Planetary Wonderings

March Focus: Sun-Earth Day and Solar Week

by Mary-Frances Bartels, NASA Solar System Ambassador

Sun-Earth Day is a special day, usually near the vernal equinox (first day of spring), with events centered around learning more about the sun and "sun-earth connections." Sun-Earth connections explore how the sun effects life on earth, and include everything from solar flares, to satellite communications, to the edge of the solar system. Each year has a different theme. The first Sun-Earth Day was in 2002. In 2004 Sun-Earth Day was moved temporarily to June 8 to correspond with the Venus Transit. This year's theme is *Eclipse: In a Different Light* and coincides with the total solar eclipse on March 29. Visit the Sun-Earth Day website is at Sunarthday.nasa.gov The eclipse will be visible starting in eastern Brazil, crossing the Atlantic Ocean, across central Africa and Turkey into Asia, ending near Mongolia. There will be a webcast on the Sun-Earth Day website from Turkey. It will be available on the Sun-Earth website during the eclipse — from 4:38 - 7:14 AM EST.

Www.MrEclipse.com is a great website to learn more about eclipses, including predictions for future eclipses. Mark your calendars for the next total solar eclipse visible across the continental 48 states is August 21, 2017.

Solar Week happens semi-annually with the next one occurring from March 6 - 10. The website (www.solarweek.org) has a collection of games, lessons, and activities focusing on the Sun-Earth Connection aimed at middle and high school students. Additionally, each day has a different focus and various scientists will be on hand to answer questions pertaining to that day's topic. Register on the website to participate in the daily Q&A.

Solar Eclipse Activity

Goals:

- To simulate a solar eclipse
- To understand the concept of angular size
- To make estimates of absolute and relative size

Materials:

- Yard or meter stick
- Construction paper
- Tape
- Scissors
- CD-ROM
- Pencil
- Black and yellow markers

Procedure:

1. MAKE THE SUN: Lay the CD on the construction paper and trace around its outer edge. Then trace around the center hole.
2. Draw two lines (a tab) down from the CD. Make the upside-down T-shaped tab which will be used to mount the CD circle on the yard/meter stick.
3. Cut out the large CD circle and connected tab. This will represent the sun. The small circle in the center will represent the size of the moon (of course, this is not to scale).
4. Color the CD circle yellow (for the sun) and the small center circle black.
5. MAKE THE MOON: Now, on a different piece of construction paper, trace just the center hole in the CD. Make the same kind of tab for this circle as you did for the sun circle. Make the

tab a bit longer than the sun's tab. Color the moon black and cut it out.
6. ASSEMBLE: Bend the sun and moon back 90 degrees from their tabs at the BASE of the tab. Wrap the fanned out portion of the tabs around the yard/meter stick and tape the ends together. The sun should be near the far end of the stick and the moon should be near the front. The sun and moon should now be able to slide up and down the stick.

Now, holding the yard/meter stick against your cheek, sight down the stick. The smaller moon circle will cover some portion of the sun circle. Slide the moon back and forth to a place where it just covers the sun. Looking at the yard/meter stick, note the distance (in inches or cm) of the moon. Then note the distance of the sun. Finally, measure the diameter of the moon. You can now create similar triangles that will help you answer the following questions:
1. On the yard/meter stick, how much further away is the sun than the moon?
2. Given the diameter of the moon, can you predict the diameter of the sun?
3. In space, our real moon has a diameter of 3,476 km and is on average 384,400 km from Earth. The sun is about 150,000,000 km from the Earth. How many times further is the sun then the moon? What would you estimate to be the diameter of the sun?
4. What is the angular size of the sun? moon? (hint: construct right triangles and use trig)

Please note that there were a few diagrams included in this writeup I had to omit to comply with the format of the newsletter. I modified a few descriptions to better indicate what is to be done. I can send the diagrams to anyone who requests them.

Questions and feedback about this column are appreciated. E-mail me at stargazer @ keeplookingup.net. Remember — Keep looking up!!