Term Projects:
Detailed Outline Due: March 4-8 (1/4 of final project grade)
Presentations: April 15-19 (3 bonus points)
FINAL DUE DATE: April 22-26 (late projects will NOT be accepted)

Dark Matter

Assignment 1
I want you to find the reason why people think dark matter exists/does not exist. Please include observational evidence for dark matter. Here are some websites that might help you get started:
http://www.eclipse.net/~cmmiller/DM/
http://chandra.harvard.edu/xray_astro/dark_matter/index.html

Black holes

Assignment 2
What are the characteristics of a black hole? What remains a mystery about them? Some guided math is required in order to help understand more about black holes. Here is a website to help you get started:

Assignment 3
Will Blackholes destroy the Earth?

Assignment 4
Will the Large Hadron Collider (LHC) create a black hole which will destroy the Earth? Why do people think that this is possible?

Gravity Waves

Assignment 4
What sort of catastrophic events cause Gravity Waves? How do we hope to detect them using such instruments like LIGO and LISA? Here is a website to help you get started:
http://imagine.gsfc.nasa.gov/docs/features/topics/gwaves/gwaves.html
**Extraterrestrial Life**

**Assignment 5**

The History of ET’s

Assess the history of the search for extraterrestrial life and the possibility for it. Be sure to include any attempts to communicate with extraterrestrials, SETI, and the Drake Equation.

**Assignment 6**

Where to Find Life

Where are some other potential locations for life within our Solar System (besides Earth)? Why might there be life there? Where would that life survive? How might that life be different from what we are used to?

**Planets**

**Assignment 7**

What methods do we use today to find exoplanets? Carefully explain the how methods work. What have we found so far, and how do these newly discovered planets compare to those in our solar system?

**Assignment 8**

Define a Planet

Make your own working definition for a planet, Star, moon, Asteroid and comet. Then, decide which category the major objects in the solar system belong to. Feel Free to create new classes of celestial bodies if you need to. Think about all possibilities, If you have two earth sized objects orbiting together, If you had a 5 Jupiter mass object floating by itself without a star, A dead comet that has lost its ice and gas, etc. Your definitions should be robust enough to classify any new objects that might be discovered.

**Assignment 9**

A Closer Look at the Planets

Choose 1 or 2 of the planets within our Solar System and discuss them in detail. Include any space missions or probes sent to the planet(s) and their discoveries. Be sure to also discuss any large moons or other notable features/ properties of the planet(s).
**Assignment 10**

Planets missions

http://www.jpl.nasa.gov/missions/index.cfm

Compare two of the projected space missions as if you are a legislative assistant. Then, write a detailed brief explaining to your congressman/woman who he/she should fund and who not.

**Sun / Stars**

**Assignment 11**

Create a 3D HR Diagram

Show all stars with their relative colors and size on the correct position of the diagram. The Third dimension should be an accurate representation of some facet of the stars other than luminosity and temperature: (lifetime, radius, mass, proportion in Solar neighborhood, distance to nearest known type, etc).

**Assignment 12**

Create a Children’s Story Book on the Sun

It should contain good factual information and must be at least 10 pages long. Be sure to state ahead of time the age group you plan to write for. If you choose not to keep the book, I'll be donating them to a local children's library. It therefore needs to be high quality, both in binding and pages.

See Lab 32.

**Assignment 13**

Create a Children’s Story Book on the Solar System.

It should contain good factual information and must be at least 10 pages long. Be sure to state ahead of time the age group you plan to write for. If you choose not to keep the book, I'll be donating them to a local children's library. It therefore needs to be high quality, both in binding and pages.

See Lab 32.

**Assignment 14**

Create a Children’s Story Book on the Stars

It should contain good factual information and must be at least 10
pages long. Be sure to state ahead of time the age group you plan to write for. If you choose not to keep the book, I'll be donating them to a local children's library. It therefore needs to be high quality, both in binding and pages. See Lab 32.

**Assignment 15**
Build a Sun Dial to Keep Track of Time

[http://www.sundials.co.uk/projects.htm](http://www.sundials.co.uk/projects.htm)

What are the different types of sun dials and how do they work? Is there any historical significance? Build your sun dial and keep track of the time. It should work in Atlanta!
*You must keep a log demonstrating the accuracy of your sundial.*

**Assignment 16**
Supernovas

Why do Astronomers believe Betelgeuse will go supernova? How soon might this happen? What are some other possible futures for Betelgeuse?

**Assignment 17**
Constellations in perspective

Choose 2 constellations and show how they would look from another perspective. The easiest way to do this is probably making a 3D model. First find the distance to all of the main stars of a constellation. Then, using some scale distance that seems appropriate cut sticks representing the relative distance between the stars of the constellation. Finally mount these to a hard backing at the proper coordinates on the celestial grid to create a 3D model of the constellation. (If you really want to be impressive, use correctly colored Christmas lights)

**Galaxies**

**Assignment 18**
Galaxies Poster

Create a poster that explains the different types of galaxies and their characteristics (elliptical, spirals and irregular dwarfs). Include Hubble’s Tuning Fork and examples.
Assignment 19

Measuring Distances in the Universe

Make a poster illustrating how far into space different techniques in astronomy can measure. Describe these techniques on the poster.

See your text and this website for help.
http://www.astro.ucla.edu/~wright/distance.htm

Assignment 20

Milkyway Exploration

Make a poster of the Milkyway. Describe its features, where we are located, bright nearby stars, and how you know this information. Be sure to point out the location of famous objects, like the crab nebula and the Pleiades.

Space Exploration

Assignment 21

Astronauts in Space

Explain the dangers that humans may/ are incurring from space travel, as well as how we will/can overcome them. What additional dangers await astronauts traveling to Mars? The outer solar system? Beyond?

Assignment 22

Interstellar travel

Research and explain the different theoretical methods for travelling large distances in space, i.e. travelling to other stars or even galaxies. What are some of the different ways that we might be able to travel at or near the speed of light in the future as technology progresses? What types of spaceship designs would be needed to counteract the dangers of zero-gravity or radiation in space?

Assignment 23

Terraforming/ Second Earth

Realistically look into if it is possible to create a second Earth. What planets or moons in our solar system might be up for the job? How would you respond to nay sayers who feel that it is wrong to destroy these pristine planets on such a complete and total scale?
Assignments:

**Assignment 24**

**Landing on the Moon**

Did humans land on the moon? Why do some people still propose that we have not? What scientific fact contradicts their accusations? Watch the Mythbusters Episode on the Moon Landing (available on YouTube and Netflix).

**Assignment 25**

**Discuss the Benefits/problems associated with building a Space Elevator.** What are the largest hurdles left to overcome? What is your opinion of the Space Fountain?

Check out [http://www.spaceward.org/elevator2010](http://www.spaceward.org/elevator2010) to see the latest developments.

**Assignment 26**

**Killer asteroids**

What are the chances of an asteroid wiping out life on earth? How large would such an asteroid have to be? What are the chances that we would see such an asteroid? What methods might we use to deflect and/or destroy it?

Check out the daily asteroid counter at: [www.spaceweather.com](http://www.spaceweather.com)

Miscellaneous

**Assignment 27**

**Global Warming**

Is it real? Find Scientific evidence to support your claim. What are some of the current advances in research in this area? If it is real, what are the possible causes, and how can we prevent its escalation? What might the Earth look like in the future?

Other Topics:

- Active Galactic Nuclei
- Neutron Stars/ Pulsars

Don’t like any of these? Come up with your own topic and pass it on to your TA for approval.