Thursday, March 26, 2009 Reading for Test 3, Chapter 9: all except 9.6.3, 9.6.4 Sky Watch reports back Tuesday

Astronomy in the News? Texas School Board is deciding how to set standards for teaching science, including astronomy, for Texas elementary school students. "Strengths and weaknesses" issues.

Pic of the Day - young Open Cluster of stars in the direction of Puppis with chance alignment of a planetary nebula.



Extra Credit for International Year of Astronomy

1 point added to term average

Check out: http://mcdonaldobservatory.org/iya/

In particular:



This IYA cornerstone project will consist of four days of astronomy activities across the globe April 2-5. During that time, professional observatories around the world — including McDonald Observatory — will stage a 24-hour webcast April 3 (Universal Time) to show what happens in a night at a research observatory. This webcast will be available on the official 100 Hours of Astronomy website. McDonald Observatory Director Dr. David L. Lambert will be a featured speaker. The McDonald Observatory portion of the webcast will begin at 12:20 a.m. Central Daylight Time on April 4 (5:20 Universal Time April 3).

Listen to part of this and write up a brief report.

Extra Credit for International Year of Astronomy

http://astronomy2009.us/

ORDER YOUR VERY OWN GALILEOSCOPE AT WWW.GALILEOSCOPE.ORG

Replica of Galileo's original telescope.



\$15

Absolutely NOT REQUIRED for extra credit.

Skywatch Extra Credit Targets constellations only, not all visible

Magnetar Candidates

Name	Location	Rotation (seconds)	Year Discovered
SGR 0526-66	Large Magellanic Cloud	8.0	1979
SGR 1900+14	Aquila	5.16	1979
SGR 1806-20	Sagittarius	7.56	1979
SGR 1801-23	Sagittarius		1997
SGR 1627-41	Ara	6.4	1998
AXP 1E 2259+586	Cassiopeia	7.0	1981
AXP 1E1048.1-5937	Carina	6.4	1985
AXP 4U 0142+61	Cassiopeia	8.7	1993
AXP 1RXS J170849-400910	Scorpius	11.0	1997
AXP 1E 1841-045	Scutum	11.8	1997
AXP AX J1844-0258	Aquila	7.0	1998
AXP CXOU J010043.1-721134	Small Magellanic Cloud	8.0	2002
AXP XTE J1810-197	Sagittarius	5.5	2003
AXP CXO J164710.2-455216	Ara	10.6	2005

Great conceptual differences between Newton and Einstein on the Nature of Gravity

Newton - Force between two objects

Einstein - Mass curves space, objects move *with no force* in curved space

Need to explore curved space - use geometry in multiple dimensions

SPACE - The Final Frontier

Dimensions - defined by the number of mutually perpendicular directions

- 0 D point
- 1 D line
- 2 D area
- 3 D volume (secret hand sign)
- 4 D ?

Hyperspace - space with more dimensions than the one under consideration Euclidian - Flat Space Geometry



Answers only good in *flat space*: operational definition of flat space *NOT necessarily two-dimensional!*

Non-Euclidian geometry - curved space

Both flat space and curved space use concept of "straight line"

Curved Space - explore with straight lines

Definition of straight line

Shortest distance between 2 points - rubber band

Draw a free hand straight line

Parallel propagation - rulers

Parallel propagation will give the shortest distance between two points without necessarily knowing where the two points are in advance.

Parallel propagation works easily, even when the space is *curved*.

Balloon

Surface is curved 2 D space

3 D space around the balloon, inside the balloon is *hyperspace* with respect to the 2D surface

Imagine a 2 D creature that can only perceive 2 D space.

2 D creatures can learn all about the curvature of the space they inhabit by doing geometry in 2 D - they never need to know about or care about "hyperspace."

That's us in 3 D! There might be 4D (or higher!) hyperspace around us, but we don't perceive it.

We can, in principle, learn everything we need to know about our 3D Universe by doing 3D observations and experiments in the confines of our own dimensionality, just as 2D creatures could learn of their universe, the surface of the balloon. Geometry on the 2D surface of the balloon

Exercises of drawing straight lines