



Helios STEM Schools Updates

August/September 2013

Issue 1

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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 first newsletter to share lessons learned and to express appreciation to everyone contributing to the programs' successes.

Alhambra Elementary School District

Mark Lialaberte, Academic Coach

The Alhambra Elementary School District (AESD) is excited to be a part of the Helios STEM Schools Pilot Program (HSSP). We have been busy this summer in our efforts to ensure our facilities and staff are prepared for our first step in moving two of our schools from “Exploratory” to “Introductory” on the STEM Immersion Guide.

Our efforts thus far include:

- Sending three teachers to participate in professional development in North Carolina to become experts with our new Paxton/Patterson ActionLABS (a highly interactive program that allows students to use and manage technology through an interactive multimedia STEM program)
- Creating a space within our schedules to have STEM be a part of our daily curriculum
- Installing the ActionLABS in two of our schools

We are in the process of gathering baseline data on student’s attitudes towards STEM. Here in AESD we are using the “Student Attitudes towards STEM Survey (S-STEM)”. It will be great to have a way to measure the attitudes of the 250+ eighth grade students as they engage in hands-on labs that are designed to build capacity and create interest in the future STEM professional pipeline.

Thank you for taking the time to see what AESD has done to prepare our teachers and schools for the upcoming year. We are ready for 2013/2014 and look forward to seeing what other schools are doing to help promote STEM in their classrooms.



Altar Valley School District

Kathryn Zanin, STEM Coordinator

The months of August and September have been filled with a buzz of excitement for the STEM team. This team consists of eight teachers spanning preschool to eighth grade, in the Altar Valley School District who are working to develop curriculum, participate in a book study, plan STEM lessons and conduct field research with the University of Arizona's College of Science.

During the past two months these teachers started the process of completing a curriculum overview to ensure all science standards are being taught. Including the identification of Next Generation Science Standards, math and ELA standards associated with their science topics of study. The team will research projects, activities, and lessons to support their units. Concluding their project by writing assessments, both formative and summative, select resources, and identifying Project Based Lessons to solve end of the year, real-world problems selected by teachers in conjunction with our partners. To strengthen teachers' background knowledge of STEM the team is conducting a book study based on the work of Dr. JoAnne Vasquez. For this, the STEM Coordinator, created a wiki space to share ideas and thoughts to questions posed by the coordinator in relation to the book study. Every two weeks a new question is posted based on the ideas presented in the chapters STEM PLC teachers read.

One teacher noticed the school's tortoise, Titus, needed a new habitat. She took her class on a walk to observe the tortoise, presenting questions to guide the students to wonder what they noticed about Titus' habitat. After watching Titus and recording data about how he interacted with his habitat the students began the process of researching tortoise habitats, designing a new one and listing the materials they would need to build a new habitat in the spring for him, as the tortoise is preparing for winter hibernation and cannot have his home disturbed. The students presented their idea to the head of the Ground's Department. The department head took the ideas and suggestions and will bring back to the students what can actually be done to support Titus. Part of the success of building Titus a new habitat is related to the partnerships that have been developed with several organizations. Partners are allowing our students to experience science in real environments.

Thanks to a generous partnership with the UA College of Science, our 5th-6th PEAK class will have an opportunity to spend two days and one night at the top of UA's Mt. Lemon Sky Lab facilities conducting field research alongside actually working scientist. Partnership with the UA College of Science is providing our middle school students with multiple opportunities to conduct research and experience science as practicing scientist do in the real world.

The past two months have been busy and productive for our STEM teachers as they begin the process of understanding the components of STEM education and how we can utilize our partners as experts in the fields of Science, Technology, Engineering, and Mathematics.



Bagdad School District

Karen Anderson, STEM Committee Member

The Bagdad Unified School District is committed to providing the highest quality educational experience for our students and to being a source of pride and value to our community. In support of this goal, we were proud to begin the school year with support from our Helios STEM grant and our partnership with Science Foundation Arizona. We have begun our STEM journey on a variety of fronts. Under the leadership of our new Superintendent, Mr. Bryan Bullington, we continue to meet with our site-based STEM Advisory Board and are making plans to improve the quality of instruction and resources that we will be providing our students and community.

The following highlights some of our accomplishments through September:

- Over the summer we began purchasing laptops and technology that will provide our students with unparalleled opportunities to infuse technology into our classrooms, lessons and increase communications within our community. Excitement is in the air, as we transition to the Google product suite.
- We are researching the purchase of a weather station that will be placed in the Bridle Creek area that will further enhance our STEM instruction as well as tie data and news to our community Freeport website.
- We have continued to research ways to expand our use of the Bridle Creek Riparian area by working with our partners, Freeport and Biozone (Prescott), to create project/problem-based units in environmental and sustainability education. This is an exciting venture that all of our students and community will be involved in!
- Bridle Creek is a 27 acre fenced riparian habitat located behind the Community Center in Bagdad at the base of Sanders Mesa. The area was first certified by the Wildlife Habitat Council (WHC) in 1995 and is currently certified through the WHC's "Wildlife at Work" program. The riparian area is composed mainly of cottonwood and willow trees and the surrounding desert landscape consist of native grasses, cacti, acacia, and mesquite trees. The area is managed for both habitat enhancement and community outreach and education for local students and interested parties.
- The elementary faculty met together in September to develop environmental lesson plans that could be used at Bridle Creek Habitat Enhancement Area (BCHEA).
- On September 24th, all of the first grade students participated in Bat Night at the Bridle Creek Habitat Enhancement Area (BCHEA). Two other activities are scheduled for Bridle Creek in October—a Fall Outdoor Classroom Activity for 1st and 4th grades, plus a Community Wellness Walk. These activities are the first steps toward using the BCHEA as a viable, outdoor learning center.
- In keeping with that train of thought, the district's grant consultant is preparing several grant proposals to assist in the development of Bridle Creek.



The Helios STEM grant support and participation promotes excellence and helps make Bagdad Schools "A Great Place to Learn."

Congress School District

Linda Coyle, STEM Technical Advisor

The year is off to a wonderful start at Congress Elementary School! Thanks to our grant from the Helios Foundation and Science Foundation Arizona, we are excited to be implementing new Science, Technology, Engineering, and Math (STEM) initiatives. This year, students will be able to enjoy Legos Robotics, ST Math, Defined STEM, Voice Thread, and a Drama program, which integrates STEM.

We began the year by working on upgrading to touch tablet computers for grades five through eight. The new computers will allow for a continued one-to-one laptop to child ratio. It also assists our students in using the most up-to-date computers.

In one of our first grant initiatives, our teachers have been busy with Professional Development and classroom implementation of ST Math (Spatial-Temporal (ST) Math®). We started the year in grades three through eight, with grades Kindergarten through two starting this week! This program blends mathematics and game-based instructional technology to provide our students with a solid support structure with which to build STEM content and skills. We chose this program, from the MIND Research Institute as part of our grant to boost math comprehension, conceptual understanding and problem solving proficiency through visual learning. To learn more about this exciting program you can go to: <http://www.mindresearch.net/programs/>

Our after school Drama club and Lego Robotics programs have been planned and registration of students by their parents has been robust. Our first parent night was a huge success and we look forward to continued outreach within our community.

We look forward to sharing our STEM successes by tying our programs to our District's Vision. First, is for students to enjoy learning and success. Second, is for students to discover the world and its opportunities.



W.F. Killip Elementary School

Ted Komada, STEM Coordinator

August was a busy month for the Killip STEM Academy. We had focuses in three major areas; completing the Strategic Plan, initiating professional development for our teachers and engaging Northern Arizona University in collaboration with current afterschool programs at Killip.

Our Strategic Plan was built from SFaz's STEM Immersion Guide. We found that we had many of the requirements of year 1 already in place. We targeted year three of the Immersion Guide because of the interdisciplinary focus on integration. We feel that the integration of NGSS, ELA and math standards is the most effective way to maintain and improve proficiency in reading and math, while introducing STEM related problem/project based learning.

In August we began foundational PD on what STEM education is with a strong focus on integration with ELA and Math. We began by discussing the widening gap between the end product of our education system and the need of business/industry for STEM educated graduates. We then explored the definition and possible applications of STEM as described by Jo Anne Vasquez in her book, *STEM Lesson Essentials: Integrating Science, Technology, Engineering, and Mathematics*. We spent a week dissecting the NGSS and examining the Crosscutting Concepts, Science and Engineering Practices and Disciplinary Core Ideas (DCI). We finished with an activity that had grade level teams of teachers identify a specific DCI that they could tie math and ELA standards/instruction to this.

We have engaged Northern Arizona University's Sustainable Communities program to work with our after school program. Through the utilization of our on-site community garden, NAU graduate and undergraduate students will engage with Killip students in measuring the garden's soil quality, its effect on plant growth and a garden's role/potential as part of Sustainable Communities. The students will then use their science and Sustainable Communities knowledge to engage in a Sustainable Communities civic project that culminates in a presentation to a relevant local governing body, group or organization. All curriculum developed for this collaboration will be aligned with NGSS and the Common Core Standards.

September was also a good month for Killip Elementary's STEM progress. We took our PD in STEM integration and began to move forward planning our first integrated instructional unit. All grade levels have either implemented instruction of their first STEM unit or have identified the area of NGSS they will be working from. Second grade was first out of the gate with a unit originating from their ELA unit on Vikings. They read about the design and parts of Viking boats and then built their own. Their objective was to support as much weight as possible in their boat as well as to obtain the fastest travel time across their "lake". Properties of Matter (2-PS1-1, 2-PS1-2) were the 2nd grade Performance Expectations (PEs) that they focused on from the NGSS.

Kindergarten will be integrating their ELA unit on pumpkins with NGSS's PEs on Force and Motion (K-PS2-1, K-PS2-2) as they design solutions to a cushion a pumpkin from an "accidental drop". First grade will be designing fish fins which aligns with their unit on fish, frogs and butterflies. They will be working off of the 1st grade Life Sciences PE on Structure and Function (1-LS1-1).

Third, fourth and fifth grade have taken a different approach and have decided to select an area of the NGSS to build an instructional unit around. All grade levels have identified the PEs of the NGSS that they will be working from and will begin to plan instruction once we have returned from our fall break.

Our garden collaboration with NAU is off to a great start. We have two NAU professors from the Sustainable Communities department that bring their students in to work with the Killip kids in the garden. This occurs 4 times a week for an hour each day with about 20 Killip students and 20 NAU students. All lessons are being documented and aligned with the NGSS. We hope to be able to share these lessons in the near future through an online resource library.

We were also put into contact with Flagstaff EcoRanch, a sustainable living ranch. Over the winter we will be developing curriculum aligned with the NGSS to use the Flagstaff EcoRanch as an off campus living laboratory.

Salt River Elementary School

Lynette Charlie, STEM Coordinator

The following is a summary of some of the major achievements of the salt River Elementary School as part of the Helios STEM Schools Pilot Program through September.

Summer Camps – Three boys attended a week long camp at the Arizona Science Center. Six girls attended the ASU BEST Summer Engineering Camp. A parent letter was received praising the opportunity for their students’ participation at the Arizona Science Center. Students at both camps learned through excellent STEM related hands on activities and got an opportunity to interact with students from across the valley.

Science Foundation AZ STEM Conference – Three teachers and one district staff person attended the conference.

Design Team Meeting- Two Design Team meetings were held to inform everyone of current progress and to get input on the strategic plan. Design team input was essential in developing a comprehensive work plan for the year. Core values were established for our site and a robust plan was developed.

STEM After School Clubs – Three clubs began on August 19th involving first through sixth grade students and will continue through December for the first semester. STEM Seed funding allowed the after school programs to prepare student centered/hands on activities for the semester.

Robotics After School Program – A boys and a girls team was created and began on August 19th involving fourth through sixth grade students and will continue through December for the first semester. The teams are preparing for their first competitions.

STEM PD – Our consultant spent two days before the school year started and got teachers thinking about STEM and developing our STEM identity. All teachers began a book study using Dr. Vasquez’s ‘*STEM Lesson Essentials: Grades 3-8*’.

Yuma Elementary District

Theresa Lowe, Grant Coordinator

The Helios STEM Pilot in Yuma School District One is off to a good start. This Helios grant mirrors an earlier grant the district received from the Department of Defense Education Activity (DoDEA) to support science teaching and learning in grades three through eight in seven of our schools with high military populations. The Helios grant allows us to extend the same initiative to ten more schools, reaching grades five through eight in all schools in the district. An exciting development over the summer is that the Helios funds helped us to garner a second DoDEA grant, further extending the initiative to grades three and four at Otondo Elementary School. Thus, we continue to expand stronger science instruction throughout the district.

Nine members of the elementary teacher cadre completed their first two days of science training in the beginning of August. The emphasis was on understanding the inquiry process and catching these new cadre members up to the previous year's worth of training received by the original DoDEA cadre members, enabling everyone to go forward together. Training will continue in three-hour monthly sessions, with each session followed by a collaboration day for each cadre member. During collaboration days, the cadre member has a substitute so that he or she can model or team teach science lessons with grade level colleagues on his or her own campus. Principals in schools using this model last year reported a noticeable increase in teachers' engagement in teaching science. We expect that engagement to increase in the current year since the number of collaboration days is doubling.

At the middle school level, interdisciplinary teams are poised to begin quarterly day-long collaborative planning sessions. The goal is to develop project-based interdisciplinary units and lessons with science standards as the anchor. Last year, the teams modified EQUIP Math and English Language Arts rubrics to include science and project based learning features and came up with a single rubric to use for interdisciplinary units and lessons.

On the technology front, ordering of iPads and planning for iPad training is in process, and the science trainers are ensuring that iPad use to support science inquiry is a part of every training session.

District and site administrators recently met as a whole and re-affirmed their commitment to the district's science initiative as a non-negotiable district-wide. Thus, the Helios STEM pilot continues to serve as a driving force in the district.