

INTRODUCTION TO ASTRONOMY
FALL 2006
REVIEW FOR EXAM 2: LIGHT AND STARS

MAJOR TOPICS:

I. The Celestial Sphere -- appearance and motions in the sky

- ~ Constellations
- ~ Coordinate Systems (horizon, RA & Dec, etc.)
- ~ Daily motion
- ~ Annual motion of the Sun & Stars
- ~ Motion and phases of the moon

II. Stars

- ~ The nature of light and structure of matter
- ~ The properties of the stars
- ~ Stellar evolution

**Bring your
Field Guide
to the exam!**

I. THE CELESTIAL SPHERE (YOU CAN'T FORGET STUFF!)

A. Constellations: FIELD GUIDE Ch. 4

- Origin and organization, asterisms
- Constellation names, abbreviations, genitives (FG pp. 440-441)
- Star names ("other" and Bayer designation)
Know how to find them!

B. Coordinate systems: NIGHTS, Oct. 8-24, FIELD GUIDE Ch. 15

- horizon – horizon, zenith, nadir, meridian, etc.
- celestial – RA, Dec, NCP, SCP, Celestial Equator

C. Motions in the sky

- daily motion CYCLES¹ pp. 1-10
stars, sun, moon, planets, comets, etc. circle NCP once per day
- annual motion CYCLES pp. 20-32
equinoxes and solstices: right ascension, declination, constellation, date
Review the Celestial Coordinates Lab!
Review NIGHTS, Jan. 19-20, Feb. 25-26, Mar. 6-10, 21, 22, April 2-4, 7, 8,
May 22-25, June 21-26, July 20-24, Sep. 27-28, Nov. 23-24, Dec. 20-22
the sun's motion along the ecliptic, and in declination (the analemma), the Zodiac
sidereal and solar day and the analemma
- motion and phases of the moon CYCLES pp. 11-19
phases, elongations, times of rising, transit, and setting (MOON WORKSHEET!!)
- motion and positions of the planets
planetary longitudes, elongations, times of rising, transit, and setting
(PLANETS WORKSHEET!!)

Sky Stuff to Know:
Summer Triangle (stars & constellations)
(NIGHTS: p. 2)
Big & Little Dippers, Summer
Triangle, Cepheus, Cassiopeia,
Perseus, Great Square
(motions!) ... (NIGHTS: May)
Solstices & Equinoxes
Know their definitions!
Know their α , δ , date, & constellation

**Review all the worksheets
All the Calculations!**

¹ A copy of Cycles is available in the Madill Science Library. Ask for it at the circulation desk.

II. STARS

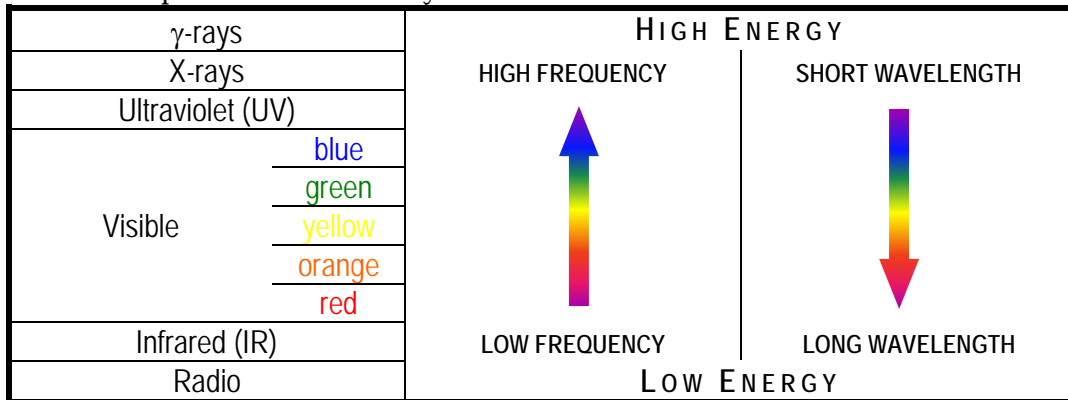
A. Spectroscopy

- The nature of light:

$$c = \lambda f$$

$$E = hf = [(hc)/\lambda]$$

- inverse square law: luminosity and flux



- electromagnetic spectrum
 - types of spectra and their sources (continuum, emission line, absorption line)
- atomic structure, source of emission and absorption lines
- Hydrogen Balmer spectrum
- Spectral Classes: **OBAFGKM** (... extra credit for a good mnemonic)
 - order: Willamina Fleming
 - classification: Annie Jump Cannon
 - temperature association: Cecilia Payne Gaposchkin



B. Star Properties (how do we measure or calculate ... any needed equations will be given)

- temperature
- distance
- size
- flux and luminosity

Review
“Magnitudes, Luminosities and Sizes” worksheets

C. HR diagram NIGHTS, March 15-21, FIELD GUIDE Appendix 3

- axes (what's plotted against what? What are the scales)
- regions (Main Sequence, Giants (red & blue) Dwarfs (red & white), Luminosity Classes)
- be able to plot positions of stars (given M_v and Spectral Type)!

D. Stellar evolution (be able to explain each process and give examples of objects in each stage)

- Star Birth (e.g. Great Nebula in Orion, Eagle Nebula: Pillars of Creation)
- Main Sequence Stars

What process defines a STAR?
 What is a star's source of energy?
 Sunspots & Solar Max

Know name,
 position &
 constellation
 of examples
 of each
 stage

- Red Giant Stage
 - what starts and ends this stage in low-mass stars (Sol)
- Star Death
 - Planetary Nebula and White Dwarf
 - Supernova and Neutron Stars
 - Supernova and Black Hole

Study the Astronomy Notes at
<http://www.astronomynotes.com/>
Stellar Evolution
<http://zebu.uoregon.edu/~imamura/I22/feb23/feb23.html>
 and
Stellar Evolution & Death
http://observe.arc.nasa.gov/nasa/space/stellardeath/stellardeath_contents.html