

Name(s): _____

Date: _____ Course/Section: _____

Grade: _____

Tracking Solar System Objects

Objectives:

The goal of this lab is to track the movement of solar system objects, such as planets, over the course of a few weeks.

Checklist:

- Complete the pre-lab quiz with your team (if required).**
- Compile a list of resources you expect to use in the lab.**
- Work with your team to complete the lab exercises and activities.**
- Record your results and mark which resources you used.**
- Share and discuss your results with the rest of the class.**
- Determine if your team's answers are reasonable.**
- Submit an observation request for next week (if required).**

Pre-Lab Quiz

Record your group's answers to each question, along with your reasoning. These concepts will be relevant later in this lab exercise.

1.

2.









3.

4.

5.

Review: Moon Phases

Label the moon phases in the image below and mark them in order of occurrence.

Picture	Order	Phase	Picture	Order	Phase
A 	_____	_____	E 	_____	_____
B 	_____	_____	F 	_____	_____
C 	_____	_____	G 	_____	_____
D 	_____	_____	H 	_____	_____

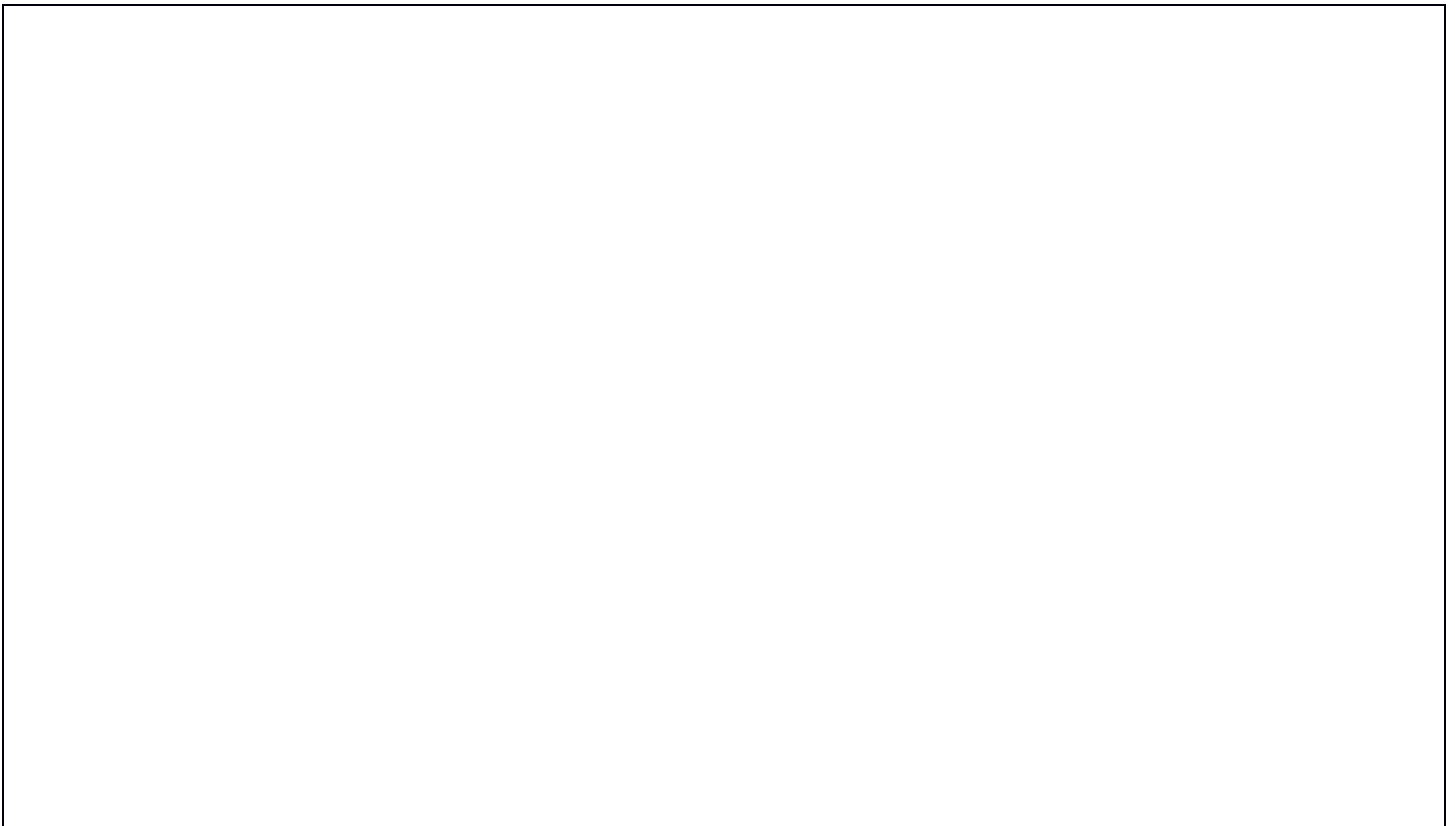
Materials reproduced from the [Astronomy Education at the University of Nebraska-Lincoln Web Site \(http://astro.unl.edu\)](http://astro.unl.edu).

Moon Phase	Rising Time	Meridian Transit Time	Setting Time
New Moon			
Waxing Crescent			
First Quarter			
Waxing Gibbous			
Full Moon			
Waning Gibbous			
Third Quarter			
Waning Crescent			

1. You see a waning gibbous moon rising, what time of day is it?
2. If today is a full moon, how long until it is a full moon again (in days)?
3. If the moon is 5° above the ecliptic, how long will it take for the moon to return to this position (in days)?

Part 1: Observing the Moon

1. What moon phase is it tonight? What side of the moon is illuminated?
2. What is the altitude and azimuth of the moon during your observation?
3. At what time will the moon be on the meridian?
4. Make a sketch of the lunar surface as you see it through the telescope. Using the Lunar 100 Cards, try to identify at least 4 lunar features. Then, label the terminator, lunar north, south, east, and west.



Part 2: Observing Planets

1. What planets are above the horizon tonight during lab? Record their RAs and Decs.

2. Using the remaining space, draw a detailed Finder Chart. Be sure to label the constellations and the planets that will be up during lab. You should make this as accurate as possible as you may track the movement of these planets over multiple nights.

Part 3: Image Analysis

1. With your images, animate the movement of the planets you observed. Describe what you observe. Do you see any retrograde motion? Does the planet cross into another constellation?

2. Look up the mean distance from Earth during your observations in km for the planets.

3. How much did the planet move in angular distance (degrees or radians) between your first and last observations? Note: For VAO, there are .67 arcseconds per pixel, or 0.000186 deg/pixel.

4. How far did the planet move, in km, between your first and last observations?

5. Since you know how much time passed between your first and last observations, how fast is the planet moving in km/s?

6. Look up the orbital velocity of each planet. How accurate is your speed? Recalling what you know about how the planets orbit, give reasons as to why your answer is different.