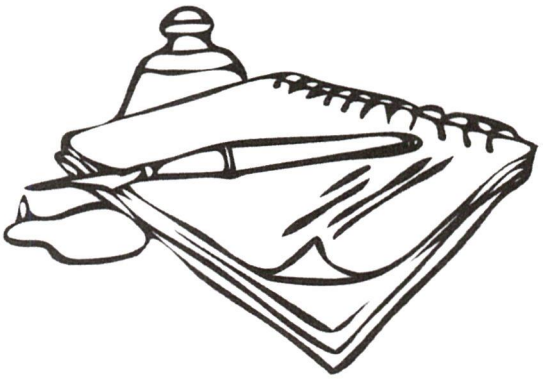
Educator Tips

by Mark Baldwin

The Moon: A Journal Exercise in Inquiry



The moon is a faithful, predictable part of earth's natural environment. We've all looked up and seen it hundreds of times, but it's surprising how many of us cannot explain its behavior: Why it changes its apparent shape, why it rises and sets at different times each day, etc. Your own observations and the records you keep in your journal are your key to understanding the lunar cycle.

Materials:
- Field Journal
- Pencil/pen

Optional:
- Compass. Your moon observations will be more accurate if you use a compass to record its direction.
- Binoculars: Lunar observing is enhanced if you use binoculars or a spotting scope.

Procedure

Consult a newspaper daily almanac, or visit http://aa.usno.navy.mil/ and click on Data Services in order to determine when the moon will be visible. Record the date and write "moon observation day 1." Once you have found the moon, record the following information:

1) Draw the moon's shape exactly as you see it. Also, record the apparent size of the moon. "Hold" the moon between thumb and forefinger held at arm's length and compare its apparent size to the size of a known object. Record this apparent size in your journal.
2) Record the time.
3) Record the direction of where a vertical line from the moon would intersect the horizon. Use a compass if you have one. If you're not sure what direction you are facing within 45 degrees, do some research to find out!
4) Record how high the moon appears directly above the horizon. This may be done approximately using the following method: Hold your right arm fully extended in front of you, making a fist with your fingers facing left. Line up the bottom of your fist with the horizon and close one eye. Try counting the number of "fists" from the horizon to a point directly overhead. Adjust the apparent "size" of your fist so that nine fists count 90 degrees, which is the number of degrees from the horizon to directly overhead. Now you may count the number of fists from the horizon to the moon, and convert this to the approximate number of degrees.

Try to make a moon observation following these guidelines every day if possible. In addition to the above, make notes about the weather: cloud cover, temperature, wind, etc. Use colored pencils to record a visual impression of the moon and your surroundings. Look at the moon through binoculars or a telescope and note your impressions with sketches and words. Following a period of moon observation take at least a few

moments for personal reflection, to write down your thoughts about the moon.

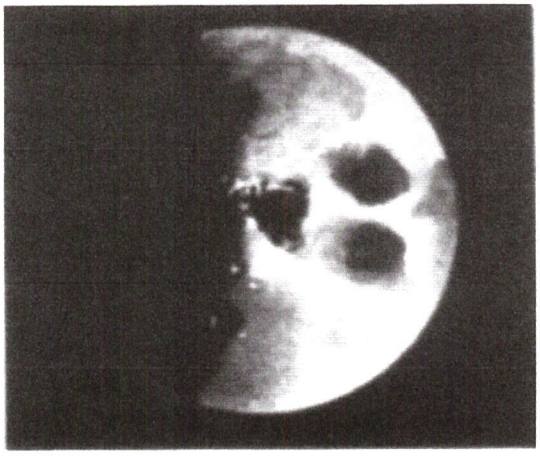
Make a list of questions you have about the moon.

Create a sky map that allows you to record each successive moon observation. Write down or draw any pattern or regularity you notice about how the moon moves.

During the course of the month start to investigate the questions you have about the moon. Address them in any order. Add questions to the list as they occur to you.

When your observations and research have led you to an understanding of what is going on between the earth, moon, and sun to make the moon behave the way it does, construct a diagram or written explanation to share.

Questions for Discussion:
What did you discover about the moon as a result of your long-term investigation? What questions do you now have about the moon? Reflect on the role your field journal played in your moon investigation.



The world is full of magic things waiting patiently for our senses to grow sharper.

John Keats

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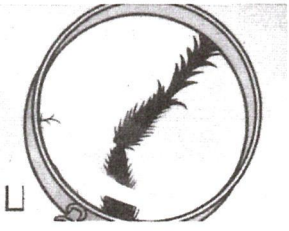
Learning How to Use a Hand Lens

Next to your field journal and a pencil, perhaps the most important tool of the amateur naturalist is your hand lens. A simple plastic model with 3X and 6X lenses can be purchased for a few dollars from any science supply catalog. A more sophisticated folding "loupe" with 10-20X magnification is a bit more expensive but well worth the price.



Materials:
Hand Lens
Natural Object

Procedure:
Determine which is your master eye. To find this out, extend your hands to arm's length with the fingers up and palms out. Overlap your thumbs and fingers to create a "knot hole" effect in the web of your hand. Pick out an object and, with both eyes open, focus on it and then center it in the "knot hole" between your hands. Close one eye and then the other. With one eye, it should stay centered; with the other, it will shift or go completely out of view. The eye that keeps it centered is your master eye.

Hold the lens so that it is very close to your master eye. Bring the object you wish to look at closer and closer to the lens until it pops into focus.This technique is in contrast to using the lens as if it were a reading glass, with the lens held a foot or more from the eye. Using the lens incorrectly in this way cancels much of its power to reveal detail.