



Helios STEM Schools Updates



April/May 2014

Issue 5

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A Message from Science Foundation Arizona

Science Foundation Arizona is honored to be working side-by-side the seven programs selected as Helios STEM Schools. This program's key premise is that STEM education is an integrated, interdisciplinary approach to learning that provides problem-based and relevant experiences for students. Ultimately the initiative will support the successful implementation of Arizona's College and Career Ready Standards and the anticipated Next Generation Science Standards.

Each school or district is transforming its approach to STEM education in a way that addresses its particular needs and builds on its unique advantages. Successfully implemented programs will prove they can be sustained and measured and will ultimately offer STEM models that can be used statewide. The schools describe their progress in this newsletter to share lessons learned and to express appreciation to everyone contributing to the programs' successes.

Alhambra Elementary School District

Mark Lialaberte, Academic Coach

STEM Labs Update

We are pleased to report great news regarding our science achievement as we wrap up our first year with our new STEM ActionLabs. Benchmark testing has revealed that our two schools that implemented STEM Action Labs this year (Cordova Middle and Granada East) have experienced on average greater than 17% growth in students who either met or exceeded expectations on science achievement. This number is significantly higher than growth of the district overall, a respectable 9%.

Based upon this data and anecdotal/observational information, the Alhambra Elementary School District has decided to expand the existing STEM Lab program to another school! Montebello School will have 14 separate labs installed this summer and will be ready to have their first students experience them in August 2014. This will bring the total number of students impacted by these engineering labs to greater than 500 in the 2014/2015 school year.

Thanks again to the Science Foundation of Arizona for the resources necessary to kick-off this past school year's giant step towards bringing two of our schools closer to the next step on the STEM Immersion Guide.

MESA (Math, Engineering, and Science Achievement Program)

As a follow-up to our previous article on our Junior High STEM Club, MESA (Math Engineering Science Appreciation), a huge congratulation goes out to all of our clubs who did an outstanding job at the state competition held at ASU on Saturday, April 12, 2014. As a District, we received 35% of first place awards (3 of 8) and we were represented eight different times in events that were awarded third, second, or first places. Overall, we were recognized eighteen different times for our students' efforts.

A special recognition goes to our Montebello students, and MESA coaches, for their first place finish in the National/State competition for building an award winning prosthetic arm. In order to place first in this competition, numerous steps had to be done with significant skill. First, students had to use their arm in competition to throw various sized balls into buckets placed at three different distances, showing the arm's strength and range of motion. They then had to lift a variety of objects and place those objects in certain orders, showing the arms operator's level of precision. Next, students had to turn in a technical paper that was supported by their research, their diagrams, a budget with corresponding receipts, and their engineering notes. Students then had to make and display the process for creating their prosthetic arm and closed the presentation with a presentation made to the judges.

With the win, the Montebello team secured an opportunity to represent all Arizona middle school MESA teams with a spot in the National Engineering Design Competition, held in Portland, Oregon in June. Great job team!



Altar Valley School District

Kathryn Zanin, STEM Coordinator

May buzzed with excitement as students from grades 4th – 8th participated in three different multi-day field trips to Mt. Lemmon, San Diego and Washington D.C. Students spent the months of April and May in preparation for what they would experience at each location.

Fourth grade students celebrated the end of the year with a field trip to Mt. Lemmon. Students spent three days and two nights participating in various STEM related activities. Each day is filled with hands-on activities, guest speakers and nature walks. The purpose of the field trip is to allow students an opportunity to experience science in real, meaningful ways.

Sixth grade students finish the year with a trip to San Diego to learn about marine biology. Students spend their days exploring Sea World, the beach and experiencing the evening skyline of San Diego and dinner from the deck of a boat. Many of the students who attend Altar Valley Middle School have never been outside the state; let alone experiencing a tour of the city from the deck of a boat.

Eighth grade students spend a week in Washington D.C. exploring the sights and sounds of the city. Though this field trip is not a part of STEM it does provide the students with a wide range of experiences as they toured the Smithsonian Museums, monuments and taking in the cultural diversity of D.C.

The dedication, time and energy teachers commit to ensuring the three multi-day trips happen for the students of the Altar Valley School District is amazing. Teachers begin in August creating lessons, fundraising and preparing students for their year-end trips.



Eighth grade students at the Reflecting Pool in D.C.



Standing in front of the White House.

Bagdad School District

John Depanfilis, STEM Coordinator

Bagdad School District's 2014 Science and Engineering Fair gave students an opportunity to showcase their scientific research and design process, where FMI Engineers volunteered to judge their work. The projects demonstrated the student's knowledge in a variety of fields including engineering, as well as in physical, environmental, earth, life and behavioral/social sciences.

Bagdad High School, in cooperation with Freeport McMoRan Copper & Gold, kicked off its second annual College, Career & Job Fair in the high school gymnasium and continued on the football field at dark with a community "Stargazing Party." This community-wide event, to which nine additional high schools and the public are invited, hosted 15 colleges (including two from out-of-state) and featured representatives from more than 30 careers.

"We want to create a 'college-going' atmosphere on our campus and in our community, whether that means going to a career and technical program or for an academic and professional degree," said fair organizer Betty Marvin.

"We're hoping to reach that special someone who, because of this glimpse of the heavens, will decide that a career in astronomy is worth considering," said Bagdad astronomy teacher, William Griffith.

Represented careers included various medical professions, multiple engineering fields, mining, geology, hydrology, metallurgy, occupational therapy, social worker, teaching, physical therapy and job recruiters. A new feature also offers a "kiosk" of several computers where the participant may go immediately online and apply for a job or college admission.

Participating colleges included Yavapai College, NAU-Yavapai, Yavapai College CTEC, Grand Canyon, University of Arizona, ASU College of Technology & Innovation, NAU, Embry-Riddle Aeronautical University, Western New Mexico University, Missouri University of Science and Technology and the new Trine University from Peoria, Ariz.

As attendees left the Gym they followed a lighted path out onto the football field, finding not only giant telescopes, but a giant-sized image of space-related videos being projected onto a screen built onto the football goalpost.

As he did in October at the Community Carnival, Arizona Science Center Director Mike George, and his colleague Liz Davison, brought two computer-guided, 11" telescopes to the party. They also brought their considerable expertise, answering any and all questions posed by the many stargazers who came to catch a glimpse of clear night sky.



Congress School District

Stephanie Miller, Superintendent

After School Programs

Kindergarten, First, and Second grade students presented to parents their LEGO Wedo projects. Students finished creating animal habitats that housed LEGO robotic animals. Parents learned about how the animals were put together and the programming that was used to animate the animals as they were in their habitats. During the final Honors Assembly, a VoiceThread was shared that showed students explaining their final products.

3rd through 8th grade Drama Students presented a play about the evolution of education. The play had a focus on integration of technology in education and how it has been used to support learning. Students learned about STEM while growing their acting skills. It was a sensational performance!

Voicethread

Voicethread continues to be used to document STEM club experiences. It was also used during the final Honors Assembly to share a K-2 STEM integrated unit. Students enjoyed creating the VoiceThread with the help of Mrs. Sims, IT services.

ST Math

Congress Elementary finished proud and strong in their ST Math progress for the year. The school had the highest average syllabus progress for the State of Arizona. Students enjoyed problem solving math problems with the help of JiJi, the friendly penguin.

Defined STEM

Defined STEM goal setting for the 2014-2015 school year was done in April and May. Teachers will be creating two multi-disciplinary STEM units during the 2014-2015 school year. Many teachers are working on their units during the summer and plan to come and share with other teachers during the District Inservice Days hosted before school starts on August 4th.

Additional Grant Funding: 6-8 Field Trip

Thanks to Science Foundation Arizona, with funding support from the Helios Foundation, the 6th through 8th grade students were able to go on a Science based field trip to San Diego. Sea World, the Reuben H. Fleet Science Center, and the Birch Aquarium were visited by students. It was a teambuilding, hands-on, and fun experience!



W.F. Killip Elementary School

Ted Komada, STEM Coordinator

The months of April and May at Killip were a time for closure and reflection of the '13-'14 year. A final round of units on Magnetism, Erosion and Plants were all planned and delivered. The uncertainty of things to come has disappeared, replaced with a comfortable sense of accomplishment and pride in the work the staff and kids have done in this year. At our final staff meeting many of the teachers identified STEM in the 'Name one thing you're most proud of this year' activity.

Community Collaboration

Although community collaboration was not a direct focus of the year we had a number of partners come in to work with our students on STEM units. Below are some highlights.

Outdoor Living Laboratory

Killip's 3125sq. ft. garden is quickly becoming part of our integrated grade level units as students explore everything from habitat to plant and animal structure, to sustainable living. Partners working in the garden in various ways are NAU Sustainable Communities, Flagstaff FoodLink, TerraBirds and 21st Century STARS.

Garden Water Catchment

Our 2nd & 5th grade "buddies" learned about water conservation early this year. They worked together to build a list of ways we could conserve water in our homes and in the school. One of the ideas was to water our garden with collected and stored rainwater from our roof instead of from the tap. The students drew collection designs and tested filters. A team of NAU Engineering students took on drawing up designs for a possible catchment and filtration system. Engineers Without Borders has committed to taking on the project next year as the students, both Killip and NAU work through the next steps of making this a water catchment system a reality.

EcoRanch

Created as an experimental growing and sustainable living education site, the Flagstaff EcoRanch is providing real-world experiences for our kids to extend their understanding for some of the work we're doing in STEM units and out in the garden.

Summer Science Camp

This summer we are offering a 3 week summer camp for 90 Killip students. Each student will participate in 3 tracks of learning; The Science of Baseball with the AZ Diamondbacks, Sustainability and Garden. Partners include: AZ Diamondbacks, Flagstaff Foodlink, National Park Service, Arizona Science Center, Hermosa Vida, 21st Century STARS and Flagstaff EcoRanch..

The 2013-2014 year has been a busy one with many great accomplishments under the HSSP

Salt River Elementary School

Lynette Charlie, STEM Coordinator

What an exciting STEM year for Salt River Elementary School. With two family STEM nights under our belt and several STEM professional developments over the course of the year we are excited about the direction our program is taking.

Here are a few examples of what we've been up to and how we continue to make STEM come alive at SRE:

Professional Development: On May 27th our education staff at Salt River participated in an all day professional development. During this time we focused on understanding the 4 technology practices as they related to the application of science concepts and how we can increase the conceptual value of incorporating Technology, Engineering and Math with science.

The science leadership team also presented at the 2nd annual SFAz STEM Club conference. The focus of the presentation was illuminating the journey of Salt River Elementary school in establishing their STEM after-school clubs. Dr. Keith Idso, Marcella Valencia and Lynette Charlie hosted this excellent and informative break-out session.

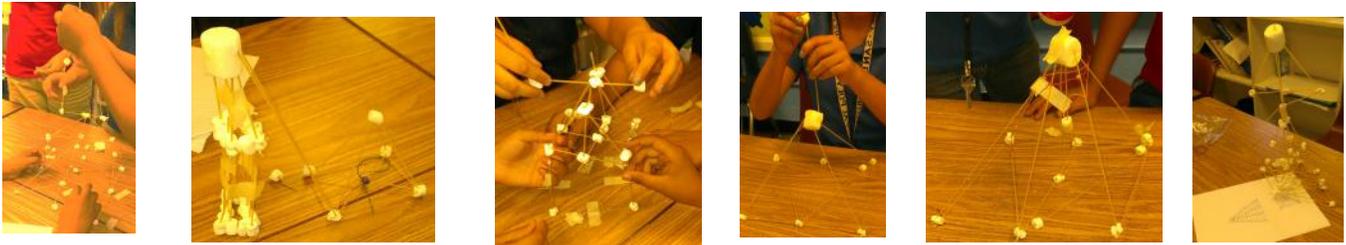


Yuma Elementary District

Theresa Lowe, Grant Coordinator

May in Yuma District One found the fifth and sixth grade teachers at the seven elementary schools in our grant busy exploring electricity with their students as follow-up to the training provided to the elementary teacher cadre by Sara Torres. Among other electricity-based centers, Sara and Debbie Weber, our Master Science Trainer, shared a way to make inexpensive basic circuit boards. Also at that training, Christa Fairman, our district technology specialist, shared a free iPad app called Exit Ticket with the cadre members. Exit Ticket is a student response system that allows a teacher to view immediate responses from each student iPad and also tracks individual students' progress over time. Cadre members had time to explore the app and set up their own accounts on their laptops so that they could manage the system for their classes. We are finding that teachers need extensive, supported time to become comfortable using iPads themselves so that they will use the iPads more comfortably with their students. We plan to offer teachers more opportunities for iPad training to address this concern.

Cadre training this year featured numerous activities based in the Next Generation Science/Engineering Standards. Typical is an engineering design problem that our students loved: design a structure that will bear the weight of a given number of marshmallows with as few spaghetti strands as possible. Pictures tell the story:



An exciting event at one of our Helios STEM Pilot schools was a day-long science event at George Washington Carver Elementary School. This school's third through sixth grade students and teachers, assisted by several community experts, hosted seventh and eighth grade students from two private schools and taught them science concepts throughout the day. Activities included measuring heart rate and blood pressure, pre- and post-Zumba exercise, using interactive white boards to create a timeline of famous scientists and their contributions, collaborating in a predator/prey scenario and then using iPad to create electronic books about what was learned, and studying native plants. Carver's students were proud to be the teachers for older students.