Planetary Wonderings

February Focus: The Moon

(with a special emphasis on educational opportunities)

By Mary-Frances Bartels, NASA Solar System Ambassador

With a lunar eclipse coming up on Wednesday, February 20, I thought the moon a good topic of discussion for the month. We will first start with the eclipse. Though visible in Europe, Africa and a part of western Asia, North and South America will be in the best position for this sky show. The total lunar eclipse will be made even more striking by the presence of the nearby planet Saturn and the bright bluish star, Regulus in the constellation of Leo. This will be the third total lunar eclipse within the past year, yet the last for North America for nearly three years. The total phase will last 51 minutes and begins at 10:01 p.m. Check out NASA's lunar eclipse website at http://sunearth.gsfc.nasa.gov/eclipse/lunar.html for more detailed information. Space.Com also plans a viewers' guide on the 15th.

Were you aware that Christopher Columbus used a popular star almanac to predict a lunar eclipse, thus helping to save his crew and himself from starvation when they were stranded in Central America? Check out the story at http://www.space.com/spacewatch/080208-ns-lunar-eclipse-columbus.html .

This month marks the 40th Anniversary of the end of lunar mission for Lunar Orbiter 5. The Lunar Orbiters photographed the moon for the purpose of helping scientists determine landing sites for the Apollo missions. Lunar Orbiter 5 was the last.

Have you heard of the Lunar Reconnaissance Orbiter? The LRO is a new Moon orbiting mission scheduled to launch in the fall of 2008. It will be used in a similar fashion as the old Lunar Orbiters were --- to recon the moon for human exploration. The first mission of NASA's Robotic Lunar Exploration Program, the LRO is designed to map the surface of the Moon and characterize future landing sites in terms of terrain roughness, usable resources, and radiation environment with the ultimate goal of facilitating the return of humans to the Moon. The mission is expected to last for one year, with a possibility of extending it to five years.

Now, on to some educational resources related to the moon and its exploration . . .

The first program we will examine is *Lunar Nautics: Designing a Mission to Live and Work on the Moon.* LN is geared towards children in grades six through eight and includes a CD-ROM. The program simulates the process of developing a base on the moon. Multiple students are encouraged to work together to plan the missions to establish the base complete with mining operation and science objectives, and prepare a report for NASA and Congress. "Student employees" of a fictitious aerospace company must work within an established budget. The supplied "employee handbook" helps students break mission design into manageable steps. Fun activities include designing a mission patch, making impact craters, building edible rock abrasion tools, constructing edible spacecraft, and performing various design challenges. The CD-ROM includes other lunar information such as history and geography complete with educator resources. I have a copy and am willing to loan it out to those interested in participating. More information may be found at http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lunar_Nautics_Designing_a_Mission.html .

Another resource is called *Field Trip to the Moon. FTttM* is actually a new exhibit and presentation at the American Museum of Natural History in New York City. However, one need not leave Ohio to experience some of the excitement of this display. A DVD is available. It opens with JFK's famous speech that propelled the US on its trip to the moon. It then details a

future Orion mission that will return humans to our nearest solar system neighbor. The Orion will use an Ares rocket, very similar to the familiar Saturn V rocket setup from the Apollo days, except that it will have reusable solid rocket boosters on either side like the shuttle. Instead of landing in water like the Apollo missions, the Orions will touch-down on land in the western portion of the US. The DVD includes a brief introduction to lunar exploration, a simulation of a future Orion mission, followed by a short detailing the formation of the moon and lunar trivia. It is chocked full of information about the moon. The DVD reportedly is available to educators from AMNH for free at http://www.amnh.org/education/school_groups/offering.php?id=85 . This website also includes information about DVD, the presentation at the museum, and classroom activities which are available as free downloads. The DVD is also available from NASA for $12 at http://tinyurl.com/2pdg4f . Alternatively, I can loan my copy to those interested.

Readers may remember my previously mentioning Project Selene. Selene is a real research project utilizing a single player game focusing on lunar geology. It is open to teens aged 13 through 18 who have parental consent. The study began last May, but is still open to new participants as the study leaders continue to make improvements to the game. Membership cards are now available. Participation is by invitation only and more information may be found at http://selene.cet.edu/ . Those who previously signed up to play are welcomed to play anytime and new players may sign up through me.

The last educational opportunity discussed here is NASA's Engineering Design Challenge: Lunar Plant Growth Chamber. One of the hurdles man will need to overcome when establishing a more permanent presence on the moon is that of making his own food. For some time NASA has looked into growing plants in space, and more recently, on the moon itself. The moon has no atmosphere of which to speak, outside temperatures vary from day to night by 500° F, and water is extremely scarce if there at all. So, simply planting a seed and watering it is not an option. NASA wants students to get in the mindset to figure out how to grow plants on the moon. To fully participate in this project requires registration, though the materials could be used without it. During the 2007-2008 school year, K-12 students will design, analyze, build and assess plant growth chambers that could be used on the moon. Registrants will receive a packet of cinnamon basil seeds that flew on the STS-118 space shuttle mission and a control packet of seeds that have not flown. The two sets of seeds will be used to evaluate the student-designed plant growth chamber. Registration is limited to the first 100,000 educators to sign up. Though NASA has been accepting signups for several weeks, there should still be some slots open. See http://www.nasa.gov/audience/foreducators/plantgrowth/home/index.html for more information.

Resource of the Month: Some readers may remember that I now have an e-mail list called Astronomy for Educators. It is announcement-only list for the purpose of disseminating information on space-related educational opportunities for K-12 teachers, especially homeschoolers. In addition to providing this column I also make available information from NASA and other sources. To subscribe: Send email to AstronomyED-request@freelists.org with SUBSCRIBE in the "Subject" field OR log into the Web interface at www.freelists.org.

Activity of the Month: The Chinese, Muslims, and Jews all use lunar calendars. Are there any other cultures that use this kind of calendar? Which have provisions to correct them to the solar calendar? What year is it on the Jewish calendar? What is special about this Jewish calendar year? Find out the answers to these questions.

Suggestions, questions, and comments about "Planetary Wonderings" are welcomed and may be directed to stargazer @ keeplookingup.net (remove spaces). Past columns may be found at www.keeplookingup.net (click on "Planetary Wonderings" on the right side of opening screen).

Remember to *keep looking up!*

Sources (not mentioned in the article): http://www.space.com/spacewatch/080207-lunar-eclipse.html