

Middle School Students Explore STEM at USU STARS GEAR UP Biotechnology Camp



Middle school students explore advanced science topics at USU STARS GEAR UP Biotech camp.

Utah middle school students from Logan, Ogden, and the Salt Lake City metropolitan area gained hands-on STEM experience during a two-day Biotech Camp in July. The USU STARS GEAR UP program provides students with science, technology, engineering, and math (STEM) readiness experiences in partnership with USU's Department of Chemistry and Biochemistry.

"USU STARS GEAR UP has a strong history of working with faculty in the College of Science to offer STEM summer camps to students from our GEAR UP partner schools across Utah," said Aryn Dotterer, USU STARS GEAR UP executive director. "The past few years have focused on STEM camps for high school students, but this year our camp targeted middle school students in their first year of the USU STARS GEAR UP program. Our goal is to increase the number of students from low-income communities who are prepared to enter and succeed in postsecondary education. Bringing middle school students to USU builds a foundation for their future success. Funding of our newest grant came late, and I was amazed at how quickly program coordinator Leigh Larsen sprang into action to make this camp happen. STEM summer camps give students an opportunity to try new things and build their confidence, which is vital during early adolescence."

The camp brought together students from under-resourced schools where they will likely be the first in their families to attend college. For these students, opportunities to explore

advanced science topics outside the classroom are a rare but critical aspect of helping to shape their educational and career aspirations.

One of the highlights of the camp was a laboratory experiment that introduced jellyfish genes into bacteria. The genetic transfer caused the bacteria to glow fluorescent green, blue, or orange, which created an exciting visible result that helped the students connect to what they were learning. The experiment exposed students to key concepts in modern biology, including gene transfer, gene expression, bacterial immune systems, and CRISPR gene editing technology. They also had the opportunity to explore basic neurobiology by learning about and touching a human brain.

"One of my favorite things about working for GEAR UP is being able to serve future first-generation college students," said Kai Kaluhikua, a USU STARS GEAR UP college adviser. "It is rewarding to see them get these kinds of opportunities."

The camp was led by Ryan Jackson, an associate professor of biochemistry, with support from biology and biochemistry students and recent graduates. Jackson's approach was to ensure that each student succeeds. USU student volunteers worked alongside the middle schoolers, walking them through each step of the experiment, answering questions, and encouraging them to think critically about the results. By building their confidence early on, camp organizers hope the young students will be more likely to envision themselves pursuing a variety of STEM careers.

For these middle school students, the experience was the first time they had worked in a university lab using professional-grade equipment and wearing personal protective equipment.

"[I loved] when their faces lit up with excitement when the experiment worked out, or when you're explaining something and you see that it clicks," said Andrew Williams, a recent USU biology graduate.

Another aspect of the camp was giving students the opportunity to learn about science in everyday life. They toured the Aggie Chocolate Factory, the USU greenhouses, and the Aggie Creamery to see how science and technology are used in food production and processing. The tours also gave students an introduction to food sciences as a potential career path.

"It was awesome seeing their interest and excitement as they learned new things," Kaluhikua said. He added that a

lot of the students who attended the camp already have an interest in the STEM field, and he “saw a lot of excitement about their futures.”

USU STARS GEAR UP is a federally funded grant program at USU that serves students in under-resourced schools throughout urban and rural Utah from seventh grade through their first year of post-secondary education. GEAR UP site coordinators and college advisers help students navigate challenges such as finding programs and applying for federal aid and scholarships, often without a parent or guardian at home who has experience in higher education. Site coordinators and college advisers also organize college visits, tutoring, financial aid nights, and college and career-related tours to benefit the students. USU STARS GEAR UP plans to offer more STEM enrichment opportunities to under-resourced Utah students.