

Astronomy 10

(Summer 2010)

Research Paper (Due on Thursday, August 5th)

An important lesson I want you to take away from this class is the ability to read and enjoy popular astronomy articles. You aren't expected to understand every little detail of the article, but you should be able to relate it to what we've learned in class this summer.

To complete your research you can use the internet, the class textbook, and popular astronomy magazines such as *Science*, *Sky & Telescope*, *Astronomy*, and *Scientific American*. Many of these have databases online, which should make researching easier. Also note that some of these websites require a subscription, but they should be accessible if you're on the UC Berkeley network. News stories from CNN and online newspaper sites may also be helpful.

However, it is very important that after researching your topic you form your own opinion. There is no wrong or right answer to these. You should think critically about opposing viewpoints for your topic and argue your own opinion convincingly. Your paper should be 2-3 double spaced pages. I will be looking at whether you have identified appropriate references for your topic, your ability to summarize viewpoints on either side of the issue, and how convincingly you argue your point. It should be clear that you have thought critically about the references you read; you should not just repeat someone else's opinion. I would much rather hear yours!

You should clearly indicate the source of your information – provide citation(s). If the resource is a webpage, please include the webpage title and URL. You may use Wikipedia to get started and find other resources, but Wikipedia should *not* be among your citations.

The most important criteria that I will be using to grade your work is the content, but the writing quality is also a factor. It does not need to be a perfectly polished paper, but it should be readable, flow well, be typed and spell-checked. And of course, *no plagiarizing!*

Please choose **ONE** of the following topics:

Topic 1: Another small step for a man and giant leap for mankind?

There has been quite a bit of discussion in the last few years about increasing the manned space program, sending humans back to the Moon, and even to Mars. As of now, people have never stepped foot on any planetary surface in the Solar System other than the Earth and the Moon. Do some research about past manned missions to the Moon, and about possible future missions to any other planets, particularly Mars. Do you think we should try to send people to land on other planets? What are the risks, and how do they weigh against the possible rewards? Are there any planets in our Solar System on which you think humans could survive on a long-term basis? Your analysis might include considerations of the possible loss of life, the possibility of new discoveries, including the search for evidence of life on other worlds, the financial costs, or any public interest in science and astronomy generated by such a mission.

Topic 2: Our future eyes

Learn about at least three future telescopes or observatories (space or Earth based, working in any region of electromagnetic spectrum) that will be operational within the next 10 years (some suggestions include TMT, JWST, SKA, ATA ..., but you should look for others!). What are the main scientific goals of each observatory? (Hint: there is usually an official webpage for the observatory that will list these somewhere). Which of the new observatories do you think is most

exciting or most promising scientifically? Your analysis might include the consideration of the approximate cost of each project (if available) compared to the possibilities of making new discoveries, or how relevant the science might be to understanding the origin of life on our planet and if we are alone in the universe. It might also include any other criteria you think is important.

Topic 3: Heaven and Earth collide

Something that has been in the popular media recently is the concern that a near Earth object (such as an asteroid or comet) could collide with the Earth. This has clearly happened in the past, and could be catastrophic for life, as demonstrated by the extinction of dinosaurs and many other animals 65 million years ago. How seriously should we be worrying about near Earth objects? Summarize TWO events from the past where the Earth was hit by a celestial body. What kind of object was each? What were the consequences of the impact? Next discuss what measures are currently underway (either ongoing or in the planning stages) to prevent or alert us of a future catastrophe. In your opinion, which of these are most effective? In your analysis please consider the cost of each, the effectiveness of alerting us to an impact, and the time over which each will be useful in comparison to the occurrence rate.

Topic 4: Astronomy and its influence on civilizations

Astronomy has had an important influence on many aspects of past civilizations. For example, it influenced the development of the modern calendar, was important for ocean navigation, and the Greeks incorporated the planets into their mythology. Summarize *three* different ways in which astronomy has affected civilizations (and you *can't* just use *all three* of my examples!). Was the influence of astronomy positive or negative in each case, and how long lasting was it? How important were scientific advances for allowing astronomy to be influential, or did the influence of astronomy in fact lead to scientific advances?