JROTC STEM LEADERSHIP ACADEMY

CADET IMPACT REPORT 2024

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 their understanding about what it takes to secure these jobs. To do this, the Academy integrates several activities aimed at informing JROTC Cadets about STEM jobs, piquing their interest to pursue these jobs, giving them hands-on application of STEM concepts in a team setting, and developing 21st century workforce skills.

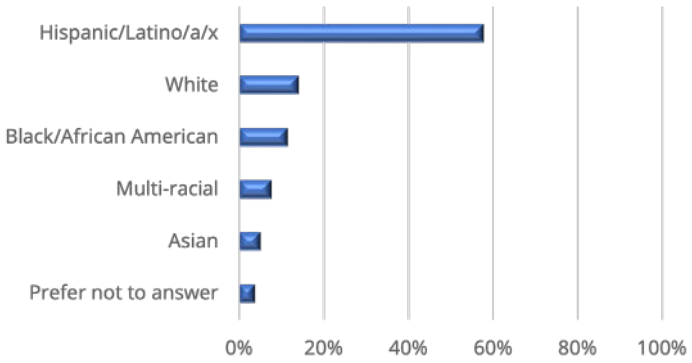
The 2024 Mesquite Academy in Texas focused on the aviation industry and a related STEM-in-the-Air curriculum, in which Cadets investigated STEM concepts using paper airplanes and foam gliders while completing missions of increasing complexity. Cadets then applied the concepts to design, build, and test wings on a motorized, single-propeller, tethered model airplane.

ACTIVITIES

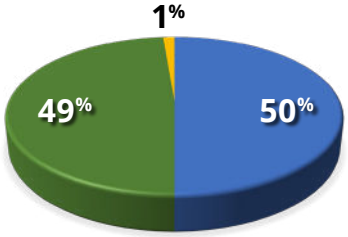
- STEM Design Challenges
- Visits to Industries, Colleges/Universities, and Educational Venues
- JROTC Cadet Leadership Challenge Activities
- Inspirational Guest Speakers

6 HIGH SCHOOLS | **76** CADETS

2024 MESQUITE ACADEMY CADETS BY RACE/ETHNICITY

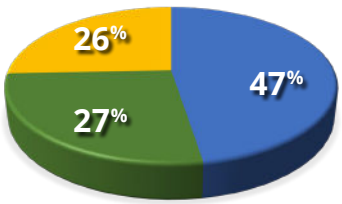


CADETS BY GENDER



- Male
- Female
- Prefer not to say

CADETS BY GRADE



- 9
- 10
- 11

How did Cadets respond to teamwork experiences?

"I used to have difficulty working with my peers, but here we listen to each other's ideas and test them. If they don't work, we try again."

11TH GRADER
POTEET **HIGH SCHOOL**

The JROTC STEM Leadership Academy engaged Cadets in developing and valuing skills in teamwork, communication, and leadership 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

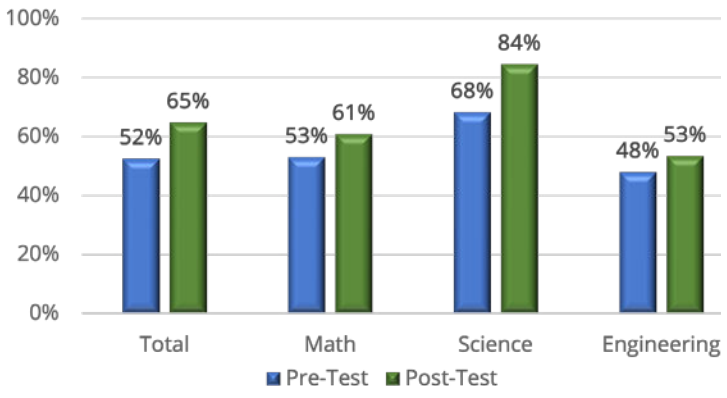
"Before this camp, when I would see math problems, I would just give up. But being here helped me grow and ask questions."

11TH GRADER
VANGUARD HIGH SCHOOL

STEM-in-the-Air Team Design Challenge

Academy Cadets applied concepts for principles of flight, force vectors, proportional reasoning, and aspect ratio, as well as the engineering design process during their team design challenges. Pre- and post-assessment results indicated that Cadets at the 2024 Mesquite Academy achieved statistically significant gains in STEM content knowledge overall, with gains in math and science being greatest.

2024 MESQUITE CADETS' CORRECT ANSWERS TO STEM CONTENT QUESTIONS

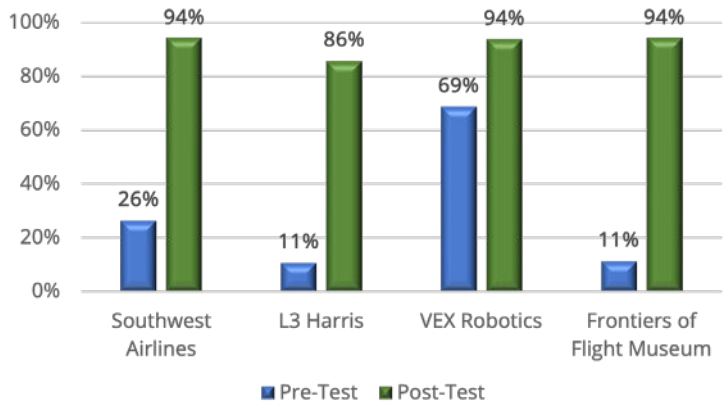


> *"I'm amazed by the airplanes at Southwest Airlines. To design a functioning airplane requires a lot of thinking to balance out the vectors and aerodynamics. Now I have more options to choose from because I learned about careers here."*
>
> **9TH GRADER,** MESQUITE HIGH SCHOOL

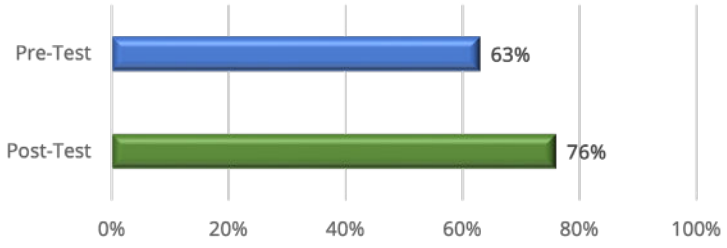
Industry Site Visits

To raise Cadets' awareness of how STEM is used in the aviation industry, the 2024 Mesquite Academy arranged visits to the Frontiers of Flight Museum, L3 Harris, Southwest Airlines, and VEX Robotics. Cadets heard from human resource personnel about hiring requirements, traits and skills needed, training programs offered, and salaries for local, high-demand STEM jobs.

2024 MESQUITE CADETS ABLE TO DESCRIBE INDUSTRY/CENTER



2024 MESQUITE CADETS AWARE OF LOCAL, GOOD-PAYING STEM JOBS

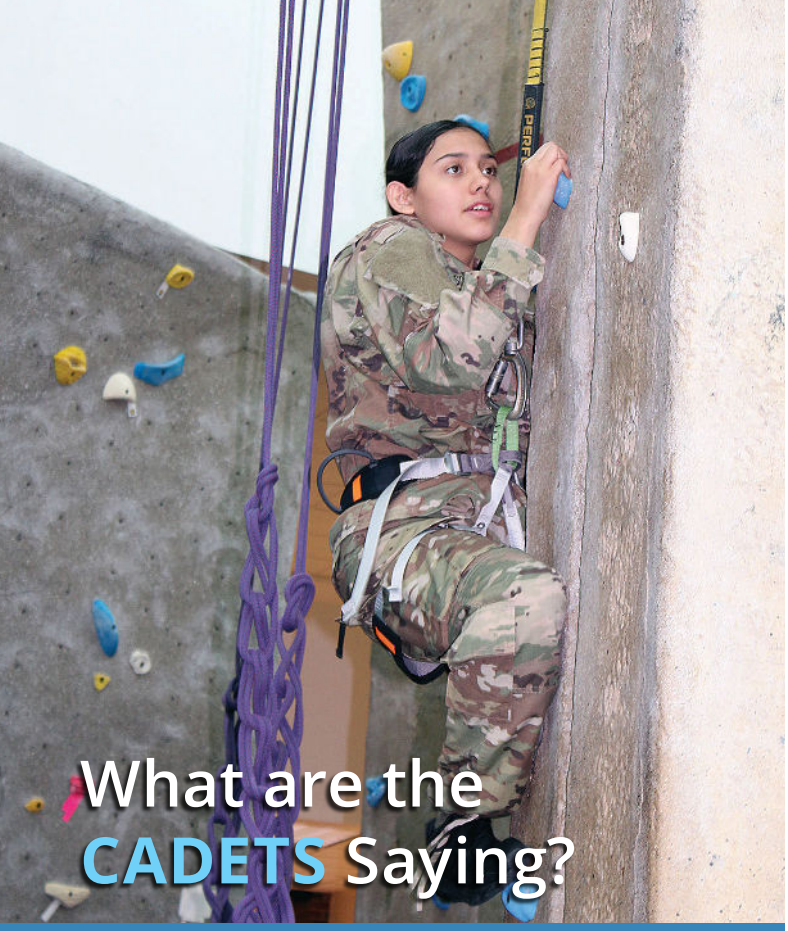


Educational Experiences

During the 2024 Academy, Mesquite Cadets got a taste of campus life while residing at Texas A&M University Commerce and learned about fields of study, student support, and enrollment. Guest speakers inspired Cadets with stories of perseverance and commitment, including two from Texas A&M University Commerce, the first female Dean of the College of Science and Engineering in the university's history and the Associate Professor and Department Head of Engineering and Technology who developed drones for firefighting, as well as an Army Blackhawk pilot who flew missions in Iraq and Afghanistan.

HOW WILL 2024 MESQUITE CADETS USE ACADEMY EXPERIENCES IN THE FUTURE?

> *"Frontiers of Flight workers had incredible stories to share that were very motivating. We saw STEM applied in the real world, and one guy explained how relevant algebra is in the workforce."*
>
> **11TH GRADER,** VANGUARD HIGH SCHOOL



What are the CADETS Saying?

"From rock climbing, I learned perseverance. No matter how hard reaching for the next handle is or how tired your grip is getting, always pushing forward gives fruitful results."

11TH GRADER, VANGUARD HIGH SCHOOL

Overall Conclusions

Based on the analysis of quantitative and qualitative data collected, the 2024 Mesquite 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 experienced 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, confidence, and personal responsibility. All combined, the Academy provided experiences that opened pathways to STEM learning and careers.

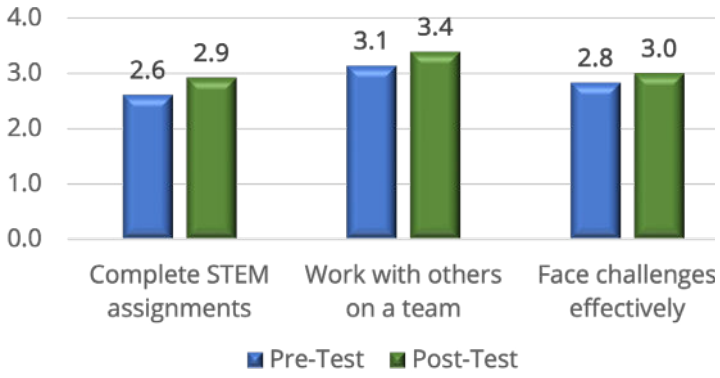
JROTC Cadet Leadership Challenge Activities

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 several JROTC activities, including:

- Rock Climbing
- Drownproofing
- Leader Reaction Course
- Physical Fitness Training

Forty-two percent of Mesquite Academy Cadets stated in their journal reflections that their most favorite part of the Academy was the JROTC activities. Combining JROTC challenge activities and STEM design challenges resulted in linked experiences that helped build academic, team, and leadership skills.

2024 MESQUITE CADETS' BELIEFS IN THEIR ABILITY TO...



"Failure is never failure unless you give up. You make mistakes, and it's okay, if they are fixed. Improvement is coming. Failure is one of the best teachers."

11TH GRADER, VANGUARD HIGH SCHOOL

Report produced by The University of Southern Mississippi, Center for STEM Education.

This material is based upon work supported by the U.S. Department of Defense Award Number HQ00342110009.

EOE/F/M/VETS/DISABILITY