

~~Week 4~~

In the first three weeks of this unit, you have set up a complete program of naked-eye observation of the Solar System. By now, the observational work should be routine, and while your students should be reminded to keep it up, the main focus of the lessons will shift to activities that will give the students a broader and deeper view.

This week, for example, your students will evaluate the claims of those who believe in astrology; they will look at the night sky through a telescope, and they will make a model of planetary orbits.

Continue the activities started in the previous weeks:

* Daily: .Moon Calendar

.Moon position records (in relation to the Sun and/or the stars and planets)

* Once this week: .Sunset

.Noon shadow

* If your students have not yet identified all the Zodiac constellations, continue working on that until they have.

* Research topic: Comets. (This should be done before Lesson 12.)

Lesson 10

ASTROLOGY

OBJECTIVES:

- * To evaluate the accuracy of astrological predictions.
- * To do this by way of a statistical approach.

GRADES: 6 and up.

SCHEDULING:

This unit will take two class periods.

PREPARATION:

The activity will be a testing of the accuracy of a given horoscope through interviews conducted by your students.

Interviewees will be asked to say which of two horoscopes applies to them. One will actually be theirs, and the other not. The question is how often the correct guesses will be made. (Approximately 50 % can be expected by chance alone.)

* Decide who will be interviewed: your own students? students in other classes? students and teachers in the playground? family and neighbors of your students? some combination of these? For the results to mean anything, you would have to interview at least 50 people. (Interviewing exactly 100 people would make for easy calculations.)

* Randomly pair the horoscopes and number the pairs. (Example: #1: Sagittarius & Pisces; #2: Capricorn & Virgo, etc.)

* Within each pair, decide which sign will be "a" and which sign will be "b". Do not tell anyone which is which until all the interviews have been completed (Example: #1a: Sagittarius,

#1b: Pisces, #2a: Virgo, #2b: Capricorn, etc.)

* Choose the horoscope from some publication. The best is probably to use the daily paper from the day preceding the activity.

* Delete the signs, and replace them with the number and letter you selected for each. Rearrange the horoscopes in numerical order. (Example: #1a: "This is an opportune time for making important financial decisions. Problems will befall one of your loved ones." #1b: "You have a tendency to take on too much. Concentrate on improving your communication with others." etc.) Duplicate the resulting sheet for your students.

STUDENT SHEETS:

* Yesterday's horoscopes (see above)

* Astrology Survey

* Astrology Survey Instructions

DISCUSSION:

Tell the students that the Sun also travels along the Ecliptic. However, since the stars are not visible in the daytime, it is not obvious which of the Zodiac constellations it is in. However by watching the sky at sunrise and sunset, it is possible to find out which constellation the Sun is in. According to astrologers, "your sign" is the constellation the Sun was in on the day of your birth.

* What is the difference between astronomy and astrology?

* What is a horoscope?

* Can the future be predicted?

ACTIVITY:

Hand out the reproduction of the horoscope, and the student sheets.

Explain the design of the experiment. Have the students enter the numbers (1 through 6) into the first "Code" column on the Astronomy Survey sheet.

Tell your students to conduct the interviews as follows:

- * Ask the subject for his or her birthday.
- * Look up the appropriate sign and find out its number.
- * Read both horoscopes that carry this number to the subject. Ask him or her which of the two horoscopes most accurately applied to him or her on the previous day.
- * Put a check mark on the survey sheet under "a" or "b", depending on the subject's answer.

(It is important that the students NOT know which horoscope is which, in order to prevent their behavior from affecting the subject. For the same reason, they should not show their tally to the subject.)

Discuss the criteria of your study with the students BEFORE starting the interviews. Ask them how many of the subjects can be expected to identify their horoscopes correctly by chance alone. Since this is clearly 50 %, agree on a greater percent of correct identifications that would make the horoscopes "pass" the test. 67 % ("2 to 1")? 75 % ("3 to 1")? 80 % ("4 to 1")? 90 % ("9 to 1")? A higher number is of course a more stringent requirement. What is important is that the class agree to the number ahead of time.

The next day, when the interviews are completed, reveal

the correct letter (a or b) for each sign, and have the students enter it in the second "Code" column. Tell them to count the correct guesses, and the total guesses and to enter the numbers on the right. Each column should be added up, and the total entered at the bottom.

Finally, all the students' results should be combined. Divide the total number of correct guesses by the total number of interviews, and multiply by 100. This is the percentage of correct guesses. Did the horoscopes pass the test?

CONCLUSIONS:

Belief or non-belief in astrology is not likely to be changed by this experiment. For one thing, "serious" believers in astrology reject newspaper horoscopes as crude.

Nevertheless, since newspaper astrology has the broadest audience, it is interesting to discuss it critically.

* Would the results have been different if the horoscope from another publication had been used?

* Why are horoscopes often vague?

* Should one trust horoscopes when making important decisions?

You may want to make clear that few, if any, astronomers believe in astrology, even though some astrologers use accurate astronomical data.

COMMENTS:

* Try to pick up a copy of the NATIONAL ENQUIRER near the beginning of the calendar year. They often feature astrologers' predictions for the coming year. It is interesting to check on the accuracy of the predictions. (All the ones I ever saw were

quite far off the mark, but see for yourself.)

* For ideas on a scientific appraisal of astrology and other paranormal claims, you may want to read various issues of THE SKEPTICAL INQUIRER (BOX 229, Central Park Station, Buffalo, New York, 14215), or write the Astronomical Society of the Pacific.

ASTROLOGY SURVEY

Sign	Dates	Code		Tally of Guesses		Number of guesses	
		1-6	a-b	a	b	Correct	Total
Capricorn	Dec 23 - Jan 19						
Aquarius	Jan 20 - Feb 19						
Pisces	Feb 20 - Mar 21						
Aries	Mar 22 - Apr 20						
Taurus	April 21 - May 21						
Gemini	May 22 - Jun 22						
Cancer	Jun 23 - Jul 23						
Leo	Jul 24 - Aug 23						
Virgo	Aug 24 - Sep 23						
Libra	Sep 24 - Oct 23						
Scorpio	Oct 24 - Nov 22						
Sagittarius	Nov 23 - Dec 22						
TOTAL							

ASTROLOGY SURVEY

L10/4

Sign	Dates	Code		Tally of Guesses		Number of guesses	
		a-b	a-b	a	b	Correct	Total
Capricorn	Dec 23 - Jan 19	2					
Aquarius	Jan 20 - Feb 19	3					
Pisces	Feb 20 - Mar 21	1					
Aries	Mar 22 - Apr 20	3					
Taurus	April 21 - May 21						
Gemini	May 22 - Jun 22						
Cancer	Jun 23 - Jul 23						
Leo	Jul 24 - Aug 23						
Virgo	Aug 24 - Sep 23						
Libra	Sep 24 - Oct 23						
Scorpio	Oct 24 - Nov 22						
Sagittarius	Nov 23 - Dec 22						
TOTAL							

Before the survey

ASTROLOGY SURVEY

Sign	Dates	Code		Tally of Guesses		Number of guesses	
		t-b	a-b	a	b	Correct	Total
Capricorn	Dec 22 - Jan 19	2			 		
Aquarius	Jan 20 - Feb 19	3					
Pisces	Feb 20 - Mar 21	1					
Aries	Mar 22 - Apr 20	3					
Taurus	April 21 - May 21						
Gemini	May 22 - Jun 22						
Cancer	Jun 23 - Jul 23						
Leo	Jul 24 - Aug 23						
Virgo	Aug 24 - Sep 23						
Libra	Sep 24 - Oct 23						
Scorpio	Oct 24 - Nov 22						
Sagittarius	Nov 23 - Dec 22						
TOTAL							

The survey

ASTROLOGY SURVEY

Sign	Dates	Code		Tally of Guesses		Number of guesses	
		a-b	a-b	a	b	Correct	Total
Capricorn	Dec 22 - Jan 19	2	b			6	8
Aquarius	Jan 20 - Feb 19	3	a			1	4
Pisces	Feb 20 - Mar 21	1	b			2	2
Aries	Mar 22 - Apr 20	3	b			4	8
Taurus	April 21 - May 21						
Gemini	May 22 - Jun 22						
Cancer	Jun 23 - Jul 23						
Leo	Jul 24 - Aug 23						
Virgo	Aug 24 - Sep 23						
Libra	Sep 24 - Oct 23						
Scorpio	Oct 24 - Nov 22						
Sagittarius	Nov 23 - Dec 22						
TOTAL							

Survey results .