



Helios STEM Schools Updates



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A Message from Science Foundation Arizona

There has been a lot of recent research tied to the questions of what is STEM and what does it look like in the educational setting? We are proud to state that the Helios STEM School Pilot Program has provided us with an opportunity to answer those questions, and more importantly how to share our progress with others. STEM education is an integrated, interdisciplinary approach to learning that provides hands-on and relevant learning experiences for students. STEM teaching and learning goes beyond the mere transfer of knowledge. It engages students and equips them with critical thinking, problem solving, creative and collaborative skills, and ultimately establishes connections between the school, work place, community and the global economy. STEM also helps students understand and apply math and science content, the foundations for success in college and careers. Our latest issue of HSSP Newsletter provides shining examples of how STEM is applied in the K-12 setting...enjoy!

Alhambra Elementary School District

Mark Lialaberte, Academic Coach

This fall the Alhambra Elementary School District has had a number of exciting successes in our STEM programs, two of which are discussed below...

League at Catalina!

The Catalina Builders, Catalina Ventura School's robotics team, competed against 27 other teams in the regional FIRST LEGO League (FLL) competition at Bioscience High School on December 5, 2015. In conjunction with Catalina teacher, Hanna Saigh, and volunteers from business partner Vertech Industrial Systems; the Catalina Builders learned programming skills, mechanical design, and how to research and design a solution to a real world problem. All of this was done in only three short months. Students had to program an autonomous robot that would successfully complete missions on a game board, demonstrate knowledge of FLL Core Values by completing a team work event at the competition, as well as presenting the judges with a project of their own design. The project theme this year was "Trash Trek" and students were tasked with identifying a problem, designing an innovative solution, and sharing that solution with others. The Catalina Builders decided to find an alternative to throwing away pencil shavings. Instead of adding the shavings to landfills, they mixed the shavings with soil (thus adding valuable nutrients while also acting as a natural insecticide) and grew heads of lettuce. The Builders showed how over 200 heads of lettuce could be grown with the soil/pencil shavings mixture collected over a single school year. That is enough lettuce to make over 2000 salads! Great job Catalina Builders!



STEM Action Labs Honored at Granada East School

Congratulations to Granada East School. Granada East was recognized during Paxton Patterson's National Sales & Marketing meeting in November. Their effective implementation of the Paxton Patterson ActionLABS has distinguished them as one of the top ten schools implementing ActionLABS in the country. As a result, executives from Paxton Patterson visited the Granada East campus and STEM classroom. The purpose of the visit was to discuss how Granada East implemented this program and to determine how to promote Granada's success to other schools around the globe. In addition, Paxton Patterson created a video specific to Granada East's accomplishments, which will be used as a tool to promote Alhambra's STEM programs.

Altar Valley School District

Julie Walters, STEM Coordinator

STEM activities flourished in Altar Valley this fall.

Young Scientists In Action!

First graders at Robles Elementary School have been learning about different earth materials in Science. They recently conducted investigations from the FOSS Pebbles, Sand, and Silt Science Kit. During the investigations, the students learned the names of different rocks and focused on the properties and uses of different natural resources. This hands-on approach to Science is not only fun and engaging for students, it allows them to develop and explore an interest in the world around them; observe, describe, and sort different rocks based on their properties; gather data about their observations by drawing and writing in their Science journals; and learn new academic vocabulary. It's a little bit messy (lots of pebbles and sand on the desks and floors!), but the first grade teachers are all very excited about teaching Science, and the students loved it! Check out the students in Mrs. Debra Norris' classroom!



Altar Valley Middle School Eaglebots Soar At First Lego League Tournament!

The Altar Valley Middle School Eaglebots, coached by 6th grade teacher Julie Venglarcik, participated in the Tucson Red Qualifying First Lego League Tournament on Saturday, December 5th and received several honors! They were recognized as a “Developing” team on their project on composting with red wigglers and Madagascar hissing cockroaches. The team scored several “Accomplished” marks in their robot design category. In the area of Core Values, the Eaglebots received “Exemplary” marks! Specifically, they were recognized for their inspiration and teamwork: Veteran team members Aden Rose and Madison Pizzuto worked together with rookie team members Brandis Johnson and Roberto Alvarez to catch the attention of one of the judges, who recognized the team with the Judges Award. Finally, they brought back the trophy signifying that they showed grit in the face of multiple setbacks in their access to the technology necessary to learn and complete their mission. Since the competition, the Eaglebots have acquired two brand new computers and we are very excited about what they'll be able to accomplish now that they have updated technology! We are very proud of our Eaglebots!



Bagdad School District

John Depanfilis, STEM Coordinator

Below are some exciting highlights of STEM activities in Bagdad this fall,

Pumpkin Chunkin

Bagdad's High School CTE classes competed in Mortimer Family Farm's Annual 'Pumpkin Chunkin' competition in Dewey, Arizona where they won first place for the fourth year in a row for longest distance! Their redesigned floating arm trebuchet launched a pumpkin 788', which set a new record for the event!

Solar Powered Charging Station

The engineering class worked with the CTE classes, in order to design and construct a solar powered charging station for the school!

Young Eagles – by: William Griffith

On Friday, November 13th, 2015, high on the Bagdad Mesa, a group of seventeen 7th-graders from Bagdad Middle School met a group of six amazing volunteer pilots (and their expert ground-crew) from EAA Chapter 883, Wickenburg, AZ. The site was Bagdad Airport (E51), and the occasion was the twice-yearly Young Eagle Rally when a new semester-group of students culminate their Mathematics in Aviation coursework by flying, one-on-one, with an intrepid EAA pilot in his airplane. Aircraft include a mixture of Cessnas, Mooneys, and Van's RV-6/8's. During the 30-min flight, each student has the opportunity to take the controls for up to 20 minutes. Immediately after takeoff they fly over the copper mine just west of town, then turn southward and loosely follow the road and RR tracks leading toward Prescott - a route they've all taken with their earthbound parents many times. From Bagdad the path overflies Hillside, Kirkland and Skull Valley before rounding Martin Mountain and heading back west on the 30-mile home leg. Students apply their classroom learning to the task, and experience a portion of the "drive" to Prescott from a young eagle's perspective. At the conclusion of each flight, the pilot presents his co-pilot with a genuine logbook recording the flight, a certificate, and a personal code with which to enter the portal (www.youneagles.org) to a whole new level of aviation education and instruction. This was the eighth such Rally (over 4 years) facilitated by EAA #883 for the students of Bagdad MS. The next Rally will be in April, 2016.



Congress School District

Stephanie Miller, Superintendent

Hooray for Science, Technology, Engineering, and Math (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 November, students were able to compete in their first regional competition. Many lessons were learned and high marks were given for teamwork. We are extremely proud of their accomplishments this year.

STEM Drama Club for Kindergarten through Second Grade presented “Hannah and Gretel; A Nutritional Tale”. Students performed for the entire school, for parents, and then at the First Trimester Honors Assembly. Many lessons on nutrition were shared. These were accompanied by music and outstanding student performances.

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:

Teachers were able to go through another ST Math training where they learned about syllabus progress versus mastery progress. Great discussions were held by the educators during the professional development. Students are continuing to pace through the syllabus with high mastery as an expectation.

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 presented at the Association for Supervision and Curriculum Development (ASCD) conference that took place in Texas. The title of the presentation was “Shifting to a STEM Culture”. This presentation was shared at the Arizona STEM Conference hosted in January.

Other Grant Related Items:

The Fifth Grade Teacher wrote a grant to participate in a “Moon, Mars, and Beyond” program. Students role played taking a journey through space. They had to communicate with ground control and solve various problems along the way.

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W.F. Killip Elementary School

Ted Komada, STEM Coordinator

The opportunity for W.F. Killip Elementary to participate in the Helios STEM School Pilot Project, as administered through Science Foundation Arizona, has been a very rewarding experience for our students, our teachers and staff, and our entire community. It has been very exciting to be such an active part of such an initiative that is truly shaping 21st Century Education.

First and foremost, the successes we created have truly been accomplished through a “team approach”. Our teachers have worked in collaborative teams to develop integrated units aligned with the Arizona College and Career Ready Standards and the Next Generation Science Standards. These units serve all children at Killip and are very detailed and comprehensive in nature. They ask our students to display mastery of skills and knowledge in non-traditional ways, requiring them to think critically as they apply STEM skills and knowledge to solve real-world and relevant problems. It has been exciting to see the change in both our students and staff as we continue to learn and grow in this wonderful world of STEM education.

Our students are engaged and motivated beyond what we have ever seen here at Killip. We have students who choose to give up their recess to participate in developing and maintaining STEM projects such as our aquaponic greenwall, coding, Lego Robotics, Solar Power or researching and building a weather station. Our 3rd grade classes are about to begin a unit on Force and Motion, using the exploration of Mars as the avenue to teach reading, math, science and engineering. Our 5th grade students participated in a unit earlier in the year, learning how the Earth’s spheres interact with one another and how those interactions make life possible on Earth. There are more units, lessons and projects that I could highlight which currently serve as examples in stark contrast to what learning was here prior to the Helios Pilot project.

We are now partnering with community members in very different and exciting ways. These partnerships support our efforts by providing opportunities for our students to encounter STEM content through experts in the classroom and experiences out in the field. They expose our students to careers in STEM fields and provide examples of real-world application of the content we’re learning about in the classroom. They are even beginning to provide funding for specific student projects across our school.

There is so much more that I could share about what we have learned and yet we continue to grow and improve as we continue to develop an effective model for STEM education. This has been true educational transformation in our Killip Culture and Climate. We are grateful to have had this opportunity and are excited to further our efforts while continuing to provide our students with the greatest educational opportunities possible.

Salt River Elementary School

Lynette Charlie, STEM Coordinator

Here is an example of what we've been up to and how we continue to make STEM come alive at SRE:

Salt River Students Visit Sri Lanka

US Embassy sponsors "Full STEAM Ahead" - Workshop in Science, Technology, Engineering, Art, and Math.

In December 2015, two students from Salt River Schools in Scottsdale, Arizona were invited by the US Embassy in Sri Lanka to attend two 'STEAM' Workshops in Sri Lanka conducted by Salt River Elementary teacher, Angelo Fernando. The students were Dominique Grey (6th grade), and Haley Smith (7th grade). As "STEAM Ambassadors" to the country, and helped out as facilitators in the sessions, and met with students and teachers. Maria Chavez, the schools' Parent-Community Coordinator delivered a message at the opening sessions.



The two workshops were held in Colombo (December 15 and 16th) and Kandy (December 18th) and were attended by more than 100 teachers from across the country, as well as curriculum developers at the National Institute of Education.

The agenda included many hands-on activities, including teaching methods and technologies that teachers could quickly adopt in the classroom. These included engineering design, physics, creativity, and communication. "This workshop was very useful in different ways because it exposed us to innovative teaching methods and new technologies in organizing the learning- teaching process," said Premalal Uduporuwa, Director of science at the National Institute of Education in Sri Lanka.

Fernando, a computer and technology teacher and robotics coach demonstrated how the 'Five Es of Learning' could be applied to teaching science, technology, engineering, art and math. "You engage the mind and the hands before teaching the theory," he said. During the workshops, he was assisted by several US and Sri Lankan experts to collaborate with him on topics such as astrophysics, solar energy, electro-magnetism, creative writing, scientific writing, photography, podcasting, and robotics. Four of these resource people participated from the US via Skype –demonstrating how low-cost technology could be put to use in the classroom.



As a further resource to teachers in Sri Lanka, Salt River Elementary collaborated with SRPMIC-TV to produce 12 videos of science and technology being implemented in the classroom, and these videos are hosted on a YouTube channel. An additional 12 videos will be produced in the next few months. The workshops were made possible through a grant from the US Embassy in Sri Lanka.

Yuma Elementary District

Theresa Lowe, Grant Coordinator

In its fifth semester of the Helios STEM School Pilot, Yuma District One is realizing results from its involvement in this valuable project. Some of those results are quantifiable and some, while observable, are less quantifiable but just as real. We would like to share some of those results.

First, we compared science pretest scores from our Fall 2015 district benchmark assessments for cohorts of students who had or had not been in classrooms affected by our elementary science cadre model. We found that, in general, cohorts of students who had been part of the cadre model for at least two years outperformed cohorts who had not. In fact, most students in the cadre model had already met grade-level end-of-year benchmarks, even at the beginning of the year. This was an informal study and did not consider all possible variables, but the trend was clear.

Another clear but less tangible result is the vastly increased comfort with technology exhibited by our middle school science teachers and elementary cadre teachers. Two and a half years ago, when our teachers first received iPads from the HSSP grant for their classrooms, many teachers quite literally were afraid to touch them and, despite copious encouragement during training, did not feel empowered to experiment with new applications. We couldn't even convince many of them to take an iPad home for the weekend to just see what it could do. This year, our whole district implemented a one-to-one iPad program for all of our students. Teachers who had been involved in the HSSP project were school leaders in using iPads with their students. In contrast to two years ago, they constantly amaze us with a variety of applications and ways to use applications. While many other district efforts underlie our successful district-wide rollout of individual student iPads, we know the HSSP project has contributed to that achievement.

The HSSP grant implementation has helped teachers and administrators see the value the District places on rigorous science education for all—not just some—students and to jump on that bandwagon. We have been able to couple the HSSP project with a mirror grant from the Department of Defense Education Agency (DoDEA) to take the elementary science cadre and middle-school science teacher training district-wide. The synergy between these two grants has made district science professional development more cohesive and easier to plan. It has also resulted in a five-year renewal of the (DoDEA grant), worth \$1.5 million. In addition, numerous teachers and principals are now submitting a variety of grant applications for STEM projects, and many of those applications have been successful. These projects include school gardens, robotics, environmental education and other STEM field trips, and equipment and supplies for STEM experiences.

We know there is much more to be done, but we also gratefully acknowledge the part the Helios STEM Pilot has played in our STEM-for-all journey.