Teaching notes for Lunar Observing lab

Materials needed:

In classroom:
- Large map/image of moon
- Any visual aides you need to describe craters, maria, and highlands

On roof:
- Binoculars
- 8 inch telescopes
- 40 mm eyepieces
- 12.5 mm eyepieces
- 24 feature maps of lunar surface (one for each student)

The focus of this lab is for the students to observe the moon in several different ways and by looking at pictures they have drawn of different locations of the Moon to determine a geologic history. The introduction to the lab should briefly introduce the phases of the Moon. You should give a general description on why the phases occur being sure to emphasize that it is not due to the shadow of the Earth. The discussion of the phases should be used to guide the students in determining the best time to observe the Moon in the sky. Talk about rise and set times for the Moon and why we will be observing the Moon between new and full phase.

Ask the students about their level of familiarity with the material. Briefly talk about how craters formed (especially if they haven't done the impact cratering lab yet), how maria formed, and how the highlands formed. The information you give the students should be just enough for them to be able to use it when determining the geologic history of the Moon. You should use the large version map of the Moon provided to aide in your introduction.

The observations the students will be taking starts with an observation of the Moon with their eyes and with the binoculars. They should draw a picture of the Moon in this configuration and then look through the telescope with the 40-mm eyepiece. They should draw another picture of what they see through the telescope and compare their binocular/eye picture to it. They should be able to see a difference and you should help them figure out why there is a difference when they look through the telescope.

The students will then move onto observing 3 areas of the Moon with a 12.5-mm eyepiece. You should give them locations corresponding to the phase you are observing in. Mark these regions with tape on the large laminated Moon Map. The table below gives locations that best utilize the phases for high relief and contrast. The students should be able to observe a well defined crater, mare,

and highland region from these areas. Make sure the students draw as detailed of a set of pictures as they can.

Lunar regions

Lunar Region	**Best phase to view region**
Mare Crisium	waxing crescent
Mare Fecunditatis/Montes Pyrenaeus	waxing crescent
Montes Caucasus/Montes Alpes/ Mare Serenitatis	first quarter
Plato Crater/Mare Imbrium	waxing gibbous
Archimedes Crater	waxing gibbous
Copernicus Crater	waxing gibbous
Tycho Crater	waxing gibbous/full

The provided lunar feature maps should be in the correct orientation to what they see through the telescope. Make sure the students label the features they have drawn with correct labels.

When the students are done drawing the 3 regions they should sit down and examine their drawings. They should be able to tell how the highlands were formed, which craters are the oldest, which craters came after the maria did, etc. If they need help getting started on the geologic history be sure to give them some pointers. Be sure they answer all the questions asked within the lab as well as the few questions asked at the end.