



Goo, giggles and sugar encourage students to pursue STEM careers

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2/22/2016 - **Los Angeles AFB** -- Thirty-seven Space and Missile Systems Center volunteers gathered at Center Street Elementary School Feb. 3 to participate in the school's Science, Technology, Engineering and Mathematics Family Night.

At least 13 SMC organizations were represented within the pool of volunteers. Approximately 800 youths, parents and educators participated in the event.

"Our goal was to build STEM awareness and encourage the kids to pursue both education and careers in STEM in the future," said Scott Matsui, lead SMC volunteer and Senior Technical Manager of the Wide Field of View Testbed Branch in the Remote Sensing Systems Directorate.

The team of volunteers accomplished this goal by presenting STEM concepts through tried and true methods universally appealing to childhood--game-like demonstrations laden with goo, giggles and sugar.

The team began planning for the event right before the holiday season. School representatives asked SMC to put together five stations for the students to cycle through during last night's event--two focused on engineering and three involved food science.

"We reviewed the types of demonstrations that kids responded well to in the past, and after brainstorming as a team, we decided to move forward with activities that not only demonstrated valuable concepts, but were also sure to engage the kids," Matsui said. "Since the kids seemed to enjoy building competitions, we wanted to continue with that theme. In addition, the school suggested having demonstrations in food science, so we researched and discussed ideas that would intrigue the students while still fitting within our budget."

The first engineering station was called "Mint Mobiles." Volunteers helped students design race cars using Lifesaver breath mints, drinking straws, index cards and tape - then sent them down a wooden ramp competing for the furthest distance traveled.

The second engineering station employed design concepts used in another popular vehicle...boats. Using aluminum foil, students created durable, buoyant boats. After a test run, the students competed to see which design stayed afloat longest as they added the weight of pennies. The top-performing design ended up holding 138 pennies before finally sinking!

After both competitions, SMC volunteers helped the students analyze which design features improved their vehicle's engineering performance.

Shifting to the food science stations, students were first met with a solubility demonstration. Students predicted what would happen when a few M&Ms soaked in a cup of water. Students learned that while the food coloring was soluble, the white letter "M" and translucent shell of the candy were not.

Next, students learned the chemistry behind making Pop Rocks and soda at a station discussing the process of injecting carbon dioxide into both candy and water. The volunteers explained the scientific reactions and processes then allowed the students to experience the pop and sizzle first-hand!



U.S. Air Force 1st Lt. Rinaldo Izzo pours milk and various other liquids to demonstrate and discuss the definition and relationship of density (mass/volume) with grade school students. Thirty-seven volunteers from Los Angeles Air Force Base, El Segundo, Calif., visited Center Elementary School in El Segundo to staff various STEM (Science Technology Engineering Mathematics) experiment stations led by the Space and Missile Systems Center volunteers, where they work with the student at the Engineering/Building Stations and Food Science Experiment Stations to collect and discuss observed results, Feb 3, 2015 (U. S. Air Force photo Joseph M. Juarez Sr)

The final food science station presented students with a Density Tower. Using clear, cylindrical containers, volunteers poured in liquids of varying density including honey, syrup, milk, dish soap, vegetable oil and rubbing alcohol. Volunteers discussed how heavier liquids have a higher density than lighter liquids. Then, using random objects like ping pong balls, grape tomatoes, beads, metal screws, popcorn kernels and bottle caps, the kids guessed which items would float or sink.

The materials for these stations included 9 pounds of M&Ms, 1,000 packs of Pop Rocks, 10 pounds of breath mints, 1,500 square-feet of aluminum foil, 1,900 index cards, 1,800 plastic straws, and multiple solutions and objects of varying density and weight.

The Center Street School Parent-Teacher Association organized the overall event with assistance also from the Los Angeles Chapter of the Armed Forces Communications and Electronics Association. "It was an honor being able to partner with both the Center Street PTA and AFCEA in encouraging the local youth to pursue STEM," Matsui noted.

"I am grateful we were able to bring such a wonderfully fun, educational event to our students," said Cheryl Smith, CSS PTA president. "To give our students the gift of exploration and creativity, and propel the children's interest in learning speaks to the very core of how PTA strives to support its students and families."

"Opportunities like STEM night offer a chance for kids to engage in a different way with STEM - to see it outside of the structure of the school and the walls of the classroom," said Andrew Walther, CSS PTA STEM Night Chair. "Kids get a chance to focus solely on the thrill of discovering and truly understanding how things around them work, and experiencing new technologies."

"The interactions with outside volunteers also allow them to imagine a future for themselves where STEM is an important and exciting part of their lives," Walther continued. "STEM night was a monumental success, and the excitement from the kids and the turnout exceeded our expectations. I was also extremely excited and thankful by the large turnout of SMC volunteers to help maximize the number of kids who got to experience our science and engineering activities."

Center Street Elementary offered other stations to further motivate their students toward STEM. Students rotated through robotics demonstrations, iPad technology showcases, math games, 3D printing and "Nitropod" liquid nitrogen ice cream exhibits.

"What made the event successful for us was that the demonstrations were hands-on," said Sienna Hopkins, parent of two students at Center Street. "I appreciated the 'try again' aspect of the evening," she continued. "The kids were not just able to race their home-made car down the track, but they were then encouraged to go back to the drawing boards, make improvements and test their results."

Lt. Col. Tom Lenz is the director of STEM Outreach Programs for SMC. "Air Force STEM has tasked us to do a full court press on STEM outreach across the board...encouraging grades K-12th to pursue education in STEM related fields, sponsoring college internships, and hiring recent college graduates," Lenz said. "We are part of a nation-wide effort to reach out to as many local schools as possible to promote educational and career opportunities in STEM for the next generation."

"Partnering with our local community and schools demonstrates our grassroots commitment to the national STEM goals," added Lenz. "STEM is a priority at each level in our chain of command...all the way up to the White House. I really appreciate the enthusiasm and energy of the SMC workforce to volunteer their off-duty time encouraging students to learn more about science and technology."

Bright Horizons 2.0, The Air Force STEM Workforce Strategy document, outlines four service-wide strategic goals. The fourth goal, Outreach, is to "increase the local STEM talent pool by exposing as many students and influencers as possible, including those underrepresented in STEM, to Air Force STEM expertise, technical facilities/equipment and STEM concepts through various local STEM outreach activities."

Three upcoming events present SMC members with another opportunity to support these nation- and service-wide goals through volunteerism.

February 26th, SMC will hold a STEM event for high school seniors who are enrolled in Career Pathways and Linked Learning programs. The goal is to improve college and career ready pathways, increase industry engagement and allow students to gain exposure to companies and professionals who work in Advanced Manufacturing, Engineering and Technology. Linked Learning incorporates academics, technical education, and real-world experiences for students.

On February 27th, SMC will host the regional MiniUrban Challenge here in the base gym. The Mini-Urban

Challenge is a national competition sponsored by the United States Air Force Research Laboratory Munitions Directorate, Doolittle Institute and John Deere. This competition challenges high school students to design and operate an autonomous "car" using a LEGO® Mindstorms® EV3 kit to successfully navigate through a model city.

On March 23rd, SMC will be assisting Richmond Street Elementary school teachers and PTA with their school led Science Night.