

# MOON OBSERVING LAB

With this exercise you will increase your awareness of the constant goings-on of our close neighbor in space. Basically, you are to follow the moon assiduously for 7 nights. Its orbital motion will become clear to you during this period.

## PROCEDURE

**1.** Observe the position of the moon for 7 consecutive evenings at the same time each evening. Your horizontal plane, upon which you base your observations, is moving with the earth's rotation. Every 24 hours the earth returns your horizontal plane to the same orientation in space. Observing every 24 hours cancels out the effect of the earth's rotation on the moon's observed direction and the night to night effect of the moon's orbital motion becomes immediately apparent to you.

Your measurements of the moon's position are the horizon-based coordinates of altitude and azimuth, to which you have been introduced. You will use your fist and thumb as measuring "instruments" (as you were introduced in the *Angular Measurement & You* lab.

**2.** Suggestion for a successful completion of 7 consecutive nightly observations: You will find that the moon's orbital motion carries it from west to east, opposite the effect of the earth's rotation. Therefore, start your observing run before full phase and when the moon is to the west. This will ensure that seven or so nights later, you can still see the moon at the same time of the evening.

**3.** Using the helpful information below, record your observations on the Moon Data Recording Form on the other side of this sheet.

## OBSERVING ITEMS (from left to right)

**DATE:** Record this in the form *mo/day*

**ALTITUDE:** Show # of fists and thumbs above your measure converted to degrees. Express like this: #f + #t. Round your degree conversion to the nearest  $\frac{1}{2}^\circ$ .

**TIME:** Record this in Mountain Standard Time (Arizona never goes on "Daylight Time") on a 24 hour clock. Time is expressed in the form *hh:mm*. (No "a.m." or "p.m." is written.) P.m. times simply have 12 hours added. One p.m. is 13:00 hours. So, for example, an observation at 8:35 p.m. is to be recorded as 20:35. Record your time in the middle of your observations, i.e., after completion of the altitude measure and before the azimuth measurement.

**AZIMUTH:** First, the "**Cardinal Rule.**" Reduce your azimuthal error by measuring from the nearest cardinal point, not from the north cardinal point. Show # of fists and thumbs along with direction from the reference cardinal point (e.g., #f + #t, W of S = # degrees) above your conversion to azimuth (again, to the nearest  $\frac{1}{2}^\circ$ .) The azimuth determination requires a step that altitude did not. You must take into consideration the azimuth of the cardinal point you used as your reference direction. Suppose you find that you have measured the moon's azimuth to be  $15^\circ$  N of W. This is not how azimuths are expressed. Since W is the  $270^\circ$  azimuth, then the moon's azimuth is properly expressed as  $285^\circ$  ( $270 + 15$ ).

**PHASE:** Describe this with one of the following terms: waxing crescent, first quarter, waxing gibbous, full, waning gibbous, third quarter, waning crescent. You may use "full" for more than one evening.

# MOON DATA RECORDING FORM

Name \_\_\_\_\_

Section \_\_\_\_\_

Your fist size \_\_\_\_°

Your thumb size \_\_\_\_°

Obs#	Date	Altitude	Time	Azimuth	Phase
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1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

**IMPORTANT:**

- This lab is to be done independently.
- Do your lab and hand it in as soon as you can. There is **extra credit** for early birds. **Late penalty** (usual 2pts. @ day) does not kick in until the first day of the last calendar month of the semester (December in the Fall Semester, May in the Spring Semester). The latest I will accept your log sheet is the day of your last lab meeting of the semester. That is the end of the semester for this course, and the observing log will not be accepted after that day.