Chapter 1: Yearly Motion

Student Worksheet

Objective:

Understand the role of the yearly motion of the Earth around the Sun in terms of the ecliptic and the zodiac. Distinguish between science and pseudoscience.

Engage:

How is a year defined? Why do you think 365 days constitutes a year? Why not 100 days? What are annual occurrences in nature that define a year?

Introduction:

In this activity you will investigate the year. You will also learn the language of using constellations as a map of the sky. A year is defined as about 365 days, or the time it takes for the Earth to make one revolution about the Sun. The year has a direct link to the constellations of the zodiac. In this activity you will investigate that link.

Background information: the **ecliptic** is simply defined as the plane of the Earth's orbit about the Sun.

Your Task:

In part one of this activity you will work in a small group with one of the constellations of the zodiac. In part two you will model the Earth's path around the Sun to understand what is meant when people say that an object is located in a constellation – for example: " The moon is in Sagittarius". In part three you will reflect on the scientific validity of astrology.

Procedure:

1. You will be instructed on how to perform a few simple operations of the planetarium app. You need to know how to:
    i. Set the date and time
    ii. Turn on the ecliptic
    iii. Turn on constellation boundaries
    iv. Speed up and slow down time
    v. Find objects (the Sun)
    vi. Look up Starlore, or other mythology

2. In your small group draw a connected-dot picture of your assigned constellation. Begin by plotting the stars on your page; then make a stick figure by connecting the dots. Label your constellation with a large, bold title and label the one or two brightest stars in the constellations with their names. You may use the app to help you.

3. On the back of the page describe the cultural significance of this constellation or any popular mythology associated with it. Just a few brief highlights will do. Keep it to a maximum of 5 sentences.

4. Also on the back of your constellation drawing, write the astrological dates associated with your constellation. Use an online horoscope to help you.

5. Follow the directions of your instructor to position yourself in a circle with the rest of the group.

6. Open up the planetarium software on your computer, tablet, or phone to finish the **Conclusion** questions below.

Conclusion:

1. In addition to the constellations of the zodiac, what other objects follow the path of the ecliptic?

2. At the time of your birth, in which constellation was the Sun? Does this match the astrological sign to which you thought you belonged?

3. How do the dates you wrote on your constellation drawing compare with the dates the Sun actually passes through the boundaries of the constellation?

4. What would be your astrological sign if you were born on December 4th?

5. If the sun is found on the ecliptic path in the middle of the constellation Leo today, where will it be found tomorrow? Where will it be found in a few weeks?

6. Does the Sun spend the same amount of time in all of the constellations of the zodiac? Explain.

7. If you were a horoscope writer, what would be a good tactic for writing horoscopes?

8. Read your horoscope from yesterday. Describe the accuracy of your horoscope.

9. What is wrong with the following statement? The sun is in Cassiopeia.

Extend:

- When did astrology start? Who started it? What was it used for?
- What is responsible for the fact that your star sign today does not match what it was defined to be so long ago? How are the constellations of the ecliptic predicted to change in the next few thousand years?
- Explain two different ways to define the ecliptic. Draw a diagram for each.