SAN DIEGO ACADEMY

JROTC STEM LEADERSHIP ACADEMY

CADET IMPACT REPORT 2023

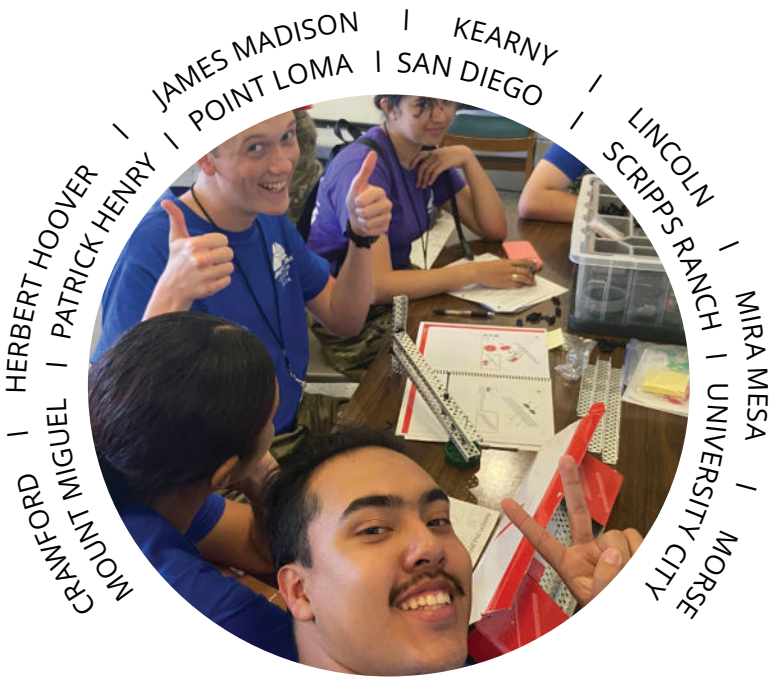
The **JROTC STEM Leadership Academy** is a six-day residential summer camp that helps meet today's workforce needs by engaging a diverse population of high school students— JROTC Cadets going into 9th-12th grades —in activities that open pathways to STEM learning and careers.

The Academy seeks to increase Cadet awareness of local high-paying, in-demand STEM career opportunities and in their understanding about what it takes to secure these jobs. To do this, the Academy integrates several activities that inform JROTC Cadets about STEM jobs, pique their interest to pursue these jobs, give them hands-on application of STEM concepts in a team setting, and develop 21st Century workforce skills.

In 2023, the Academy focused on Advanced Manufacturing industries and related STEM on the Ground curriculum, in which Cadets designed, built, and tested remote-controlled, multi-purpose robots that completed several missions, each with increasing complexity.

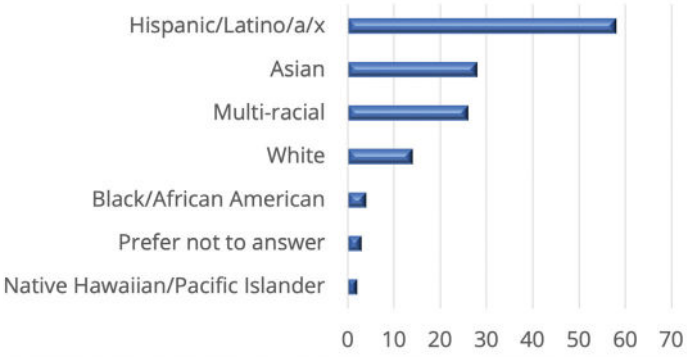
ACTIVITIES

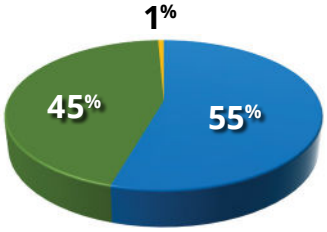
- STEM Design Challenges
- Visits to Industries, Colleges/Universities, and Educational Venues
- JROTC Cadet Leadership Challenge Activities
- Inspirational Guest Speakers



13 HIGH SCHOOLS | **140** CADETS

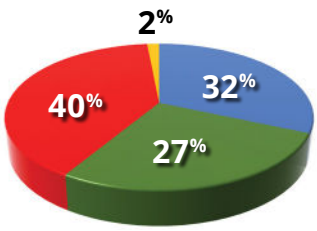
PERCENT ACADEMY CADETS





CADETS BY GENDER

- Male
- Female
- Prefer not to say



CADETS BY GRADE

9 10 11 12

The JROTC STEM Leadership Academy engaged Cadets in developing and valuing teamwork, communication, and leadership skills needed to be successful contributors and collaborators. Carefully structured activities designed to do this included:

- Winning Colors Personality Assessment
- Team Building Activities
- STEM Design Challenges
- JROTC Fitness Challenges and Sports Nights

How did Cadets respond to teamwork experiences?

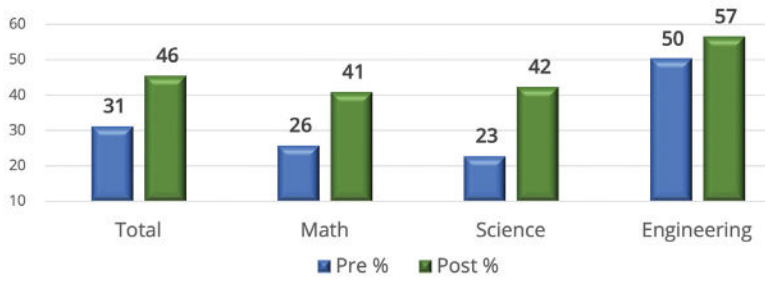
"At first, I tried hard to make things go my way, so sure I was right. Later, I let other team members put their ideas into action. While building the robot, I realized that input is important, and I need to listen to others."

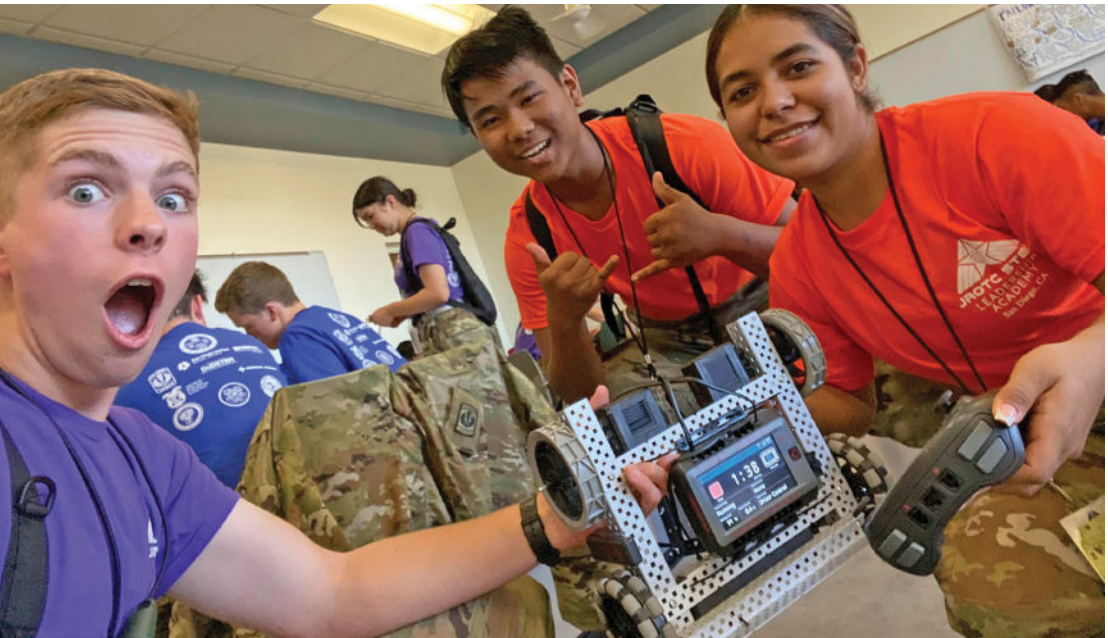
10TH GRADER
JAMES MADISON **HIGH SCHOOL**

STEM on the Ground Team Design Challenge

Academy Cadets applied the STEM concepts of Simple and Complex Machines, Gear and Gear Ratios, Inverse Relationships (lifting force versus speed), and the Engineering Design Process during their team design challenges. Pre- and post-assessment results indicated that cadets achieved statistically significant gains in STEM content knowledge overall, with gains in math and science being greatest.

CADET CORRECT ANSWERS TO STEM CONTENT QUESTIONS





"From the robot building, I learned more about teamwork and troubleshooting that can be useful for any other projects I may be a part of."

11TH GRADER
KEARNY HIGH SCHOOL

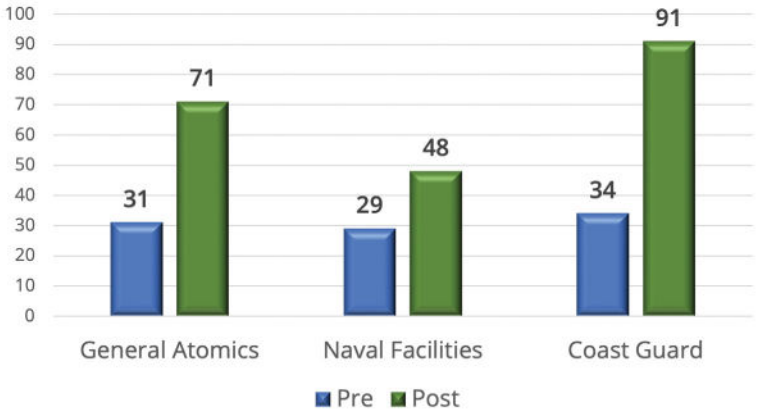
> *"It fascinated me to see all the different kinds of people working at the Navy facility. There were women and men of multiple races, and it really stood out to me how diverse the environment was and how this job could be for anyone."*
>
> **11TH GRADER**
> SCRIPPS RANCH HIGH SCHOOL

Industry Site Visits

To raise Cadet awareness of how STEM is used in the region's manufacturing industry, the Academy arranged visits to General Atomics, the Naval Facilities Engineering and Expeditionary Warfare Center, and the U.S. Coast Guard. Cadets heard from human resource personnel about hiring requirements, key traits needed, training programs offered, and salaries of high-demand jobs from technicians to engineers.

Results from pre- and post-assessments showed that Cadets' awareness of and interest in local STEM jobs increased. At the end of the Academy, 43% of Cadets strongly agreed that there are good-paying local STEM jobs compared to 23% of Cadets at the beginning of the Academy.

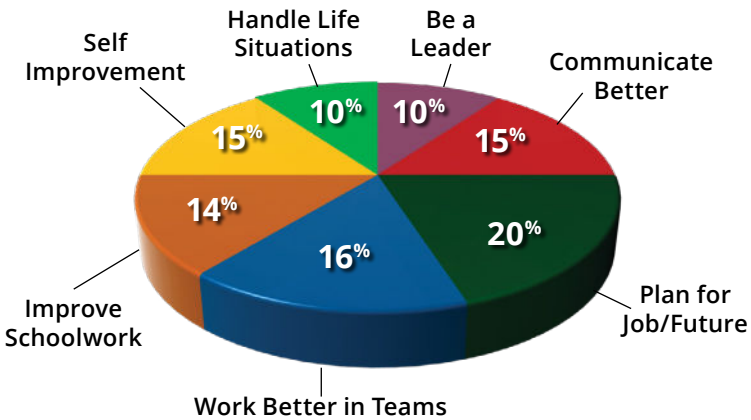
NUMBER OF CADETS ABLE TO DESCRIBE INDUSTRY

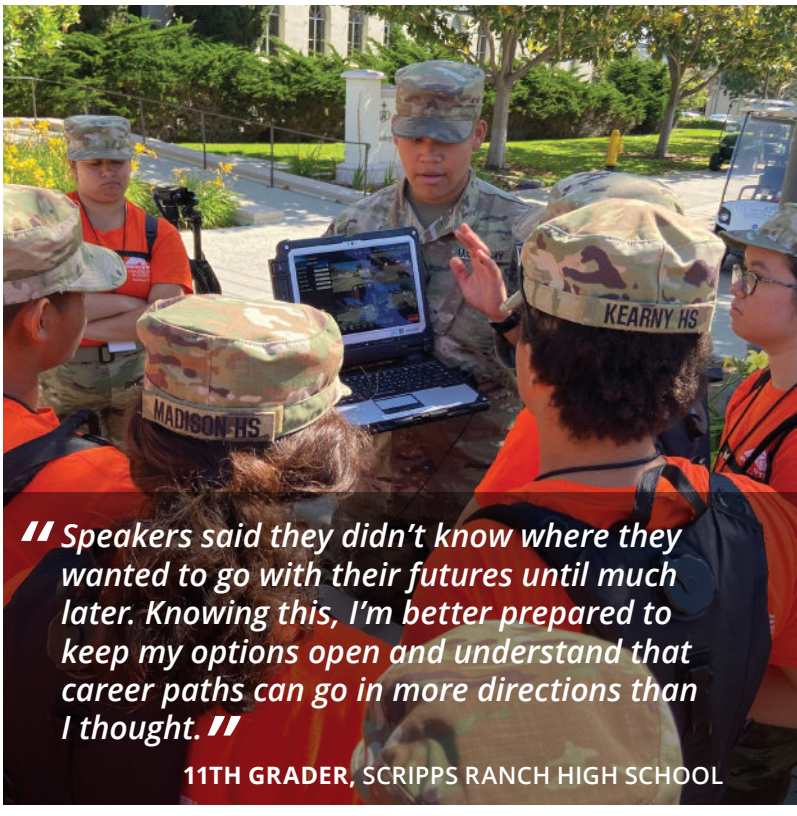


Educational Experiences

Cadets resided at the University of San Diego, where they got a taste of campus life and learned about college admissions. Cadets heard inspiring stories about life and careers from the San Diego Chapter President of the National Society of Black Engineers, a General Atomics engineer, and other guest speakers.

HOW WILL ACADEMY EXPERIENCES HELP CADETS IN THE FUTURE?





> *"Speakers said they didn't know where they wanted to go with their futures until much later. Knowing this, I'm better prepared to keep my options open and understand that career paths can go in more directions than I thought."*
>
> **11TH GRADER**, SCRIPPS RANCH HIGH SCHOOL

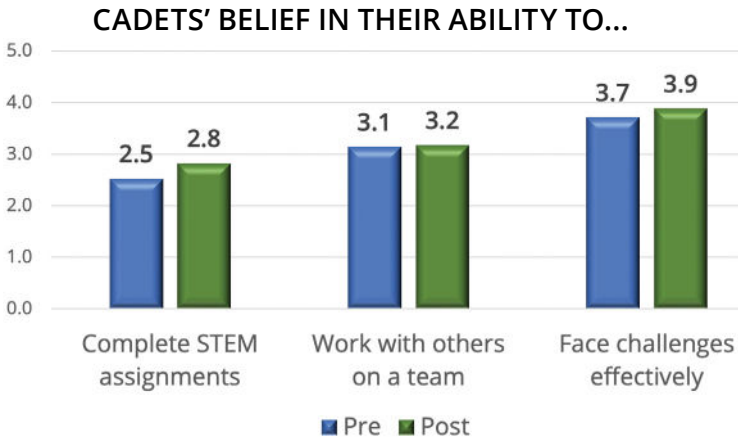
What are the CADETS Saying?

"By participating in the push-up contest, I learned that mentality is king over exercises. If you mentally didn't give up, you could achieve higher numbers than you thought possible."

11TH GRADER
MADISON HIGH SCHOOL

JROTC Cadet Leadership Challenge Activities

The foundation of the Academy lies in the JROTC culture and character education curriculum. Cadets who attended the Academy received additional exposure to that curriculum and culture by participating in JROTC activities that included physical training and sports nights. Combining JROTC challenge activities and STEM design challenges resulted in linked experiences that helped build academic, team, and leadership skills.



Overall Conclusions

Based on the analysis of quantitative and qualitative data collected, the 2023 JROTC STEM Leadership Academy increased a diverse group of Cadets' awareness of and interest in local STEM career opportunities and increased their confidence in being able to enter a STEM career field. Cadets made gains in math, science, and engineering knowledge and in experience working with technology, which increases the likelihood they will succeed in STEM courses and careers. Cadets gained skills in teamwork, leadership, communication, and other 21st Century workforce skills and experienced growth in social skills, courage, and personal responsibility. All combined, the Academy provided experiences that opened pathways to STEM learning and careers.

center for STEM Education

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EOE/F/M/VETS/DISABILITY