Up To Date

NASA IV&V Program
Educator Resource Center Newsletter

December 2011

Edited by Pam Casto

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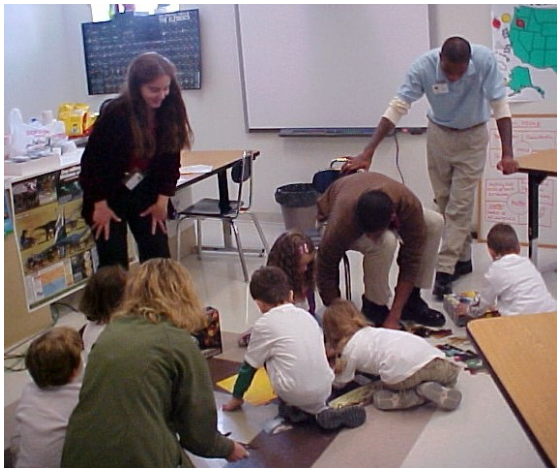
Mentoring in Tucker County by Vaia Meador

Editors Note: This article was submitted by one of the ERC's most dedicated teachers, Vaia Meador, who teaches at a correctional institute and has attend many NASA ERC workshops.

As an outreach program to their local community, The Rubenstein Juvenile Center located in Davis, WV invited local elementary school students from Tucker County to visit their school and participate in lessons and activities in a variety of subjects. The English class read to the students while the science class taught about magnets, senses, the solar system, microscopes and science of flight. Included in the activities were the utilization of a giant solar system puzzle borrowed from the NASA IV&V ERC as a teamwork activity and different paper airplane designs with templates from the ERC in Fairmont, to teach about flight.



Above: Groups of kindergarten students work as a team under the guidance of Vaia Meador and her students to "create the solar system."

Teacher Vaia Meador and her students based the science lessons on Kindergarten CSO's printed from the WV Dept of Education website. In one day they covered almost all the science CSO's spread out among the different groups that rotated through the program.

The high school students also printed and prepared two books for young children from the NASA website and passed them out for the students to take back to their classrooms to read.

The kindergarten children had a great time during their visit in part because of the many hands-on activities from NASA and the IV&V Educator Resource Center. At the end of the day the high school students were tired, but enjoyed working with the little children and becoming teachers themselves for awhile. *Photo Credits: Vaia Meador*

Below: Students utilize 3-D glasses to look at 3-D pictures of the sun.

GRAIL, MoonKAM, and Students

NASA's twin Gravity Recover And Interior Laboratory (GRAIL) spacecraft are now in lunar orbit.

During GRAIL's science mission, the two spacecraft will transmit radio signals precisely defining the distance between them. As they fly over areas of greater and lesser gravity caused by visible features such as mountains and craters, and masses hidden beneath the lunar surface, the distance between the two spacecraft will change slightly.

Scientists will translate this information into a high-resolution map of the moon's gravitational field. The data will allow scientists to understand what goes on below the lunar surface. This information will increase knowledge of how Earth and its rocky neighbors in the inner solar system developed into the diverse worlds we see today.

Each spacecraft carries a small camera called GRAIL MoonKAM (Moon Knowledge Acquired by Middle school students) with the sole purpose of education and public outreach. The MoonKAM program is led by Sally Ride, America's first woman in space, and her team at Sally Ride Science in collaboration with undergraduate students at the University of California in San Diego.

GRAIL MoonKAM will engage middle schools across the country in the GRAIL mission and lunar exploration. Thousands of fifth- to eighth-grade students will select target areas on the lunar surface and send requests to the GRAIL MoonKAM Mission Operations Center in San Diego. Photos of the target areas will be sent back by the GRAIL satellites for students to study. A student contest that began in October 2011 also will choose new names for the spacecraft. The new names are scheduled to be announced in January 2012.

NASA's Jet Propulsion Laboratory in Pasadena, Calif., manages the GRAIL mission for NASA's Science Mission Directorate, Washington.

Highlights from the Educator Resource Center in 2011 by Josh Revels

2011 was an exciting year for the ERC as new partnerships with other organizations around the state were developed, new workshops created, and new kits added to the Equipment Loan Program. As the year ended, the Educator Resource Center metrics revealed the following statistics:

Workshop Total: 143

ERC impacted teachers, informal educators, students, and pre-service teachers through conferences, webinars, trainings, and NEW student workshops.

Trained Educators/Students: 1755

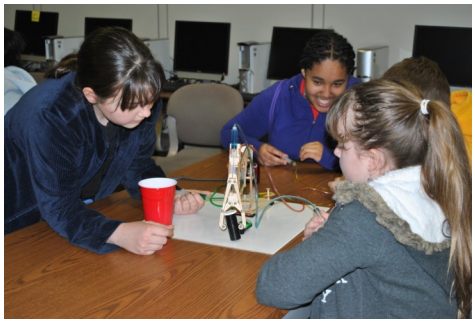
This is 446 more educators and students than the previous year.

Most Popular Kit: GPS

The GPS devices were so popular that an additional kit of 20 devices was added to our Equipment Loan Program. All four GPS kits were checked out for a combined total of 492 days, which is expected to increase in 2012. The next most popular in order were: STARLAB, NXT Robotics, Kindernauts, Basic Rocketry, WeDo Robotics, and Probeware.

New Kits: LEGO WeDo Robotics, Space Weather

Our popular new kits have significantly enhanced the free resources available to teachers. Build and program simple projects such as a racing, soccer, and animal themed LEGO constructions with the K-8 LEGO WeDo Robotics kit. Incorporate technology into your 5-12 classrooms using iPads and solar scopes with a fun Space Weather unit that significantly increases student knowledge about our nearest star, the Sun. Schedule a training to learn more about using these kits. How to register for an ERC workshop or schedule one for your school information is on the back of the newsletter.

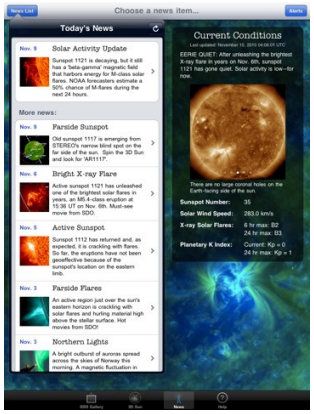


Above: Students doing an activity from the new robotics kit.

Busiest Months: June and October

In June, eleven workshops, including the multiday Rocket Camp and Exploring the Universe, filled the month along with checking out over twenty different kits. October saw nineteen workshops and over twenty equipment loans.

The ERC continuously worked to integrate many subject areas into great activities and lessons for educators and students. The ERC plans to extend this goal by significantly updating several kits this year and adding a Planetary Geology Kit and a Sun-Earth Day Kit. We hope to hear more remarks like the one teacher who said, "Awesome workshop! Thank you so much! Great math integration." and another who said, "This is my first workshop, I will definitely use the robotics equipment. Very interested in other kits also."



Above: Snapshot of an app on the new ipad2's used as part of the new Space Weather Kit.

Upcoming Workshops and Events at the ERC

Jan. 14 Robots and Ratios .....10 AM—4 PM

Jan. 14 Flight and Bernoulli Webinar 10:00-11:30AM

Jan. 16 Robots and Ratios Part 2.....10 AM—4 PM

Jan. 17 Student Planetary Geology (filled)

Jan. 24 Student Electromagnetic Spectrum (filled)

Jan. 28 STARLAB and Telescopes .....4 PM—8 PM

Feb. 7 Student Robotics (filled)

Feb. 11 Glass and Mirrors Webinar...10:30 AM—12:30 PM

Feb. 16 NASA Games.....4 PM -7 PM

Feb. 20 Virtual Worlds .....10 AM-4 PM

Feb. 21 Student Living and Working in Space (filled)

Mar. 3 Life on Earth..and Elsewhere? Webinar ...10:30 AM-12:30 PM

Mar. 6 Student Planetary Geology (filled)

Mar. 7 Lunar/Meteorite Certification.....5 PM—8 PM

Mar. 10 Robots and Ratios .....10 AM—4 PM

March 20 Student Rocketry (filled)

Mar. 21 Sun-Earth Day Celebration....time TBA

Mar. 24 Robotics Explorations Webinar....10-11:30 AM

Mar. 24 Robotics Explorations and WeDo Workshop .....1 PM—5 PM

A Few NASA Highlights of 2011

NASA's Office of Education successfully developed a variety of new partnerships and engaged in a number of activities to promote STEM education. For example, at the launch of the Mars Science Laboratory and the Curiosity rover in November, NASA announced an educational collaboration with entertainer will.i.am of the musical group **The Black Eyed Peas** to engage students in hands-on activities in engineering, robotics and other high tech fields. The goal is to promote curiosity and exploration and hone student skills for the high-tech job opportunities of the future. Another partnership joined NASA and the Donna Karan Urban Zen Foundation to inspire underserviced youth in New York City. NASA's Summer of Innovation program for 2011 served more than 3,700 middle school teachers and 46,000 middle school students.

NASA's Space Shuttle Program concluded in 2011 with three final missions to the International Space Station. Each mission carried supplies and equipment that will sustain the space station crews until NASA's new Commercial Resupply Service providers take over this role. STS-135, the last shuttle mission, had Commander Chris Ferguson present the station's crew with a U.S. flag flown on the first space shuttle mission, STS-1, in April 1981. The flag will remain displayed aboard the station until the next crew launched from the U.S. retrieves it for return to Earth so it can be carried by the first crew launched from the U.S. on a journey of exploration beyond low-Earth orbit.

NASA selected the Orion Crew Exploration Vehicle as the spacecraft that would take astronauts beyond low Earth orbit into deep space travel. Also announced was the design of a new heavy lift rocket called the **Space Launch System** that will take astronauts farther into space than ever before –perhaps to an asteroid or Mars, and create high quality jobs here at home.

In December, NASA announced that it will competitively award Space Act agreements for the next phase of the Commercial Crew Program. The move will keep on track the agency's plan for the U.S. companies to transport astronauts into space and ultimately will end outsourcing the work to foreign governments. Since the end of the shuttle program the U.S. has been dependent on Russia to take our astronauts to and from the International Space Station.

NASA and its international partners celebrated 11 years of permanent human habitation on the International Space Station on Nov. 2. More than 1,400 research and technology development experiments have been conducted aboard the orbiting lab, many of which are producing advances in medicine, environmental systems and our understanding of the universe. NASA selected an independent non-profit organization, the Center for the Advancement of Science in Space (CASIS), to manage U.S. scientific and technological research conducted through the part of ISS that is a National Laboratory, and is transitioning responsibilities to CASIS. **Robonaut 2**, the first humanoid robot in space, and the Robotics Refueling Mission (RRM), which tests robotic techniques for on-orbit satellite servicing, were delivered to the station in 2011.

NASA missions continued their ground-breaking research on Mars in 2011. These discoveries will help lay the foundation for future human missions to the Red Planet. NASA's Mars Reconnaissance Orbiter revealed possible **flowing water** during the planet's warmest months. Dark, finger-like features appear and extend down some Martian slopes during late spring through summer, fade in winter, and return the next spring. Repeated observations tracked the seasonal changes in these recurring features on several steep slopes in the middle latitudes of Mars' southern hemisphere. Scientists' best explanation for these observations is the flow of briny water. Some aspects of the observations still puzzle researchers, but flows of liquid brine fit the features' characteristics.

NASA's new Aquarius instrument, launched into Earth orbit on June 10, produced its first global map of the salinity of the ocean surface. Surface salinity is the last of the major ocean surface quantities to be measured globally from space and provides scientists with a new tool to explore the connections between global rainfall, ocean currents and climate changes. Aquarius is now producing continuous observations of the global oceans in unprecedented detail, including extensive low-salinity regions associated with the outflow of major rivers.

The Solar Terrestrial Relations Observatory (STEREO) spacecraft captured the first entire view of the **far side of the sun** in June. These first-ever views will advance the study of solar and space physics, help validate previous imaging techniques, and contribute to the accuracy and timeliness of space weather forecasts. The spacecraft reached opposite sides of the sun in February, but a small part of the sun was inaccessible to their combined view until June.

In 2011, NASA's Kepler mission confirmed its first planet in the habitable zone, the region where liquid water could exist on a planet's surface. Kepler also discovered more than 1,000 new planet candidates, nearly doubling its previously known count to 2,326. Ten of these candidates are near-Earth-size and orbit in the habitable zone of their host star. The newly confirmed planet, **Kepler-22b**, is the smallest yet found to orbit in the middle of the habitable zone of a star similar to our sun. The planet is about 2.4 times the radius of Earth and located 600 light-years away. Scientists don't yet know if Kepler-22b has a predominantly rocky, gaseous or liquid composition, but its discovery is a step closer to finding Earth-like planets.

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ERC Website: http://erc.ivv.nasa.gov

Links to Student Competitions

First Lego League Robotics:

http://www.firstlegoleague.org/

Real World Design Challenge:

http://www.realworlddesignchallenge.org/

Team America Rocketry Challenge:

http://rocketcontest.org/

Green Aviation Contests:

http://aero.larc.nasa.gov/competitions.htm

The NASA Independent Verification and Validation Program Educator Resource Center's goal is to serve teachers, informal educators, and pre-service teachers to enable them to reach their goals. Through a grant with Fairmont State University, the NASA IV&V Program ERC provides materials, equipment for loan, and professional development workshops for informal and formal educators both at the facility and around the state of West Virginia that reflect NASA's current research and technology.

Science Quote of the Month:

Every minute dies a man, Every minute one is born;" I need hardly point out to you that this calculation would tend to keep the sum total of the world's population in a state of perpetual equipoise, whereas it is a well-known fact that the said sum total is constantly on the increase. I would therefore take the liberty of suggesting that in the next edition of your excellent poem the erroneous calculation to which I refer should be corrected as follows: "Every moment dies a man, And one and a sixteenth is born." I may add that the exact figures are 1.067, but something must, of course, be conceded to the laws of metre. ~

Charles Babbage, letter to Alfred, Lord Tennyson, about a couplet in his "The Vision of Sin"

Where in WV is the ERC?

December Workshops in Red

December Equipment Loans in Blue

To register for a workshop:

Go to: http://erc.ivv.nasa.gov

and click on workshop registration

To schedule a workshop:

Contact the ERC by calling 304-367-8436 or emailing:

pamela.casto@ivv.nasa.gov

To schedule equipment for loan: First, check the equipment loan calendar on the ERC website to see if the equipment is available for the dates desired. Then choose your dates (up to a two week loan period) and email Nicole Culp who will schedule the loan.

nicole.culp@ivv.nasa.gov