Project Guidelines

1. February 17th: Project Topic Chosen
   - You can choose any topic related to ASTR 1010!
   - The project topic is worth 2 points out of 20 points for the project
   - Please see the list of possible topics at the end of this handout
   - Turn in a typed or hand-written piece of paper with your chosen topic at the beginning of lab on this day

2. March 9th: Project Outline Due
   - The outline is worth 4 points out of 20 total points for the project
   - It should be at least one page, typed, double spaced
   - Include at least 3 sources you’re thinking of using, an actual outline of what you plan to include in the project (what specific topics will you be discussing), and a description of the format of your project (poster, interpretive dance, making a song, etc.)

3. April 13th: Project Presentations
   - 3-4 minute presentation
   - Attendance during all of the presentations is required for everyone

4. April 20th: Lab Evaluation, Observatory Report Due
   - Required attendance to complete lab evaluation, worth 10 points
   - The Observatory Report form can be found on the lab website (www.astro.gsu.edu/lab/)
   - Suggested Observatories: On-campus observation, HLCO, Georgia Tech, Fernbank
Project Types

You may choose any of the following project types to go along with your chosen project topic. Or you can make up your own project! You should choose a project that matches your skills. You will present your projects at the end of the semester.

**Children’s Book:** Writing a children’s book does not mean that you can make things up or include less information. You will need a thorough understanding of the material (and some creativity) to accomplish this. You must convey accurate scientific information in a clear, engaging, and fun way that a child would enjoy and understand. Do not just list the facts about your topic; try to tell a story that includes that information instead. You should construct the book so that it is easy to open and easy to read (consider your colors carefully). You will be graded on the quality of your book and your ability to convey accurate information. Citations of your sources must be included.

**Poster or Craft Project:** If you choose a more hands-on/creative topic like a poster, craft project, etc., you must still write a 1 page (minimum) “paper” describing your creation that includes any relevant scientific information. The paper should be written in 12 pt. font (including the title) and double spaced. You must cite your sources on your poster. If you choose a poster, make sure it is a larger cardboard poster, not the kind that can be easily rolled up or the miniature trifold kind.

**Sundial Project:** There are several types of sundials that you can choose to make. Be sure to use materials that will not fall apart easily. You should keep a log of your attempts to use the sundial; at least 10 entries spanning over 2 weeks. Similar to the craft project description above, you must include at least 1 page (12 pt. font and double spaced) describing your project, any relevant scientific information (like how and why these work), and some information on the history of sundials. Citations must be included and do not count toward the 1-page write-up.

**PowerPoint Presentation:** Your presentation should last 3-4 minutes, so you will need however many slides is necessary to accomplish that. Please cite your sources at the end of the presentation. You must include a 1-page paper (12 pt. font, double spaced) describing the content of your presentation.

When citing sources, Wikipedia does not count. It can be a good place to start in order to get big picture concepts and to get you thinking, but you should seek out more reliable sources: published works (textbooks, scholarly papers, even science journals for a general audience -- e.g., Scientific American, Popular Science, etc.). Public outreach websites from academic institutions and places like NASA are ok too, but they shouldn’t be your only sources. Remember that this is a research project and the quality of your work should reflect that.
Possible Project Topics

**Planets:**

**Defining 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, such as two Earth sized objects orbiting together; 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.

**Planet Missions**
http://science.nasa.gov/planetary-science/missions/development/
Compare two of the projected planetary space missions as if you are a legislative assistant. Discuss the pros and cons of each one, then explain which one you feel deserves funding and why. Consider cost, time, broader impacts, etc.

**Sun / Stars:**

**Create a Children’s Story Book on the Sun**
Consider discussing the formation of the Sun, its structure and appearance, and the processes that produce sunlight. 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. It needs to be high quality, both in binding and pages.

**Create a Children’s Story Book on the Solar System**
Consider discussing the types of objects within the solar system, their formation, and properties of the planets. 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. It needs to be high quality, both in binding and pages.

**Build a Sun Dial to Keep Track of Time**
http://www.sundials.co.uk/projects.htm
What are the different types of sundials and how do they work? Explain their historical significance. Build a quality sundial and keep track of the time. It should work in Atlanta!
*You must keep a log demonstrating the accuracy of your sundial.*

**Constellations in perspective**
Choose any 2 constellations and show how they would look from another perspective. The easiest way to do this is by 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. Use correct colors for the stars and include information about them.
**Space Exploration:**

**Astronauts in Space**

Explain the dangers that humans may/are incurring from space travel, as well as how we will/can overcome them. Do the benefits outweigh the risks? What additional dangers await astronauts traveling to Mars? The rest of the Solar System?

**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? What are the different processes by which this might be done and the timescales necessary?

**Landing on the Moon**

Did humans land on the Moon? Why do some people still propose that we have not? What scientific facts contradict their accusations? Watch the Mythbusters Episode on the Moon Landing (available on YouTube and Netflix) and find other arguments to address which have been proposed by non-believers. Note that the Mythbusters episode is a good place to start but cannot be your only source.

**Space Elevator**

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://science.howstuffworks.com/space-elevator.htm](http://science.howstuffworks.com/space-elevator.htm) for more information.

**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)

**Extraterrestrial Life:**

**The History of ET's**

Assess the history of the search for extraterrestrial life and the possibility for it, including evidence on Earth and in the laboratory for non-carbon based organisms. Be sure to include any notable attempts to communicate with extraterrestrials, the SETI project, and the Drake Equation.

**Where to Find Life**

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

**Miscellaneous:**

**Global Warming (Media)**

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?
Astronomy Impact (Education)
Given the recent budget cuts the government has been making, astronomy has been hit pretty hard, particularly in the areas of public outreach and education. Prepare a project or a letter to your local Congressperson (which you should send) which addresses the importance of astronomy and astronomy education for the general public.

Technology
What are some modern (last 10 years) advancements in observation (within the Solar System) technology (telescopes, detectors/cameras, satellites, filters) and how do they compare to technology available 50-100 years ago? What technological developments for space travel and astronomy observations are currently being used by the general public or in other fields of research?

The Future of NASA and Privatized Space Flight
The idea of private corporations providing civilians and researchers with access to space is becoming more mainstream. What do you think is the likelihood that the final frontier will be controlled by private corporations rather than governments? What are some possible consequences of this change? And is it a good or bad change? Support your claims with research on these developments and previously cited sources' predictions.

The Future of Science from Literature
Choose one of the novels listed below to read and examine from a scientific standpoint. Compare the technologies predicted in the book to technological advances which have occurred up to this point in time. Also, compare the scientific theories in the book to those currently in use. Did the book predict anything correctly? If not, explain why.

Light Pollution (Photography)
Using appropriate photography equipment, photograph examples of light pollution in various locations (not limited to just Atlanta, if you happen to travel). Discuss the different types of light (Mercury, Sodium, etc.) involved in light pollution, the problems associated with light pollution, and alternatives to the bright street lights that pollute the night sky. Provide examples of technology and legislation currently in place to help minimize light pollution.

Pick an Astronomer
Choose a less-famous astronomer to research and give details on their life and the science on which they focused. Explain the theory behind any discoveries that were made and discuss the technology which was in use at the time. Make sure the astronomer you choose studied Solar System astronomy.

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