

### Intro to the Nature of Science Lab

*This and all AST101IN labs are to be completed in groups of 2-3 people. For this lab, you should answer all of the questions on a separate sheet of paper and should hand in just one paper per group with all group members' names on it. Each group member should participate equally in the lab. All group members should complete the readings when the lab prompts them to do so. Group members who finish the readings before others should sit quietly and wait for everyone to finish. **Do not pick up the second two articles until the lab prompts you to!***

**Purpose:** To introduce the concept of pseudoscience and to begin to identify qualities that distinguish it from true science.

**Materials:** Three readings:

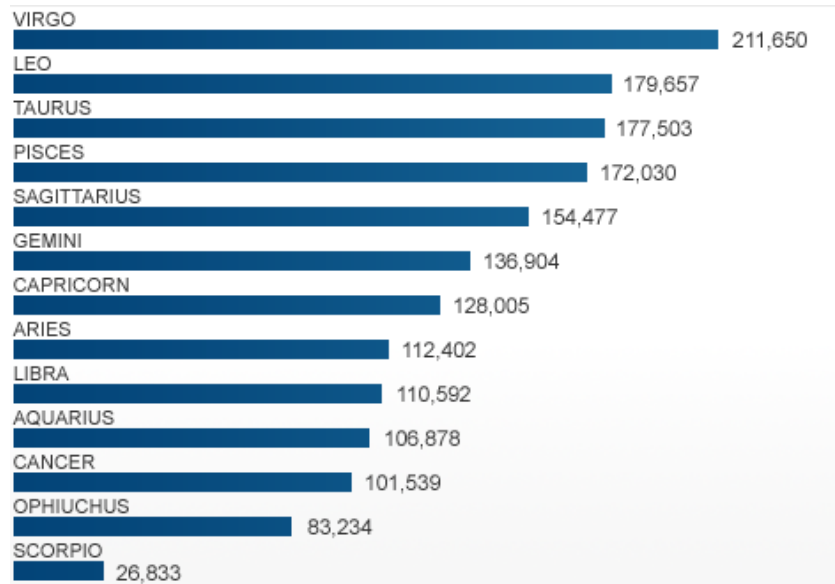
- (1) "Horoscope Hang-Up: Earth Rotation Changes Zodiac Signs"
- (2) "The Astrotest"
- (3) "An Astronomer Looks at Astrology"

### Instructions

In 2011, the "New" Zodiac Signs were rolled out in the media. Read the brief article from Time magazine online entitled "Horoscope Hang-Up: Earth Rotation Changes Zodiac Signs", then answer questions 1-4 on a separate sheet of paper.

1. The article describes a reason that astronomers defined a new set of Zodiac signs. What was their reasoning for this?
2. What is the scientific explanation for this phenomenon (the signs being off by ~one month) according to this article?
3. Is this a good, scientific article? Why or why not? Are you satisfied by the explanations it provides?
4. Write down two questions you have about the subject that are not answered by this article.

Shortly after the release of these "New" Zodiac signs, Allstate Insurance Company issued a press release that correlated drivers' Zodiac signs with their likelihood of crashing. The article listed the number of crashes in Allstate's 2010 records in which drivers of each Zodiac sign were involved, and the data are represented on the next page in graphical form.



5. What does the chart imply? Summarize its meaning in one sentence.
6. What is your first reaction to this data? Are you surprised? Do you have any doubts about its validity?
7. The data in the chart are perfectly accurate *however* there is a logical, scientific explanation for why the Zodiac signs follow this trend. You may have recognized it right away, or you may need to go back and look at the first article with a critical eye. What is the logical explanation?

Now, let's examine the basic premise of Astrology itself: that your personality, fate or the quality of your day might be determined by the position of the sun and planets on the date of your birth.

8. Is this idea testable? Together with your group mates, design a test that YOU could conduct to investigate whether horoscope predictions are valid and describe it.

Pick up and read the article "The Astrotest", which is about one such scientific experiment to test the validity of Astrologers' predictions, and then answer questions 9-11 on a separate sheet of paper.

9. In one paragraph, describe the "Astrotest" experiment conducted by the author. What was his hypothesis and how did he test it? Describe the experimental design and its results
10. Is this a good, scientific article? If so, name a couple of differences you see between this article and the first one you read that makes this article more scientific (or, if you disagree, name a couple of similarities).
11. Together with your group mates, brainstorm two tough questions that you might ask an astrologer if you were given an opportunity to interview one and "feel them out" regarding how legit their profession is.

Pick up and read the article 'An Astronomer Looks at Astrology', which asks 10 such questions, and then answer questions 12-14 below.

12. How were these questions similar or different to the two you came up with?
13. In what way is Mr. Fraknoi's approach to the topic scientific?
14. How do the "sidebars" included in the article (in grey) help to strengthen it's argument?
  
15. Together with your group mates, brainstorm some qualities of science that distinguish it from fake or "pseudo" science and list them (bullet/list form is fine). Also, make a similar list to describe the qualities of Pseudoscience. You may wish to take notes in the space provided below as you will be asked to do something similar for your first homework assignment. However, when you complete it for homework, make sure to put these qualities in your own words and not those of your group members!

Characteristics of Good Science

Characteristics of Pseudoscience

16. Finally, has this exercise changed your mind about the validity of Astrology at all? (Be honest – I won't judge!) Why or why not?