



Helios STEM Schools Updates



July-September 2015

Issue 10

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A Message from Science Foundation Arizona

Science Foundation Arizona is honored to be working side-by-side with 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 prepare our students with skills necessary for the 21st century workforce.

Now in our third and final year of the program, we see each school or district transforming its approach to STEM education in a way that addresses its particular needs and builds on its unique advantages. These programs are becoming STEM models that can be used statewide. In each newsletter the schools describe their progress and share lessons learned, expressing appreciation to everyone contributing to the programs' successes.

Alhambra Elementary School District

Mark Lialaberte, Academic Coach

While the Alhambra Elementary District moves into our third and final year of the Helios STEM School Pilot Program, we continue to have many STEM activities going on throughout our district. Two of these activities we are especially proud of, include are our MESA Activities and Engineering Activities both highlighted below.

MESA Activities

The Alhambra District's MESA (Math, Engineering, and Science Achievement) Team, from Montebello School, led by MESA advisor Kelby Milgrim, earned three awards at the MESA National Challenge in Ogden, Utah, in June, and was awarded an **overall fourth place** in the United States! The national challenge was to design, engineer, and operate a low-cost, environmentally sustainable, easy-to-operate prosthetic arm that could perform a variety of real life tasks.

Alhambra's Montebello MESA Team earned **second place in the country in the "Design Efficiency" category**, a **third place award in the "Object Relocation" category** and a **third place award in the Academic Poster Presentation category**. In addition to earning these top awards, Alhambra's Montebello Team placed fourth in distance accuracy, fifth place in the oral presentation, and eighth place in the technical paper.



Engineering Activities

The Alhambra Elementary School District continues to work to embed science into all levels of English Language Arts. A committee was formed over the summer to address this particular goal. The committee (a combination of classroom teachers and coaches) was tasked with creating lessons for grades K-8. These lessons were standards-focused (both Arizona Science Standards and AZCCRS), made use of technology that closely aligned to that used in the AzMERIT, and made explicit connections to the existing science curriculum. Over thirty multi-day lessons were created.

In September, all Alhambra teachers were brought together for a full day of professional development to learn how to implement these lessons. Teachers were provided rationale for the creation of the lessons. They were given time to fully engage in the materials and personalize them by adding teacher notes, anchor charts, and real time assessments. With the addition of these lessons, science continues to break out of the science lab and gain traction - growing in every classroom.

Altar Valley School District

Julie Walters, STEM Coordinator

Summer 2015: Discovery STEM Camp

For sixteen fun-filled days in June, Altar Valley Middle School was the sight of roller coasters, solar cars, wind turbines, catapults, and many more STEM creations and experiments. Students in second through eighth grades were invited to attend Discovery STEM Camp, an engineering and design experience with a focus on energy. Observers were likely to see students of all ages actively engaged in science, technology, engineering, and math. Both teachers and students enjoyed the hands-on learning. In addition to the STEM classes, students were able to choose music, art, cooking, or volleyball as a special. Our first graders were treated to a week with a teacher from the Arizona Science Center. In that week they dissected scorpions, made volcanoes and robots, and built structures from spaghetti and marshmallows! One student commented on his end of summer survey, "This is the coolest school I have ever been to."

We are looking forward to continuing the camp next summer with more exciting experiments and fun, active learning!



Scorpion Dissection!



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Wind Turbines!



Solar-Powered Cars!

2015-16 School Year: Paxton Patterson

This school year, we are very excited about the Paxton Patterson Lab at Altar Valley Middle School! The Paxton Lab has been added to our students' schedules as a special area class. So, in addition to Art and P.E., each of our students will have the opportunity to experience an Integrated Instructional Unit (IIU) and learn about topics such as Forensic Science and Flight Technology through a combination of computer-based modules and hands-on activities. As our Paxton Lab teacher, Georgina Woodley, put it, "If we want our students to be competitive in Science, Technology, Engineering, and Math, we have to give them positive experiences in those areas. Paxton Patterson modules are a step in that direction." We are proud of our Paxton Lab and are looking forward to showcasing our students and Ms. Woodley at the STEM Conference in Phoenix in January!

Bagdad School District

John Depanfilis, STEM Coordinator

Summer STEM Kids Camp

Bagdad Unified School District ran their first annual “Summer STEM Kids Camp” during June and July, which was a huge success. The classes ran anywhere from 1 week in length up to 4 weeks. The focus of this camp was for kids to have fun and engaging classes with a STEM emphasis. Teachers designed and facilitated various classes of their own interest and specialty, which included 14 exciting and diverse classes for kids ranging from 6 to 18 years of age. Some of the captivating classes included; Magic of Science, Xtreme Science, Go! Chefs, Rocket Rally, Mad Scientist, Computer Mania, MineCraft Math, Spin Slap and Roll, Crazy Bout Golf, Volleyball, Softball, Go Buggy, Under the Sea and Kite Kapers!



Some of the exciting courses offered during this program included ...

Rocket Rally Experience where students explored rocket flight while learning about the principles of aerospace engineering using science and math. In this course, students planned, assembled, prepared and launched model rockets and did a follow up with debriefing exercises. Behaving like NASA specialists, each student tracked, recovered, inspected, and evaluated the rockets.

Mad Scientist Class that attempted to bring out the inner scientist in the students. Students were told that is “This course there will never be a dull moment with all the hands on experiments. You will become a crazy chemist watching explosions and changes right before your eyes. You want to become a junior engineer? You will while you work on your building and reasoning skills! Come and enjoy your journey to becoming a Mad Scientist!”

Arizona First Tech Challenge – by Julian Hill (Bagdad High School Student)

In addition to the summer program above, this summer Bagdad High School’s Engineering Class attended the “Arizona First Tech Challenge,” which is the robotics competition kickoff @ ASU. The event began with a bang, as they revealed the robot’s battleground and all the new rules and concepts for this year’s competition. There were all kinds of cool cliffs and obstacles that you had to maneuver. We were also introduced to the Android Studio, which is the programming software for the robots. Judges will critique our notebook and enjoy seeing documented bloopers or any signs of mistakes. Our notebook needs to be creative and innovative!



Congress School District

Stephanie Miller, Superintendent

Hooray for **S**cience, **T**echnology, **E**ngineering, and **M**ath (**STEM**)! The Science Foundation Arizona Grant, with grant funding by the Helios Foundation, helps support five targeted areas. This is the third year of a three-year grant.

After School Programs: The STEM Legos Robotics Club is now year long for 6th through 8th Grade Students. In September, students were able to attend the kick off event hosted by First Lego League at Arizona State University. Second and Fifth grade students will now all get to experience Legos robotics during the school day. This allows for sustainability of the program and for all students to have equal access to robotics. Second grade started their coursework in September and Fifth grade will begin after Winter Break.



STEM Drama Club for Kindergarten through Second Grade has also started. We expect an outstanding performance in November; "Hansel and Gretel: The Nutrition Show".



Voicethread: Voicethread continues to be used in classrooms to document and support developed projects. STEM projects are greatly enhanced by usage of this tool.

ST Math: Students have begun to work on their STMath syllabus work. We are pacing well and expect to have many students complete the challenge puzzles this year.

Defined STEM: The Defined STEM product continues to support students and staff as interdisciplinary STEM units are created and presented. Thanks to Defined STEM, in October, a team from the school will be presenting at the Association for Supervision and Curriculum Development (ASCD) conference taking place in Texas. The title of the presentation will be "Shifting to a STEM Culture".

Other Grant Related Items: In August 2015, District Administration Magazine wrote an article about Congress Elementary School and its work with integrating STEM. Then in September 2015, The Learning Counsel published an online article about Congress Elementary School and accelerating education through STEM. The article was called, "Accelerating Education with STEM A New Approach to STEM Education at a Rural Elementary School Revs up Learning with Hands-on Student Experiences"

W.F. Killip Elementary School

Ted Komada, STEM Coordinator

Special Projects Kick Off The Year At Killip Elementary

One of the major focuses Killip has for year 3 of the HSSP project is the inclusion of 'real-world and relevant' projects for our students. Four such projects are in the works right now at Killip. The following is a detailed description of one such project.

4th Grade Alternative Energy

This project has grown out of a 4th grade unit on Energy. The students read, wrote about and worked with hands-on activities to learn where our energy comes from and the pro's and con's of various energy types. They were given the task of making a recommendation as to which type of alternative energy would be most feasible at Killip. They have decided on Solar and will be making presentations in November to their peers and teachers to justify and defend their selection.

This project will allow the students to pursue their recommendation into that coveted realm of 'Relevant, Real-World' application of content knowledge. The students will start by dissecting solar powered Garden Path lights. They will examine how they work and then reassemble multiple solar panels from the lights into a 'Double A' battery charger that they will be able to take home to use with their AA battery powered toys or electronic equipment.

Having gained some knowledge and experience with how solar panels function and then having applied that knowledge to building their own small solar battery charger, the students will be given the task of designing a larger system capable of powering the Aquaponic Greenwall at the school. The scope of this larger system goes beyond the knowledge of the STEM coordinator so additional content expertise will be sought from the community. Once that solar professional is identified we will engage our students in drawing up their versions of design plans that will be compared to the professional plans. Students will work with the solar professional to revise their plans until they understand the function of the various components needed to complete a functional solar powered system. Students will develop an implementation plan and will submit a proposal to the STEM coordinator for approval. If approved the students will work alongside (where feasible and safe) the solar professional and/or Habitat for Humanity, and/or FUSD facilities/maintenance department to complete the install.



Salt River Elementary School

Erik Haarstad, Principal

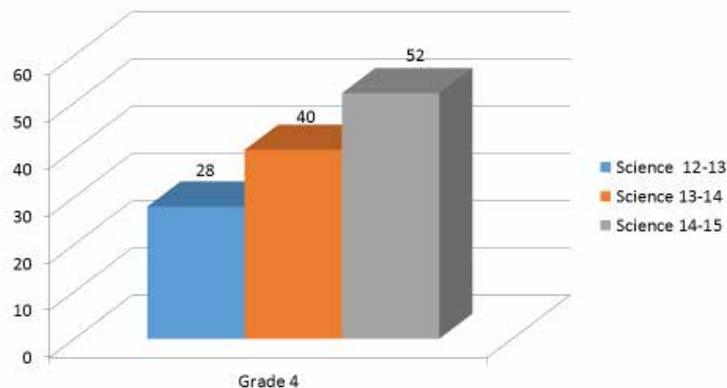
As we being year three as a Helios STEM School, Salt River Elementary School continues with our strong commitment to providing our teachers extensive STEM Professional Development and we are now starting to see proof of the impact of this professional development.

Kristen Moorhead has been providing professional development and consulting to Salt River Elementary since the first year of the school's Helios STEM 3-year grant (we are in Year 3). STEM stands for Science, Technology, Engineering and Mathematics. Teachers such as teacher Ms. Etsitty are taking what they learn on best teaching practices in Science and STEM and applying this in their classrooms!

One measure of progress from continuous teacher training is an increase in AIMS Science proficiency scores over the past three years in Grade 4 (see graph below).



Recent AIMS Science



Yuma Elementary District

Theresa Lowe, Grant Coordinator

As an example of progress toward STEM immersion in our schools, this month Yuma District One is featuring activities at Pecan Grove Elementary School. Pecan Grove is committed to bringing science alive for kindergarten through fifth-grade students in one of Yuma's poorest neighborhoods.

Pecan Grove has found a truly unique solution to allowing students to explore science topics of their choice. Through the generosity of a local donor, the school has outfitted a science center in two connected classrooms with an array of interactive stations that entice budding scientists to investigate everything from insects to the universe. Walking into this room is like walking into a science museum! The room is open before school and during lunchtime to students at every grade level. Each class gets five daily passes, allowing different students to visit throughout the week. In lieu of doing other duties (such as bus or lunch-room duty), a teacher serves as host, curator, and guide. At other times of the day, teachers can schedule time to accompany their classes to the science center.



Palmcroft was also the site of a STEM-based summer school funded through the district Migrant program. The program sought to build science, literacy and math skills through an interdisciplinary approach. Students used jellybeans to simulate pressure and temperature effects of the rock cycle and were delighted by the disgusting black, stinky rocks they produced. They also harvested their own seeds from the school garden and replanted them, learned coding, experimented with engineering principles involved in building, launched bottle rockets to study Newton's laws, and modeled the water cycle.

In a new initiative this Fall, Pecan Grove is fielding two robotics teams through Lego League. In addition, the school is part of the district-wide Personalized Learning initiative, through which every student has an iPad. Teachers who have been part of two-year's experience with iPads through the HSSP grant feel much more comfortable expanding their iPad repertoire this year.

