SAVA students build tiny houses for homeless vets

Sacramento Academic & Vocational Academy (SAVA) is a charter school at which students participate in high quality, rigorous and relevant career pathways and programs. The popular residential construction program teaches job site safety, proper use of tools, an introduction to blueprints and industry math. Students begin their education with small projects such as building Adirondack chairs and finish up their program by designing and building a modified tiny house. This high school course is carried out in partnership with the construction management program at Cosumnes River College.

SAVA celebrated a Build Day on April 3 in which the students worked with volunteers from the business community to build a tiny house. Students also worked very closely with Kavanah, a local not-for-profit organization which provides housing for homeless vets. These students learned valuable construction skills as they read drawings, framed, installed insulation, dry walled and painted, laid flooring and hung windows and doors. These skills provide a pathway to a career in the construction industry. SMUD donated gently used solar modules, which will provide these tiny houses with power for lighting and small appliances.

The tiny houses will ultimately be placed on church properties and will provide clean and safe, transitional housing for homeless vets. The vets will volunteer at the church property and help parishioners.

continues on page 2
When water is electrolyzed, what fuel is formed? If you guessed hydrogen, congratulations!

That’s just one example of the type of rapid-fire questions student teams may face at the National Science Bowl, the Department of Energy’s nationwide academic competition that tests students’ knowledge in all areas of science and mathematics. The National Science Bowl not only aims to inspire students to excel in science, technology, engineering and math, but also pursue STEM careers later in life. Previous National Science Bowl competitors have gone on to start businesses, work at tech companies and more!

Locally, the Western Area Power Association sponsors the Science Bowl with the help of many SMUD volunteers. This year, 21 teams vied for the prestigious opportunity to go to Washington D.C. for the national competition. SMUD sponsors the Science Bowl to provide opportunities for students to study and learn not only about STEM but specifically energy systems. SMUD supplied the awards for teams placing 2nd through 6th. The funds will be applied to each school’s science programs.

Congratulations to the winners:
1. Mira Loma - Team 1
2. Mira Loma - Team 2
3. Vista del Lago - Team 1
4. Vista del Lago - Team 2
5. Davis
6. Folsom - Team 1

Mira Loma went on to compete in the national competition where they placed 10th. If you think your high school would like to join the Science Bowl competition contact Michael Locke, Locke@WAPA.gov.
Solar Carnival Workshop takes teachers on a ride

Do you feel that your science presentations are lacking whimsy? A group of Sacramento teachers learned how to lighten things up in the classroom by presenting a unit titled “Solar Carnival” which teaches students about solar energy.

Students working in teams are given the challenge of designing and constructing working model carnival rides and games from recycled materials. The resulting solar carnival gives students and families the chance to not only learn about solar technology but also explore electrical wiring, design and practice their craftsmanship.

This lesson is presented by Solar Schoolhouse. Learn more at solarschoolhouse.org.

For more information on having SMUD sponsor a Solar Schoolhouse lesson or other solar topics at your school contact suzette.bienvenue@smud.org.

Going for gold at the Science Olympiad

Hovercraft cars, helicopters and herpetology were a few of the categories in this year’s Sacramento Regional Science Olympiad held on March 3. At the event, 31 regional high schools and 22 middle schools competed.

The Science Olympiad is a national competition which bubbles up from local events. Its goal is to engage students in STEM via competitions, which are organized like academic track meets, consisting of a series of 23 team events.

The culmination of nearly 300 regional and state tournaments, and about 100 practice invitational, the Science Olympiad National Tournament is held at a different university each year.

This year at the regional competition, Mira Loma placed 1st followed by Pleasant Grove, Sheldon and Bella Vista. These teams went to the State championships in Turlock, CA on April 14. Mira Loma won the opportunity to go to the national championship. Congratulations!

<table>
<thead>
<tr>
<th>Middle Schools</th>
<th>High Schools</th>
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<tbody>
<tr>
<td>1st place: Winston Churchill MS-A</td>
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<tr>
<td>2nd place: Arden MS-A</td>
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<td>3rd place: Pomolita MS-A</td>
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<td>4th place: John Barrett MS</td>
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<td>1st place: Mira Loma HS-A</td>
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<tr>
<td>4th place: Bella Vista HS-A</td>
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</tbody>
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For more information on how to join the fun and become a future Science Olympian, visit soinc.org or contact James Hill the local coordinator at jdhill@sanjuan.edu.
STEM Regional Science Fair

The annual STEM Regional Science Fair, sponsored by the nonprofit Sacramento Regional Science and Engineering Fair Foundation, was held on March 10 at American River College. Hundreds of middle and high school students came from across the region to demonstrate their science prowess. As always, SMUD supported this year’s event by judging for the “Best in Energy” project.

Middle School winner Elijah Reeves from W. E. Mitchell Middle School presented his research on changing the electrical resistance of water. His question was, “Does changing the salinity and pressure effect the conductive properties of water?” Elijah demonstrated that science doesn’t need a lot of fancy equipment just an inquisitive mind, patience and a lot of duct tape. Elijah said, “I had to repeat the experiment more times than I could count, but I learned a lot in the process.”

High School winners Kristofer Thomas and Angel Gutierrez from the School of Engineering and Sciences asked, “Can a water wheel be a practical source of energy?” This energetic duo had a great presentation with a formidable water wheel, which they designed and constructed. Their major lesson learned was to make a water wheel from material which can get wet! They would like to turn their research and ideas into a business model by creating water wheels, which can be placed in gutters to create energy from rainwater.

If you have a question of your own and would like to enter the 2019 STEM Regional Science Fair, visit sacstemfair.org. To learn how to teach science through the science fair model, contact Nadia Compton at ncompton@sacstemfair.org.
Over 200 local high school students competed in the 13th Annual SMUD Solar Car Race at Cosumnes River College on April 18. It was a great way to learn about renewable energy and celebrate Earth Week.

April 18, 2018

Off to the SMUD Solar Car Races!

The day proved to be cloudy, so the students were surprised when the cars they designed and built themselves could still get enough power from the sun to race. The teams used the same solar panels, motors and gear sets, but each car was unique. Of the 86 cars which raced, some were very creative and built of unusual materials like Legos, water bottles and other recyclables. One team even utilized a ping-pong ball and a paper cone to adjust the solar panel and track the sun. It was up to the teams to be creative and innovative and build the fastest car possible.

Teams compete in several award categories including race time, sustainability, innovation and more. This was the first year that SMUD presented the Grit and Gumption Award, which went to the team who persevered through adversity and found positive ways to meet challenges to get their car on the track. Congratulations to this year’s winners!

1. **Innovation Award**: Car 64, Folsom High School
2. **Engineering and Design Award**: Car 41, Laguna Creek High School
3. **Sustainability Award**: Car 39, Laguna Creek High School
4. **Stock Award**: Car 20, Foothill High School
5. **Artistic Award**: Car 9, School of Engineering and Sciences
6. **Judges Award**: Car 46, Rio Valley Charter
7. **Gumption Award**: Car 70, Laguna Creek High School

**Speed Races:**

1st: Car 42, College Track
2nd: Car 12, Grant Union High School
3rd: Car 67, Folsom High School
4th: Car 68, Folsom High School

To learn more about how to integrate Solar Sprint Racing into your curriculum or how your high school can participate in the 2019 SMUD Solar Car Race contact Daniel Gehringer at daniel.gehringer@smud.org or learn more at smud.org/Solar-Car-Race.

**Career Ambassadors connect with students**

If you have students who are interested in exploring their career options, SMUD’s Career Ambassadors are here to help. They connect students with other SMUD employees, help them explore different career pathways and promote SMUD’s scholarship and internship programs. The Ambassadors also participate in career-related events with local schools and education partners such as career fairs, mock interviews and resume reviews.

One of our featured Career Ambassadors is Nathan Hall, IT Business Relationship Manager. When asked what he enjoys the most about the Career Ambassador Program, Nathan stated, “I most enjoyed a middle school event that I attended where I saw young, mature children who were interested in developing themselves professionally. And I love to hear how much SMUD means to the community of Sacramento at every event I attend.”

For more information about our Career Ambassador Program, contact Sarah Geiger at 916-732-5317 or at EducationOutreach@smud.org.
See water in a whole new way

Splash is a hidden gem of outdoor education allowing students to explore the local ecosystem with plants and animals that are native to Sacramento. Located in Mather, Splash is a nonprofit organization that’s dedicated to helping local children understand and value their natural world through outdoor exploration.

Splash offers a comprehensive 4th & 5th grade program, Life in the Watershed, which includes a hands-on tour of vernal pools. It also gives public tours, classroom presentations and a series of classes that attract the lifelong learners of our community. One of the coolest things about Splash is that students get to uncover an entire world that exists in their own backyard, from larval dragonflies to snakes and other critters. For more information or to book a tour, visit sacsplash.org.

2018 Solar Regatta winners:

Prep
- Regatta Cup Winner
  Arcadia High School, 45 points
- 2nd Place
  Boy Scout Troop 55, 43 points
- 3rd Place
  Laguna Creek High School, 28 points

Colleges
- Regatta Cup Winner
  City College of San Francisco, 70 points
- 2nd Place
  University of California, Davis, 50 points
- 3rd Place
  College of the Sequoias, 23 points

The spirit of competition and innovation could be felt out on the water as more than 600 high school and college students throughout California took part in the 7th annual SMUD Solar Regatta at Rancho Seco Recreational Area. High school and college students raced full-sized, solar-powered boats they designed and built at the competition held on May 4 and 5.

The event is designed to help inspire students to pursue educational and career paths in STEAM (science, technology, engineering, art and math) fields. In order to participate, students must utilize renewable energy and technological skills they have learned in school and apply them in a practical, hands-on way.

Twenty high schools and 16 college teams competed in speed, slalom and endurance races and then presented a thorough view of the design and build process of their boats to an audience. The high school winner of the Regatta Cup returned to race with the colleges on Saturday.

If your school is interested in participating in the 2019 Solar Regatta, which will be held on May 3 and 4, visit smud.org/Solar-Regatta. Applications will be open until Oct. 30, 2018, or until all racing slots are filled.

Students race sun-powered boats at the California Solar Regatta

May 4 & 5, 2018

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Why is the Maker Movement important for education?

Small children routinely create as they play whether it is with blocks, paper or playdough. Unfortunately, somewhere along the educational route, students lose touch with crafting and to some degree, using their imaginations. In this digital age, students have become accustomed to pressing a button and instantly seeing a result creating a disconnect between design, creation and use.

The Maker Movement is attempting to reconnect and reengage students through free play and design.

Parents often lament that their children will play at home with Legos for hours but are unfocused and disengaged in the classroom. The Maker Movement is attempting to reconnect and reengage students through free play and design. The movement helps students take charge of their own learning by teaching them how to solve problems with design, documentation and dissemination. Like working with Legos, students have an idea, build or construct a design and share with others locally or even through the internet.

How can the Maker Movement concept be used in a classroom? If a student is learning about electricity, why not also teach schematic drawings, design, modeling, LED technology and circuitry by designing electronic greeting cards? In this way, electricity is transformed from static and theoretical to a dynamic, fluid activity, which will result in deeper learning with a completed project.

At SMUD’s Energy Education & Technology Center, we are dedicated to STEM education and have developed engaging projects which will encourage teachers to help their students master complex concepts by playing, designing and building. This fall we’ll be offering a variety of electric circuit workshops including playing with conductive playdough, building with electrified Legos, sewing with LED circuits and making electronic greeting cards.

If you’re looking for ways to meet NGSS standards and engage your students, consider using one of our make-and-take projects. Your students will gain a more lasting framework for their knowledge and have fun learning. Free lesson plans and materials are provided. Register for our free professional development workshops at smud.org/Education.

Want to know what’s going on here?

This hands-on activity (pictured below) was conducted at a teacher workshop in April. It used a game to demonstrate the stresses connected to providing clean, safe drinking water. For more information on integrating water education into your curriculum visit projectwet.org.

For more FREE Teacher workshops, turn to pages 9–11.
Sacramento students help local businesses with energy audits

Over 200 students from eight middle and high schools in the Sacramento area are completing SMUD’s Energy Efficiency Career Exploration program. Throughout the school year, the students learned about power generation, energy efficiency, how to perform energy audits and explored career opportunities in the energy sector. Students’ final projects include the opportunity to perform energy audits of local businesses.

At the Sacramento Academic & Vocational Academy, students audited a 3,800 square foot animal feed and supply store, looking for energy savings opportunities in lighting, heating and air conditioning and appliance usage. Recommendations included more efficient insulation and upgrades to lighting, heat lamps and appliances that would result in savings for the business.

At Pleasant Grove High School, over 60 students in the Innovation, Design and Engineering Academy audited a local fire station and a guitar manufacturer. They found that simple behavior changes such as turning lights off when leaving rooms and adjusting thermostats could drive substantial savings. Additionally, their recommendations for refrigerator upgrades and installation of skylights or solar tubes could result in hundreds of dollars in annual savings.

Other businesses audited by participating schools included restaurants, a laundromat and a tire shop. In addition to the technical skills learned in performing the audits, students were required to conduct the initial outreach to businesses. The process taught students the “soft skills” required in many professional settings, including coordination with business owners and managers via phone and email, professional dress and presentation, project management, data analysis and report writing.

“Not only did I learn about the importance of saving energy and how it is influenced throughout work and my life in general, I was able to learn how to work with others as a team and help people outside of school.”

-Susan (Pleasant Grove High School student)

If you’re interested in having your students participate in the program this coming school year, please contact Susan Wheeler at 916-732-6540 or susan.wheeler@smud.org.
Crazy Electric Circuits (Grades 3–9)
Sept. 15, 2018 | 9 a.m. – 3 p.m.
Folsom Community Center
52 Natoma Street, Folsom

Davin Bowker of the San Juan Unified School District will lead educators through activities where they’ll learn how to build and diagram circuits, create crazy circuits using Lego building blocks and through other make and take projects, which support STEAM education. Teachers will be served breakfast and lunch and will receive a classroom Crazy Circuits Starter set.

Energy & Me! (Grades PreK–3)
Sept. 19, 2018 | 4:30 – 7:30 p.m.
Folsom Community Center
52 Natoma Street, Folsom

This energizing workshop is directed at primary teachers in grades K-3. Teachers will learn how to present energy concepts with playacting, singing and dancing. A classroom kit including curriculum, CD, posters and DVD will be provided. A light dinner will be served.

The Real Reasons for Seasons (Grades 5–10+)
Sept. 26, 2018 | 4:30 – 7:30 p.m.
Powerhouse Science Center
3615 Auburn Blvd., Sacramento

“The seasons come and then pass by; can you explain the reasons why?” As it turns out, most people can’t! Research shows that understanding and explaining the causes of seasons can be challenging for people of all ages. This GEMS® workshop is aimed at teaching educators to help students arrive at a clear understanding of seasons as they investigate the connections between the Sun and Earth. Teachers will take a “Trip to the Sun,” determine the real shape of the Earth’s orbit, evaluate actual data on world temperature and hours of sunlight in different locations and model how the angle at which sunlight hits the Earth affects its concentration. This lesson was developed in partnership with the NASA Office of Space Science Sun-Earth Connection Education Forum (SECEF). A light dinner will be served and teachers will receive a GEMS guide.
Project WET (Grades 4−12)
Oct. 6, 2018 | 8:30 a.m. − 3 p.m.
Soil Born Farms
2140 Chase Drive, Rancho Cordova

Teachers will experience activities to engage students in learning about watershed processes and human history along the banks of a reclaimed creek, while learning about concepts and skills at the heart of Common Core and Next Generation Science Standards. Participants will receive the Project WET 2.0 Guide with access to over 110 Common Core and NGSS correlated activities. Teachers will be provided with breakfast and lunch.

Bristlebot Challenge (Grades 2–6)
Oct. 11, 2018 | 4:30 − 7:30 p.m.
SMUD Energy Education & Technology Center
6301 S Street, Sacramento

Expose young students to their first personal robot with an easy to design, and build Bristlebot. Teachers will learn how to make connections with NGSS and Common Core and STEAM while having their students design and implement competition challenges using the Bristlebots. Each teacher will receive a classroom set of Bristlebot components. A light dinner will be served.

GEMS® Hot Water, Warm Homes from Sunlight (Grades 4−8)
Oct. 18, 2018 | 4:30 – 7:30 p.m.
Historic Folsom Power House
9980 Greenback Lane, Folsom

Discover the energy in passive construction by building model homes and hot water heaters to determine the effects of size, color and number of windows on the amount of heat production from sunlight. Teachers also learn an introductory activity about growing plants that defines the concepts of a controlled experiment, variable and outcome. The Green House Effect is also reviewed. Teachers will receive a GEMS teacher guide and classroom materials and a light dinner will be served.

Magical LED Circuits (Grades 4−12)
Oct. 20, 2018 | 9 a.m. − 3 p.m.
SMUD Energy Education & Technology Center
6301 S Street, Sacramento

Discover a new way to teach STEAM and meet scientist, Jie Qi, the co-founder of Chibitronics. Get your imagination in gear by learning how to blend electronics with arts while finding creative ways to teach your students about electric circuits. Experience the magical works of art as you learn to use basic circuitry, simple coding and electronic stickers to create a variety of paper crafts. Teachers will receive a Circuit Sticker Sketchbook, project templates and classroom materials. Breakfast and lunch will be served.
GEMS® Spooky Science of Energy Transformation  
(Grades 4–12)  
Oct. 23, 2018 | 4:30 – 7:30 p.m.  
Historic Folsom Power House  
9980 Greenback Lane, Folsom

Using a spooky Halloween theme, this workshop will focus on science investigations and will help teachers develop the skills to foster inquiry abilities, which research has shown is very difficult to teach. Teachers will review energy in sublimation and other energy transformations, which will help support student skills in observations, experimentation and inference. Teachers will receive a light dinner, GEMS guide and classroom materials. Costumes are recommended for special prizes.

Circuits with Greeting Cards (Grades 4–12)  
Nov. 1, 2018 | 4:30 – 7:30 p.m.  
SMUD Energy Education & Technology Center  
6301 S Street, Sacramento

Get ready for the holiday season by joining this hands-on STEAM workshop and learn how to teach the science of circuitry making electronic greeting cards with LED lights! Attendees will learn the concepts of drawing schematics, parallel and series circuits and basic electronics. Teachers will receive classroom materials. A light dinner will be served.

Sewing with Circuits (Grades 4–12)  
Nov. 29, 2018 | 4:30 – 7:30 p.m.  
SMUD Energy Education & Technology Center  
6301 S Street, Sacramento

Even if you don’t know how to sew, this easy to learn craft will help you teach your students circuitry by sewing circuits with LED lights. Attendees will learn the concepts of drawing schematics, parallel and series circuits and basic electronics. Teachers will learn how to make tiny stuffed animals, wristbands, bookmarks and hats all with LED lights. Teachers will receive classroom materials. A light dinner will be served.

FREE lesson plans

Take advantage of free lesson plans, videos and materials at smud.org/Education. Topics include energy auditing, electronic greeting cards and more.
Electricity Fair

Family fun
Photo booth
Music
Face painting
Tour the Powerhouse
DIY activities
Electric vehicles
Last stop on the light rail

September 8, 2018 | 10 a.m. – 2 p.m.
Folsom Powerhouse State Historic Park
9960 Greenback Lane, Folsom 95630

SMUD®
Energy Education & Technology Center
6301 S Street, Mail Stop A226
Sacramento, CA 95817-1899