

MOON OBSERVATION ASSIGNMENT



DUE 12/3/2019

- Observations **MUST begin 11/14 and conclude 11/22**
- **5 observations within this time frame, AND a full moon (Separate) observation**
 - NOTE that the FULL MOON can ONLY be done on **11/14**, as it is actually full on **11/13**
- There will **NOT** be the opportunity to make this up.

Purpose:

To observe the movement of the moon around Earth and the sun.

- You will be observing different phases and positions of the moon throughout this observation, and calculating its path across the sky, as well as distance to a reference star.

Deliverables:

- Template of observations (not for points-but have this checked by me) due: 11/14
- moon phase calendar (Due by start date) due 11/14
- Observations and analysis due 12/3

Calendar:

[rise/set link](#)

Create a calendar using either the link provided or one that you find, which includes the following information for EACH day, spanning from **11/14-11/22**

- Moon rise/set
 - Note that some go into the next day!
- Exact name of Moon phase

Observation procedures:

1. Formulate your plan for observing at the **same time** (cannot deviate more than 15 minutes) from the **same location**, for 5 observations over the course of your observing period.

Your goal is to see different, full phases of the moon when the sky is dark. Also remember it is YOUR job to calculate when the moon will be rising and determine when you will begin your observation. You will also be measuring the movement in relation to a star.

- Keep in mind the weather may not cooperate, so leave days for weather disruptions!*
- Additionally, you may only alter/adjust your observing time ONCE. This must be specified in your observations*

2. **Make 5 observation forms.** You will be making recordings each night, and each night should be one page. Yes this will be a book when you turn it in.

Yes, typing it is a fantastic idea. Please do this.

3. You should spend about 10 minutes taking your observation, **AFTER** your eyes have adjusted to the dark. Make sure your parents know where you are. Take a buddy.

4. You will be observing at the **same time, from the same place every night**. you should have discussed with me any issues with this prior. You may make **ONE** time adjustment throughout.

Remember that moonrise changes each night!

5. Choose the same star to observe each night. Use your star charts and apps.

6. **AFTER** you have completed all of your observations, answer the analysis questions.

You will also do a full moon observation, in addition to your 5!

NIGHTLY OBSERVATIONS: (40 points)

Each of these items should be included in your template

1. **Sketch** of the skyline, indicating direction, any obstructions to your view (rooftops, trees, etc). I suggest copying one picture! (this can also be a photo you draw over)
 - a. sketch should include location of the moon and your reference star. Be sure you shade the correct side of the moon! This should be a decent drawing including your foreground objects. If artistry is really not your cup of tea, you can take a photo of your sky line and sketch in the celestial objects. You cannot use a photo for the entirety of this portion. Include directions (N, S, E, W)
2. The **date, time, & location** (specifically) from which you are observing the moon.
3. Moon **rise and set**.
4. Record/estimate the **percentage illuminated**.
5. The correct name of the **lunar phase**.
6. Measure/record the **altitude** of the moon each night, with your hand measurements.
7. Measure/record the **Azimuth** each night, using the altimeter OR your hands.
 - a. Note-**do NOT use your app for this!** I want you to use your hand measurements to approximate both coordinates! The app is based on an algorithm, and may not be accurate. Additionally, the app generally uses Declination and R. Ascension, which are NOT the same.
8. Choose a **reference star**. This star will be your reference star EACH night-as in the SAME star. Measure the movement in relation to the star you have chosen. Indicate this star on your observation sheet. This needs to be one you can *easily find each night*. You will be measuring the location and movement **in relation** to the moon. For example, you would indicate that your star is Altair and use your hand measurements to determine how far Altair is from the moon each night, in degrees. Yes, this will be an approximation.
9. Identify and label any other stellar objects you can visibly see, such as planets, constellations, bright stars. Again, use your eyes and app only to check the names.

10. Sun-Earth-Moon-Geometry: A diagram showing the location of the Moon in relation to the Earth and Sun during the observed phase. (think about the model we made-you are basically drawing it).

Additionally:

Full Moon Observation (10 points)

You will do an **additional** full moon observation. Observe the moon first while it is rising, and again when it is highest in the sky. You can complete the actual observation when the moon is at its' highest transit. This may mean you have two observations this night.

- Draw a nice detailed, large sketch of the full moon, including at least 5 visible craters, with any visible ray or ejecta features.
- at the top of page include time, altitude and azimuth.
- give me 3 general observations of the full moon-it's pretty awesome-just sit and stare at it for a bit.
- How do other stars within 50 degrees of the full moon appear?

Additional question: How does the moon appear on the horizon, compared to the highest point of transit?

Watch the following [video](#). Why does the moon ACTUALLY appear to be higher in the sky?

Hints:

- Let your eyes adjust to the darkness before you start observing. This will take about five minutes.
- Use the Moon Phases Diagram to help you figure out the time of day/night the moon will be up, the phase, and the geometry.
- Use your packet of moon stuff! Most all of the info is in there.
- Observe in the same place, at the same time each night. You may adjust ONE time, not two. Choose wisely!
- Remember there are no daytime observations!

Analysis Questions: (14 points)

(AT THE END OF ASSIGNMENT, NOT EACH NIGHT!!!!)

1. Do the features, such as craters that you are able to see, on the moon change from night to night? How did the visibility of the Lunar surface change during your observation?
2. Between week one and two what differences did you notice? How many degrees did your moon appear to move? How did it's location change?
3. What did you notice about the motion of the moon in relation to the star you selected?
4. If you were to observe the moon for a month, do you think the same phase would be in the same place in the sky? Why or why not? (if you do not tell me why you will not get credit for this question).
5. If you were to observe for the remainder of this lunar cycle, identify three changes that you would observe. Either number or make these bullet points.
6. At which point during your observations did the moon cross the meridian? How could you tell?

7. If you were to view over the same period in the Southern Hemisphere, would your observations have been different? Why or why not?

Additional points:

- Clarity, neatness and organization
- Aesthetics and creativity

Bonus points:

- Superior demonstration of artistic skill
- Significant time apparent in each observation, drawing

Internet Resources

Explanations of the moon phases:

[Lunar Phases Tutorial](#) - We will use this tutorial in class to better understand when and where to look for the different moon phases. Your assignment is to do all 3 parts of the tutorial and then copy all of the quiz solutions on a piece of paper (time, phase, and direction).

[A Practical Guide to Astronomy](#) - This site has good background information about moon.

[Moon Phases](#) - this site will help you understand our perspective of the moon's reflected sun light and why the shape appears to change during its orbit.

[Prentice Hall](#) Moon Phases also has good animations of motion and lighting.

[Skywatcher's Guide to the Moon](#)

Information to help you plan when to look for each lunar phase:

Sky and Telescope [Almanac](#) - make sure you set your location to Valencia.