





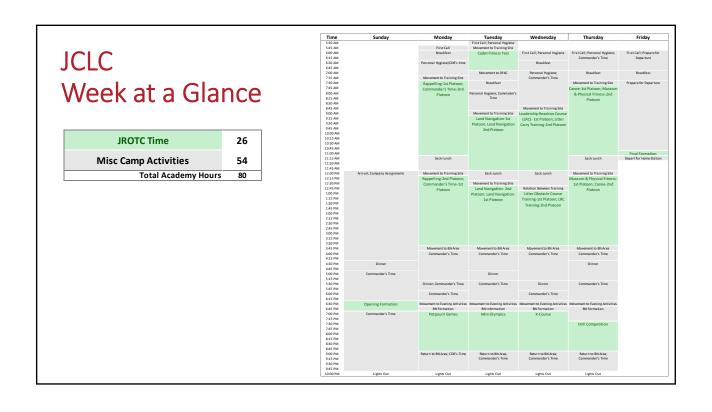
Academy Overview



Academy Overview

- Residential Academy for 160 Cadets on Campus of Spring Hill College
 - 6 days/ 5 nights
 - Expanded the number of students served in the region (120, 144, and 160 students)
- Incorporates Components of JROTC Cadet Leadership Camp (JCLC)
 - Rappelling Training
 - · Drown-Proofing Training
 - Map Reading / Land Navigation Training
 - · Physical Fitness Training
 - Organized Sports
- Immerses Students in STEM Learning and Workforce Experiences
 - Engineering Design Challenges
 - Industry Site Visits
 - Guest Speakers

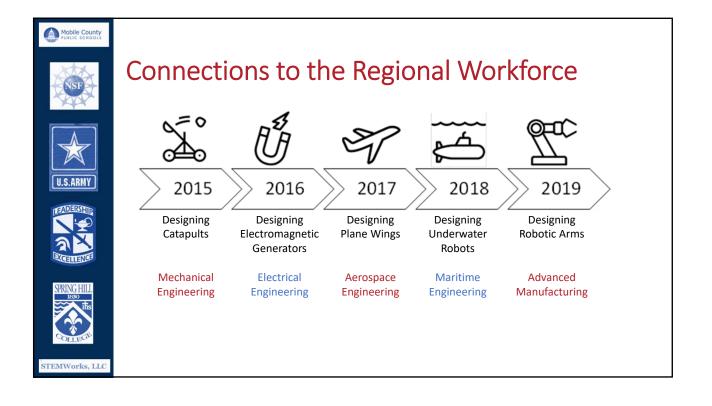
Tuesday Time 5 - 530 AM 5 - 53 Academy Week at a Glance **JROTC Time** 17 **STEM Time** 25 **Workforce Time** 12 **Reflection Time** 4 **Misc Camp Activities** 26 Total Academy Hours 83





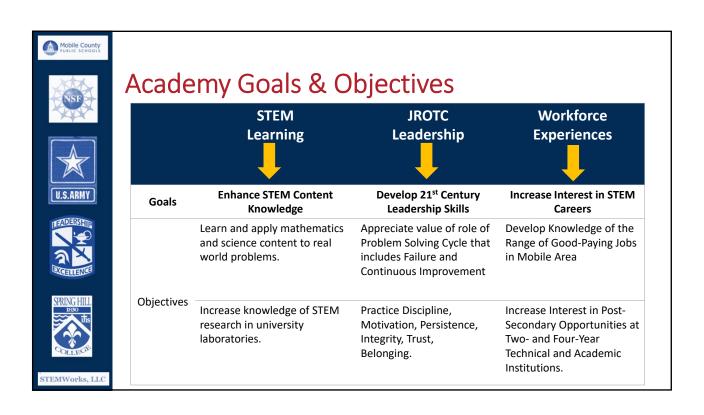








Goals, Objectives, & Target Population





Target Population

- 14 Public High Schools in Mobile County*
- 9th & 10th Graders are Primary Targets
- 11th Graders are Secondary Targets
- All enrolled in JROTC
- 160 Students Maximum (10 per school + 20)



*Majority of MCPSS High Schools are Title 1 Schools; Includes Satsuma and Chickasaw School Systems.



Academy Costs & Funding Streams



Average Costs for Academy

Personnel & Staff:	22,902
Contractual w/STEMWorks, LLC	39,990
SHC Housing, Classrooms, Facilities	46,635
Branded Materials	12,844
Field Trip Fees	2,629
Other Supplies	10,241
TOTAL	\$135,241

Note: Cost Estimate Does Not Include In-Kind Contribution of MCPSS Instructor Salaries (\$50,000 +).

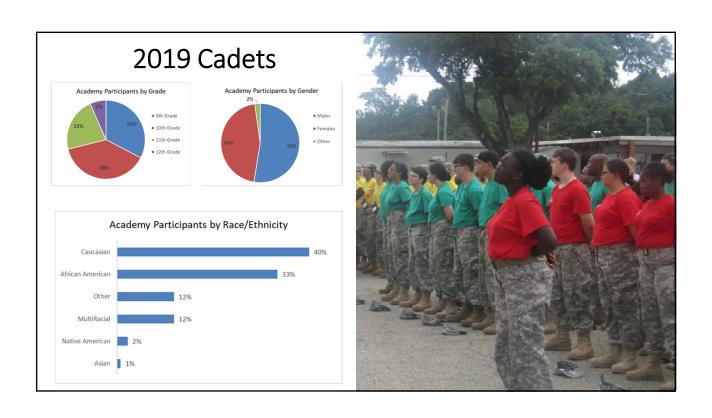


Historic & Current Funding Sources

- ➤ Army Grant Contract
- >MCPSS CTE Operations & Maintenance Fund
- ➤ Cadet Participation Fees (\$50.00 each)
- ➤ Community Donations/Gifts
 - Local Foundations (J.L. Bedsole Foundation, Community Foundation)
 - Local Business Grants/Donations (Amazon, Alabama Power, BAE, City of Mobile)
- ➤ National Science Foundation Grant
 - · Heavily research focused
 - Provide funds for implementation as well



2019 Academy Impact on Cadets





Teambuilding, Communication, and Leadership Development

Carefully structured activities were planned for the Academy week to engage Cadets in valuing teamwork and communication skills and help them develop leadership skills needed to be a successful team member and leader. Activities included:

- Winning Colors Personality Assessment
- Sports Night
- Team STEM Challenges
- JROTC Fitness Challenges

Cadets also responded to daily journal reflection prompts related to their ability to work in teams. When asked how they would use what they learned, cadets responded:



Teambuilding, Communication, and Leadership Development

- Students entered the Academy with fairly high levels of confidence in their ability to work in teams. Post-assessment results indicate Cadets maintained high levels of confidence, 90% reported high levels of confidence working in teams.
- Many cadets reported these activities as their favorite or most valuable of the camp.

At sports night, I learned how to work together with my team and have fun.

− Tsepo, 9th Grader

The most valuable thing was getting to work with a team because I got to learn team work techniques.

- Annelise, 9th Grader

My favorite part of stem was sports night because it helped me connect with the other campers here.

- Summer, 10th Grader



STEM Design Challenges & Investigations

Cadet teams tackled several STEM Design Challenges and investigations related to the maritime industry throughout the week.

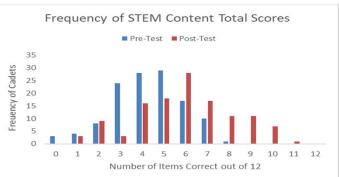
This year, the Academy developed an advanced manufacturing engineering design challenge using VEX EDR robotics kits. The team identified three broad mathematics and science concepts to focus on:

- (1) Gear Ratios
- (2) Inverse Relationships
- (3) Rotational Force



STEM Design Challenges & Investigations

- Students made *statistically significant* gains in all three content areas-science, mathematics, and engineering.
- There were 12 STEM content questions. Scores were calculated by assigning 1-point value to each question answered correctly. The highest possible score for these items was 12 points.



STEM Design Challenges & University and College STEM Investigations

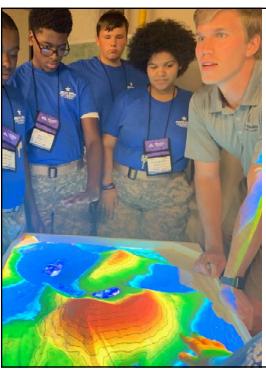
My favorite part was the robot building because I loved designing it and creating something with my team members that we can be proud of.

-Christopher, 10th Grader

The most valuable thing I did,saw or heard during my camp experience was how to build a robot with my teammates.

Creating Kenny and meeting g so many new people





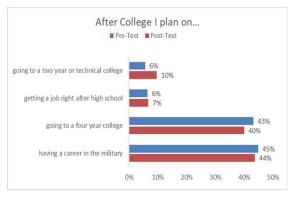
University, College, & Educational Field Trips

Cadets resided on the Spring Hill College campus for the entire Academy, learning what life is like on a college campus, and also participated in engineering investigations at University of South Alabama.



University, College, & Educational Field Trips

- While cadets seem to have a stable idea of what they plan to do after high school, there were reports from cadets in increased interest in STEM jobs.
- The biggest shift in cadets' plans were an increased interest in enrolling in a 2-year or technical college





Industry Site Visits & Guest Speakers

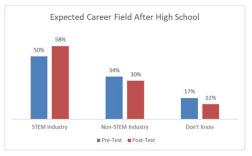
Academy Cadets visited Cadets also toured SSAB steel, BASF chemical, and Hyundai the car manufactuer. The goal of these visits was to help Academy Cadets see how STEM is used in the region's advanced manufacturing industry, and for them to hear from human resource personnel as to requirements for hiring and key traits looked for in applicants, as well as salaries of high demand jobs from technicians to engineers.

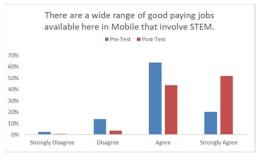
To reinforce the importance of completing an education and securing jobs in the region, guest speakers from business, military, and higher education institutions shared personal stories highlighting their educational and career path.



Industry Site Visits & Guest Speakers

- Results from the pre/post assessment and journal entries indicate Cadets increased their awareness of STEM jobs in the region.
- Additionally, Cadets increased their awareness of good paying jobs in the region and recognized that there are many STEM jobs that do not require a four-year college degree.





Industry Site Visits & Guest Speakers

Hyundai because it was so interesting and that had a lot to give to a person who has not went to college yet and they getting a good pay.- Alyssa, 9th grader

One of the most valuable things I heard or saw at stem camp were all the job opportunities around mobile that include stem.-Summer, 10^{th} grader

The guest speakers that used to be in ROTC and now they are successful so I look at them like it could be me one day-Jennifer, 9th grader





Overall Conclusions

- The Academy experience increased Cadet awareness of, and interest in, STEM jobs available in the region.
- Cadets report more confidence in their ability to enter a STEM career field.
- Cadets also made gains in science, mathematics, and engineering content which further supports cadets' ability to be successful in STEM academics and careers.



ITEST Year 2

2019 JROTC Summer STEM Academy and Cadet Leadership Challenge Camp



Research Questions

RQ1:

What are the unique and synergistic contributions of the (1) JROTC program, (2) STEM learning, and (3) workforce experiences, to broadening STEM career interest, preparation, and aspirations, especially for students from underrepresented populations?

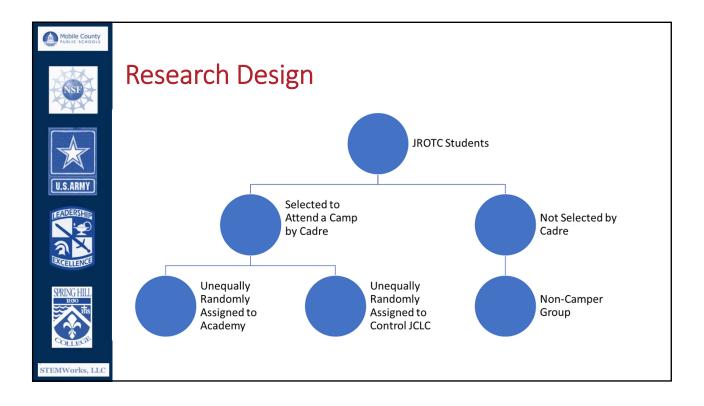
RQ2:

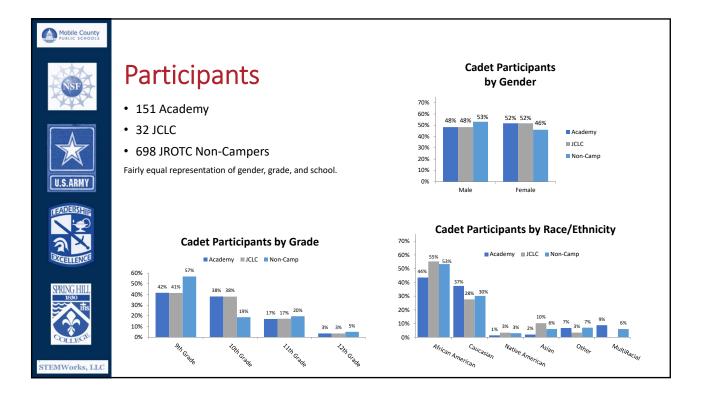
What are the short-term interest, preparation, and aspirational shifts that occur in cadets as the result of the blended JROTC and STEM intervention?

RQ3:

What are the long-term interest, preparation, and aspirational shifts that occur in student cadets as the result of the blended JROTC and STEM intervention?

Data for RQ3 is being collected as cohort 1 cadets are entering their senior year.







Instrumentation

11 sets of measures used to compare groups

- Taking a STEM-related school path
- Interest in Job Types
- Planned Career Area
- · Successfully Working on a Collaborative Challenge
- Persistence Working on a Collaborative Challenge
- STEM Content Knowledge Test
- Industries You Could Describe to a Friend
- Beliefs about STEM Careers
- STEM Semantics Survey
- Engineering Competence
- 21st Century Workforce Skills Confidence
- Summer Experience Satisfaction



Differences between the JCLC & Academy Cadets

Differences were found on STEM and workforce related items where Academy cadets scored higher on the posttest (controlling for pretest scores)

- Academic Content Knowledge
- Ability to explain how a robot works
- · Ability to describe local industries to a friend
- Beliefs about STEM Careers
- 21st Century Workforce Skills Confidence Scale



Differences between the JCLC & Academy Cadets

Some items showed no significant difference

- Taking a STEM-related School Path*
- Career Choices*
- Confidence Working in Teams

Given that the Academy was a one-week experience, it is not surprising that items measuring fairly stable constructs, beliefs and future plans, do not demonstrate significant shifts.



