Astronomy 104 Study Guide
Unit 1: *The Sky*

Lesson 1- *"The Sky is the Limit"*

Terms

asteroid	asterism	constellation	celestial sphere
moon	galaxy	planet	star

circumpolar star- A star that that does not set below the horizon.

declination- The equivalent of latitude for the celestial sphere.

meridian- The imaginary line in the sky that runs north and south directly over an observer.

Right Ascension- The equivalent of longitude for the celestial sphere.

transit- The passage of a celestial object (Sun, Moon, planet, star) across the meridian.

Concepts and Ideas

1. How do the Moon, Earth, Jupiter and the Sun compare in size?
2. How does the Solar System appear when scaled to a "human" size?
3. What is the difference between an asterism and a constellation? Compare these terms to a stained glass window.
4. What is the concept of the celestial sphere? How does it seem to move?
5. What makes Polaris special when compared to other visible stars? Explain.
6. How do celestial objects become circumpolar?
7. How does right ascension and declination compare to longitude and latitude?

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Lesson 2- *"The Greater and Lessor Lights in the Sky"*

Terms

Ecliptic	Lunar Eclipse	New Moon
First Quarter Moon	Second Quarter Moon	Third Quarter Moon
Solar Eclipse	Full Moon	

annual motion- The slow eastward motion of the Sun along the ecliptic. This carries the Sun through 12 Zodiacal Constellations each year.

Diurnal motion-The daily motion of the Sun, Moon and planets caused by the rotation of the earth.

equinox-The two days of the year when the Sun rises due east. They mark the start of spring or fall.

sidereal day-A day as measured by the stars. It is 4 minutes shorter than a solar day.

solar day- A day as measured using the Sun.

solstice- The two days of the year when the Sun rises furthest north or south of East. They mark the start of summer or winter.

Concepts and Ideas

1. What are the different ways stars can be named? Why and how are they used? What information do Bayer and Flamsteed names provide?

2. Use a planisphere to do the following:
   find the rising, setting and transit times of a star or constellation.
   find what stars and constellations are visible for a given date and time.

3. Explain the difference between annual and diurnal motion of the Sun. How does it cause the Sun to appear to move across the celestial sphere?

4. How does the tilt of the earth cause seasons?

5. How do observers determine solstices and equinoxes?

6. How and why does the Moon go through phases?

7. How do Lunar and Solar Eclipses occur? Why do they not happen every month?

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Lesson 3- *"A Time for every Purpose using the Heavens"*

Terms

Apparent Solar day	Daylight Saving time	International Date Line
Julian Days	Leap Year	Local Mean Solar Time
Lunar Calendar	Mean Solar Time	Solar Calendar
standard time	time zones	unequal hours

Concepts and Ideas

1. What are the two different ways to use time? explain.

2. How are apparent and local mean solar time measured? How do the systems compare with each other?

3. What is the purpose of Time zones? How are they arranged?

4. Why is daylight saving Time used? How did it begin?

5. What problem does the International date Line Solve? How does it work?

6. How is the Moon used to measure months?

7. How does using the Moon to measure years compare with using the Sun?

8. What issues are created by using both the Sun and the Moon in creating a calendar? How are these problems solved?

9. Be able to trace the development of the Julian and Gregorian Calendar.

10. How does the Gregorian calendar handle leap years?

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Lesson 4- *"Do You Know the Way to San Jose?"*

Terms

John Harrison	latitude longitude	local Noon	Longitude Prize
solar Noon	Polaris	time ball	transit

Concepts and Ideas

1. North and south are defined by the rotation of the Earth and determined by using shadows at solar noon. The compass was invented later. the compass points to magnetic north.

2. Polaris can be used to find approximate north and latitude for observers in the Northern Hemisphere.

3. Latitude measures your angle north and south of the equator while longitude measures your angle east or west of a defined prime meridian.

4. **IF** the Earth had no tilt (and we know it actually does have a tilt) then the Sun at solar noon will be short of being overhead by an angle equal to your latitude. If you were at the 40^0 north then the Sun at noon would be 50^0 above the horizon. 90^0 - 50^0 = Latitude of 40^0.

5. Since the real Earth is tilted the Sun at Solar Noon is usually higher or lower than we would expect from item #4. To correct for this we need to add the solar declination for the day. Latitude = 90^0 - Elevation of Solar Noon + Solar Declination for the day

6. Longitude is easy to calculate if you know the mean solar time of your location and a reference meridian (prime meridian). The Sun seems to move across the sky from east to west at 15^0 per hour. For every hour **BEHIND** the prime meridian you are you are 15^0 **WEST** of the prime meridian. For every hour **EARLY** you are 15^0 **EAST** of the prime meridian.

7. In reality longitude is very difficult to measure because knowing the time at a distant prime meridian requires a very precise clock or an astronomical method of calculating it. Be aware of the practical and historical issues involved with the "Longitude Problem". How was it solved?