

	<p style="text-align: center;">Teaching Lesson</p> <p style="text-align: center;"><b>HOW'S YOUR HOROSCOPE?</b> TESTING ASTROLOGY</p> <p style="text-align: center;">© 2002 by Larry Flammer</p> <p style="text-align: center;"><a href="http://www.indiana.edu/~ensiweb/lessons/hor.les.html">http://www.indiana.edu/~ensiweb/lessons/hor.les.html</a></p>	<p style="text-align: center;">NATURE OF SCIENCE Realm &amp; Limits</p>
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**SYNOPSIS:**

Is astrology a science, pseudoscience, or a non-science? A major premise of astrology is that one's birth sign correlates with a particular collection of personality traits and interests. In order to test that premise, students compare their own traits with standard astrological descriptions, THEN learn whether their actual birthday matches the corresponding astrological dates. Simple statistical calculations reveal likely results due to chance. Discussion explores various explanations for results matching expectations for chance alone, and for results which do not match. The reasons that astrology is a pseudoscience are also examined.

**CONCEPTS:**

Science deals only with natural patterns and mechanisms.  
 Scientific explanations cannot include mysterious or supernatural forces, as such forces cannot be disproven.  
 Concepts whose proponents proclaim scientific support, yet do not survive scientific testing, are pseudosciences.  
 Astrology is a pseudoscience.  
 Astrology is unreliable, based on ancient mythology which defys modern knowledge, and is disproved by science.

**MATERIALS:**

- Student Handouts:
  - Your Horoscope: Background, directions, and list of traits
  - Your Horoscope Worksheet: Discussion questions
- Teacher:
  - Horoscope lesson
  - Worksheet key
  - Overhead: Key to astrological signs and dates

**TIME:** 15-20 minutes minimum to a 50 minute period, depending on extent of discussion.

**TEACHING STRATEGY & PREPARATION:**

**BACKGROUND:**

Astrology (not to be confused with the science of astronomy) claims that the personality, talents, daily activities, job choice, mate choice, and many other aspects of one's life are associated with that person's birthday. This is supposedly due to positions of the Sun, Moon and planets against the background of the visual star patterns (constellations) at the time and place of birth, and some mysterious force or influence between them. Those "positions" are their locations in the sky relative to one of twelve constellations arrayed along the ecliptic (general path of Sun/Moon and planets) throughout the year. Those twelve constellations are designated as the signs of the Zodiac, and whichever sign the Sun is "in" when you are born is your "Sun Sign". There are many other complex elements astrologers use to draw and interpret one's "horoscope", or birth map, but the Sun Sign under which you are born is considered the most important single factor, hence the question one might hear: "What is your sign?"

Many followers of astrology have claimed it as a "science", yet, for several reasons, it is best termed a pseudoscience. It is important, to be scientifically literate, that your students recognize what IS science, what is NOT science, and what is PSEUDOscience, and WHAT distinguishes these entities. The mysterious, forces which link these heavenly bodies with our birthdates behave like no other known forces. For example, unlike any other long-range forces, they are unaffected by distance. They are beyond nature, or "supernatural" forces, and astrologers make no effort to understand them. Furthermore, all attempts to demonstrate the purported association between birthdates and particular sets of traits, using scientific procedures, have failed. Nevertheless, many people (more than 50%) believe in astrology. As a "recreational" pastime, there's probably no harm here, but where

astrology is used to make critical decisions about national security, personal health, and even choices of marriage and business partners (all of which happen regularly), it becomes a most serious issue. If students don't learn to recognize bogus science in their science classes, they probably never will.

#### PREPARATION:

NOTE: We provide two versions of this lesson:

1. Traditional sequence (T) of the signs, with main "key words" first in the list of traits
2. Randomized sequence (RS) of the signs, with those main "key words" buried in each list.

It might be interesting (and informative) to use one version in one class, and the other version in another. Try it, and let us know your results. **Note** that each "Background/Procedure/Table" page has its own Overhead Key.

Prepare copies of "Your Horoscope" handouts:

- Page 1: Background, Procedure, and Table (one per person in your largest class, for re-use each period)
- Page 2: Worksheet - Discussion Questions (one per person in all your classes)

Prepare an overhead of the **Key to the Sun-Sign Dates**.

#### CONTEXT:

This lesson would be most appropriate as part of your Nature of Science unit. If used early in the unit, it could provide a stimulating example to explore the elements which distinguish science from non-science. If used later in the unit, it provides an opportunity for students to apply what they've learned about the nature of science: can they recognize an example of pseudoscience, and explain why it is a pseudoscience? Can they point out which rules of science are ignored or broken by astrology? Can they explain why it's a pseudoscience and not a non-science?

#### COMMENTS:

Some students might notice that the date-range for each Sun Sign may vary a day or so in different sources. If so, point out that this is due to factors e.g. leap year, time zones, daylight savings, latitude/longitude location, and when the ranges were quoted. The times used for this lesson were the ones most frequently quoted in several sources. Students born within a day or so of an adjacent sign are said to be on the "cusp" of their sign, which is usually factored in for a complete astrological chart. However, we will assume for the purposes of this lesson that such influences should cancel each other out, and not affect the class tallies appreciably.

The lists of traits and interests were also pooled and summarized from several sources; they seemed to show general consistency from source to source.

#### PROCEDURES:

See "Procedures" on the student handout.

1. Announce that we are going to do an experiment to test the accuracy and reliability of astrological birth signs.  
The **Question**: are the Sun-Sign traits accurately associated with their respective birth-dates?  
The **Hypothesis**: The traits associated with each sign correspond to the traits of those born under that sign  
The **Prediction**: If this is true, then a significant proportion of us (greater than that due to chance) should find that our personality traits and interests do indeed match those described for our birth sign.
2. The **Test**: Hand out page 1 to all students; ask them to take out (or provide them with) a sheet of paper on which to place their birthday and the code number for the combination of traits with which they identify most closely.
3. Also, ask them to indicate whether they think astrology can give accurate information (YES) or not (NO).
4. Students fold their sheets in half, hiding their information, and hand them in when called for.
5. Teacher re-distributes the sheets so students do not get their own sheets
6. Show the KEY to Sun-Sign Dates on the overhead
7. Students indicate HIT or MISS on the sheet, based on the key.
8. Teacher takes show of hands tally of HITs and MISSES, and records on overhead or whiteboard.
9. Teacher also counts numbers of YESs and Nos (show of hands), and records on overhead or whiteboard.
10. Hand out Worksheet for students to work on by themselves (about 10 minutes)
11. When most have finished worksheet, engage class in discussion of their answers. You might want to ask groups of 2-4 students to engage in a preliminary discussion first, comparing notes and sharing ideas. Then have each group take turns in reporting out on each item, sharing and discussing replies classwide. See KEY for sample responses. If more HITs than expected, see item #1 in the Extensions & Variations.
12. Take new class consensus: Do you think astrology can give accurate predictions (YES) or not (NO)?

## ASSESSMENT & EVALUATION:

1. Collect worksheets, and tally the YESs and Nos for item #12. Note how the class total compares with the original class total. Hopefully, there will be an increase in the NO answers, but don't be discouraged. Concepts are hard to change, whether they are logical or accurate or not. You might want to pose the question in a pre-test "attitude survey" at the beginning of the year, then again at the end of the year, to see if a combination of time, repeated experiences with the nature of science, and some growth in maturity have collectively raised the level of healthy skepticism and science literacy in your class.
2. Administer test questions in which students are asked to identify the elements of good science missing in astrology, and to recognize why it is a pseudoscience rather than a non-science enterprise. Carefully crafted multiple choice questions can also be used to assess this knowledge. If you do this, please share your efforts with us.

## EXTENSIONS AND VARIATIONS:

1. It's quite possible, especially in some communities, that a fair number of students may know the traits associated with their birthdates (and their sign), so they may recognize them in the activity, producing a significantly higher number of HITS (over those expected due to chance). If this happens, be sure to point this out. You could even ask how many knew (or were even vaguely aware) of the traits for their birth sign. If not too many, subtract their responses from the class totals. This is also a good opportunity to discuss one of the pitfalls of such surveys: how many selected the traits **expected**, and how many selected the traits **felt**? If felt, to what extent could their traits be the result of a "self-fulfilling prophecy" situation, if they had been told or had read of their traits at an early age?
2. Several excellent suggestions for related activities are included in the Fraknoi article cited below.
3. Additional problems which might suggest particular inquiries can be found in the little book by Royer and the two online essays listed below.

## OTHER RESOURCES:

See the excellent article by Andrew Fraknoi in the Astronomical Society of the Pacific publication for teachers: *The Universe in the Classroom*, No. 11, Fall 1988. Original source-idea for this lesson. Available online at: <http://astrosociety.org/education/publications/tnl/11/11.html>. Lots of insights, teaching ideas, and resources.

One of the possible student projects suggested in the Fraknoi article is to compare the signs of a large number of people in a particular career (e.g. professional sports, or teaching, or business....) with their respective Sun Signs. Here's one of many online astrology sites, this one specializing in appropriate careers for different signs: <http://career.astrology.com/>. Try baseball players' birthdays (next reference).

An apparently unbiased list of baseball players' birthdays (with counts, for every day of year, data from the Baseball Archives), see: <http://www.kitebird.com/mysql-cookbook/bbbirth.php>. Consider taking sampling counts for each Sun-Sign date range, e.g. take counts for every third day, giving us 10 counts per sign.

Royer, Mary-Paige. 1991. *Astrology: Great Mysteries - Opposing Viewpoints*. Very nice overview of astrology, along with many of the challenges to its validity, done in a relatively non-confrontational manner. This little book should be in your school or classroom library.

Essay: Critical Thinking: Astrology as a Pseudoscience.  
[http://www.csj.org/studyindex/studycrthk/study\\_pseudoscience/study\\_factastrology.htm](http://www.csj.org/studyindex/studycrthk/study_pseudoscience/study_factastrology.htm)

Essay: Astrology, from the Skeptic's Dictionary: <http://skepdic.com/astrology.html>

## ATTRIBUTIONS:

This lesson is adapted directly from one of the teaching ideas in the Fraknoi article cited above. However, instead of using the terribly vague comments found in a typical daily horoscope, as suggested, we have chosen to use a general consensus of descriptive traits typically associated with each sign. Whereas the original (Fraknoi) version has been successfully used in the classroom, the present version has not. Therefore, we welcome feedback from your experience with this material.

Developed and adapted for the ENSI site by Larry Flammer, November 2002.