is meant by the spiral density waves
- Understand the idea of self propagating star formation
- Know how we used the rotation curve to determine the mass of our galaxy
- Know what is meant by dark halo and dark matter
- Know what the MACHO's and WIMP's are
- Know how we use gravitational lensing and why we use it
- Know what constellation the center of the galaxy lies in
- Know what Sag A* is
- Know what is meant by proper motion

Chapter 24

Vocabulary

Spiral	Elliptical	Irregular
Barred Spiral	Hubble Classification Scheme	
Lenticular Galaxies	Large Magellanic Cloud	Small Magellanic Cloud
Standard Candles	Local Group	Galaxy Cluster
Hubble's Law	Hubble Flow	Cosmological Redshift
Hubble's Constant	Active Galaxies	Starburst Galaxies
Active Galactic Nuclei	Seyfert Galaxies	Radio Galaxies
Radio Lobes	Core-Dominated Radio Galaxies	
Blazar	Quasars	Synchrotron Radiation

- Know the main types of galaxies; spirals, ellipticals, irregular, and barred spirals
- Know the classification scheme for each type of galaxy
- Know that spiral disks are rich in dust and gas
- Know why the disks of a spiral is bluish
- Know why a barred spiral is so special
- Know the structure of a fan elliptical galaxy
- Know that the largest ellipticals may contain trillions of stars
- Know what the most common elliptical is
- Know what color most of the stars are and why
- Know that there is little to no cool gas and dust
- Know that hot gas is found in the ellipticals
- Know what an S0 or lenticular galaxy is
- Understand what the irregulars are
- Know what our 2 companion galaxies are called and what kind they are
- Know what the Hubble Tuning Fork model was and why it wasn't right
- Know what a standard candle is and how it is used
- Know why a type I supernova is so useful in distance calculations
- Know what the Tully-Fisher relationship is and how it is used
- Know what a galaxy cluster is and which one we belong to
- Know that not all galaxies belong to a cluster

- Know what Vesto Slipher discovered at Lowell Observatory
- Know what the Hubble Law says
- Know what the cosmological redshift is
- Know what Hubble's Constant is and how it is used
- Know what is meant by an active galaxy
- Know how much energy compared to a normal galaxy an active galaxy puts out
- Know what a starburst galaxy is
- Know what the active galactic nuclei are
- Know what a Seyfert galaxy is and its type
- Know why most Seyfert galaxies emit strongly in the infrared
- Know what a radio galaxy is
- Know what radio lobes in a galaxy are
- Know what a core-dominated radio galaxy is
- Know some common features of an active galaxy
- Know what a blazar is
- Know what a quasar is
- Know that quasars are some of the most distant objects
- Know the 3 things about a quasar that makes them unique
- Know the traits of the cores of active galaxies
- Know what is thought to power quasars
- Know what an accretion disk is
- Know what line broadening is
- Know what synchrotron radiation is
- Know what astronomers think is causing the energy coming from the nucleus of active galaxies to be seen in the infrared range