SEEK

Summer Engineering Experience for Kids

2023 PROGRAM REPORT

NATIONAL SOCIETY OF BLACK ENGINEERS

SEEK

SUMMER ENGINEERING EXPERIENCE FOR KIDS

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SEEK

2023 PROGRAM REPORT

In the past few years, the National Society of Black Engineers (NSBE) has reached new milestones in creating pathways to opportunity for those who have been historically underrepresented in STEM, by transitioning to a virtual platform for our Summer Engineering Experience for Kids (SEEK) program. We are proud of our efforts and deeply grateful for the partners who supported us in this work and contributed so greatly to our impact. We could not have done it without you.

This report is a story of our impact in 2023 — our first year returning to in-person programming since the onset of the COVID-19 pandemic — and the efforts to continue broadening the participation of students with marginalized identities in STEM. We believe the only way to achieve an equitable society is by disrupting the systems that have perpetuated racism and exclusion. And, as the premier organization for Black people in engineering, we have learned that the work of disrupting systems is best done by embracing who we are and being unapologetic in the fight.

Highlighting the programmatic aspects of the Summer Engineering Experience for Kids, this report summarizes the ways in which we worked to deliver a robust in-person program. It also demonstrates how we have expanded our reach to offer the virtual SEEK program in tandem with SEEK's in-person sites, to continue providing broad access to students. We are dedicated to continuous improvement and value the feedback we have received from parents, students and partners as we look ahead to 2024. We have ambitious goals to increase our impact across the nation and around the world, making NSBE a household name, and your continued partnership will be vital to that effort. Thank you for your generous support and for joining us in the transformational work ahead.

Rochelle L. Williams, Ph.D.

Chief Programs and Membership Officer
National Society of Black Engineers

INTRODUCTION

SEEK launched in 2007, is a cost-free, three-week summer program that offers a fun and engaging STEM educational experience for students in grades 3–5. **SEEK** aims to provide high-quality learning opportunities to students from groups underrepresented in STEM, students who otherwise may not have access to a robust STEM education. Learning activities for the program are guided by mentor/instructors, many of whom are STEM students or professionals and members of NSBE, and who also serve as STEM career role models for the **SEEK** scholars.

This year, SEEK's hands-on engineering design activities and STEM equity trainings for our students took place during in-person camps in five U.S. cities and on SEEK's online platform, which together served more than 1,100 K–12 scholars across the country.

The positive impact of SEEK continues to increase. This year's students who had also participated in SEEK in previous years reported higher math, reading and science scores than did newcomers to SEEK.

SEEK curriculum

Each week during our SEEK program, we focused on different components of engineering.

WEEK 1 | CODING

Computer Science & Engineering

Students used the CyberPi coding kit by Makeblock to learn the fundamentals of computer science/ engineering and coding.

WEEK 2 | ROBOTICS

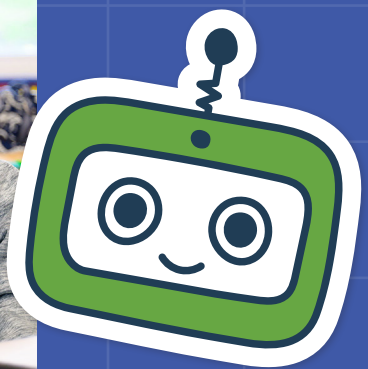
Mechanical Engineering

Students used the mBot robotics kit by Madeblock to learn the fundamentals of mechanical engineering and the world of sensors.

WEEK 3 | DRONES

Aeronautical Engineering

Students used the UF05000 drone to explore the concept and mechanics of flight, the history of drones, as well as the fundamentals of drone racing.



NSBE Jr. Night

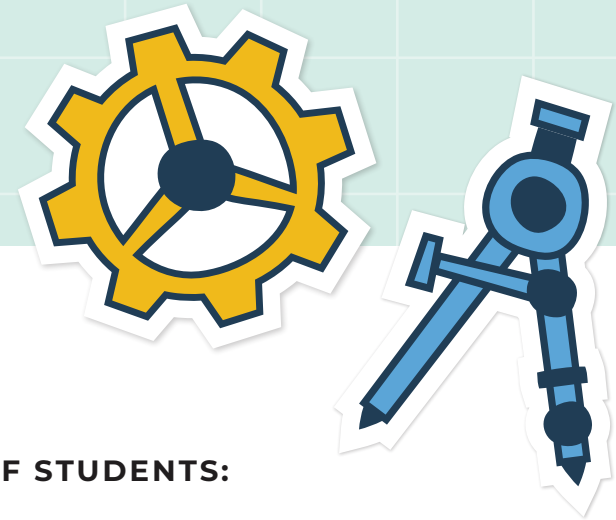
NSBE Jr. Night allows NSBE staff to promote NSBE's year-round pre-college program as the next step in SEEK students' development. Parents learned more about our program directly from NSBE Jr. chapter advisors and alumni from across the country. The event was attended by 70 parents.

Techbridge Girls

SEEK Powered by Techbridge Girls was offered virtually to increase the capacity of SEEK mentors to deliver high-quality, gender- and culture-relevant STEM programming as well as increase SEEK's impact by strengthening middle school girls' STEM identities. NSBE has worked to increase social/emotional skills, improve career awareness and deepen these promising students' understanding of how STEM can create a beneficial change. This year, we served more than 115 middle school girls!

SEEK Powered by Techbridge Girls is part of NSBE's work to ensure that all girls have greater STEM experiences. We believe girls deserve a future in which STEM solutions are better and more equitable and in which those solutions serve them. This program aims to galvanize girls' out-of-school time with educators and STEM professionals who have equity training and a curriculum that empowers them to act as STEM career catalysts for our girls.

SEEK DATA



Student Participation

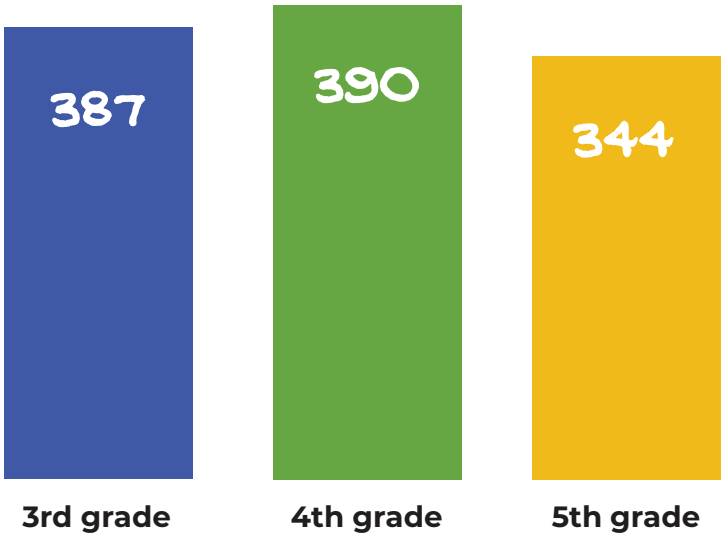
STUDENTS REGISTERED:

1,121

TOP FIVE STATES FOR VIRTUAL PARTICIPATION:

- 65 Texas
- 63 Maryland
- 44 California
- 27 Minnesota
- 26 Georgia

GRADES OF STUDENTS:



GENDER OF STUDENTS:

641 boys
478 girls
1 non-binary
1 undisclosed

SITE	COUNT	PERCENT
Virtual	489	43.6%
Washington, D.C.	159	14.2%
Houston	146	13.0%
Atlanta	141	12.6%
Detroit	113	10.1%
Chicago	73	6.5%
Total	**1,121**	**100.0%**

STUDENT'S RACE OR ETHNICITY

RACE OR ETHNICITY	COUNT	PERCENT
American Indian or Alaska Native	6	1%
Asian	16	1%
Black or African American	760	68%
Unknown	267	24%
Hispanic or Latino	11	1%
Multiracial	56	5%
Native Hawaiian or Other Pacific Islander	1	0.1%
White	4	0.4%
Total	**1,121**	**100%**

VIRTUAL PARTICIPANTS' HOME STATES

STATE	COUNT
Texas	65
Maryland	63
California	44
Minnesota	27
Georgia	26
New York	19
Alabama	18
South Carolina	15
Illinois	14
North Carolina	14
Virginia	14
Florida	12
New Jersey	11
Pennsylvania	9
Colorado	6
Connecticut	5
Delaware	5
Louisiana	5
Mississippi	5

STATE	COUNT
Ohio	5
Tennessee	5
District of Columbia	3
Massachusetts	3
Michigan	3
Oklahoma	3
Washington	3
Iowa	2
Missouri	2
Oregon	2
Arizona	1
Hawaii	1
Indiana	1
Kansas	1
Utah	1
West Virginia	1
Unknown	75
Total	**489**

Both participation in SEEK and being a member of NSBE Jr. appear to be associated with attainment of “A” averages in math, reading and science.

- Of SEEK 2023 students who participated in SEEK previously, **65% had an A average in math, compared with 60%** of SEEK 2023 students who had an A average but did not previously participate in SEEK.
- Of SEEK 2023 students who participated in SEEK previously, **66% had an A average in reading, compared with 61%** who had an A average but did not previously participate in SEEK.
- Of SEEK 2023 students who participated in SEEK previously, **70% had an A average in science, compared with 65%** who had an A average but did not previously participate in SEEK.
- Of SEEK 2023 students who were NSBE Jr. members, **72% had an A average in science, compared with 66%** who had an A average but were not NSBE Jr. members.
- Of SEEK 2023 students who were NSBE Jr. members, **66% had an A average in math, compared with 61%** who had an A average but were not NSBE Jr. members.
- Of SEEK 2023 students who were NSBE Jr. members, **64% had an A average in reading, compared with 62%** who had an A average but were not NSBE Jr. members.

Techbridge Girls

SEEK POWERED BY TECHBRIDGE GIRLS MENTOR/INSTRUCTORS:

6

SEEK POWERED BY TECHBRIDGE GIRLS MENTOR/INSTRUCTORS’ AREAS OF STUDY:

- 40% education
- 40% engineering
- 20% other

SEEK POWERED BY TECHBRIDGE GIRLS STUDENTS:

116

GRADES OF SEEK POWERED BY TECHBRIDGE GIRLS STUDENTS:

- 54 6th grade
- 43 7th grade
- 19 8th grade

Student Survey

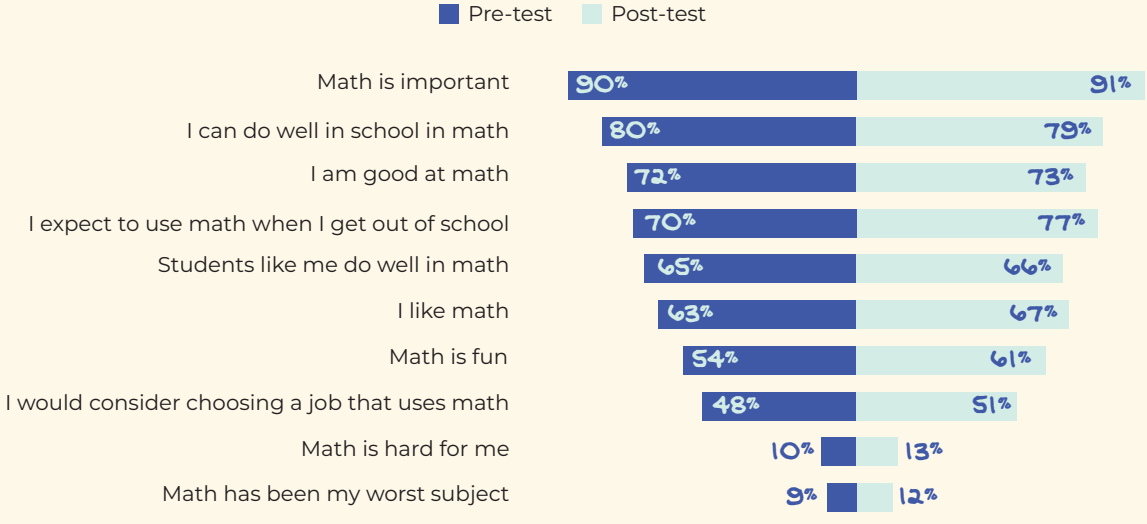
Student satisfaction is very important to achieving the goals of SEEK. We value student feedback. Our SEEK student survey provides an opportunity for the students to reflect on their work and help us continuously grow SEEK to provide them with the best possible experience each year! SEEK received an average rating of 87% for overall student satisfaction in 2023.

SURVEY HIGHLIGHTS:

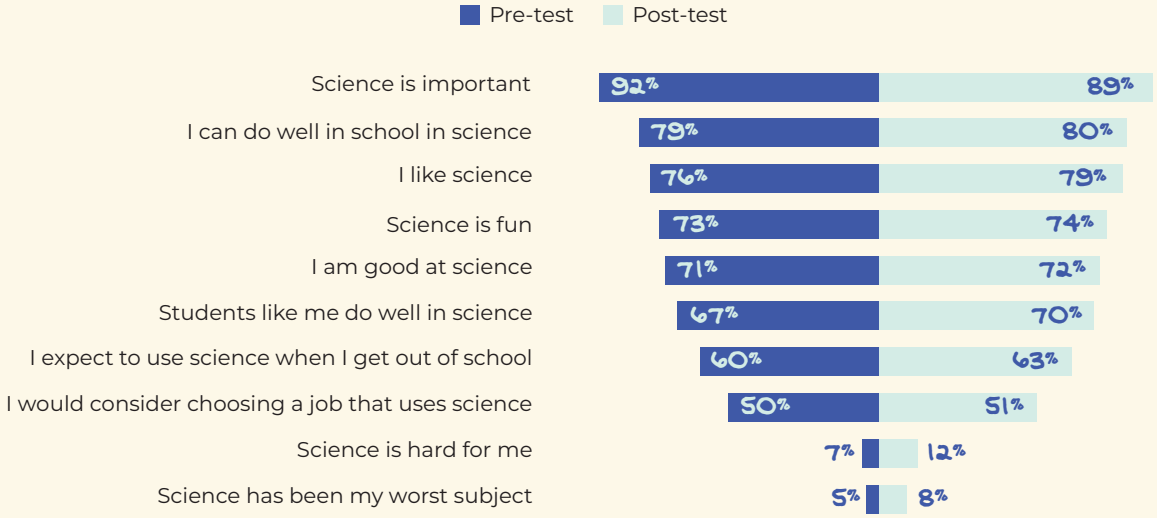
- **90%** of students believed they did a good job
- **85%** of students liked what they did
- **88%** of students believed their mentor was helpful
- **91%** of students believed what they did was fun
- **83%** of students believed they could use what they learned
- **86%** of students believed their mentor cared about what they did

Assessments were taken on the first day of camp (pre-tests) as well as the next-to-last day of camp (post-tests). All assessments were proctored by the students' mentor/instructors. Mentor/instructors were directed to provide minimal assistance with the assessments, so student responses are accurate. The following graphs only show results of students who completed both the pre- and post-assessment (n = 304).

AFFIRMED ATTITUDES ABOUT MATH

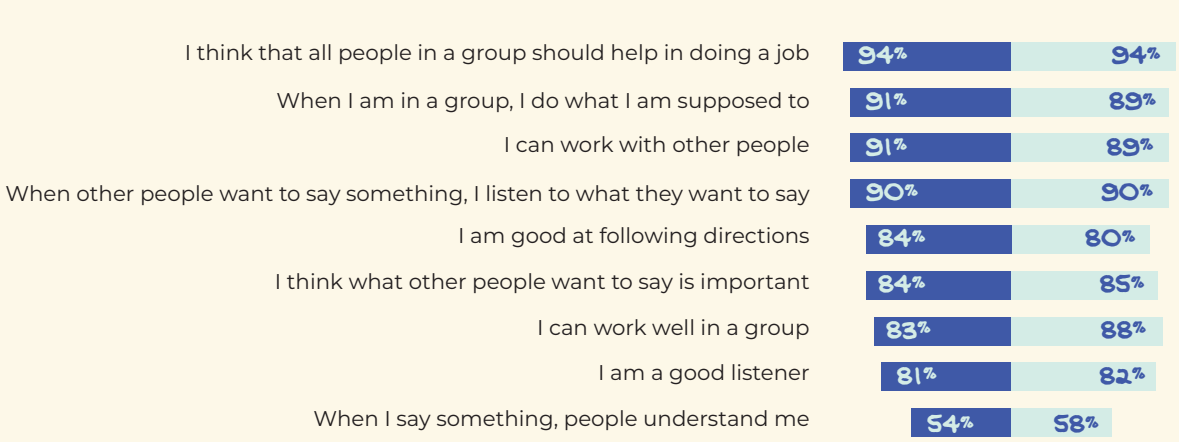


AFFIRMED ATTITUDES ABOUT SCIENCE

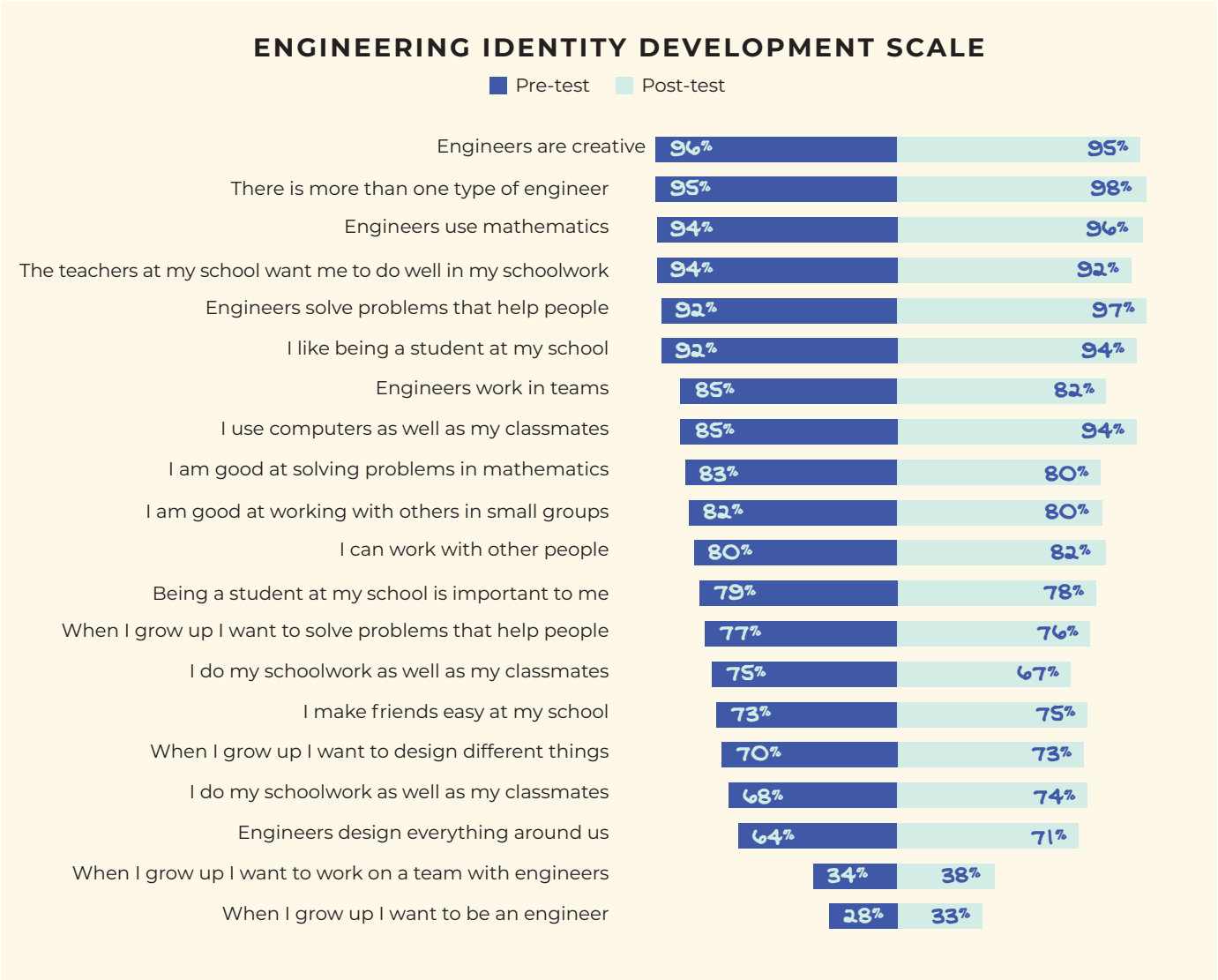


To measure STEM-related and interpersonal and intrapersonal skills, we leveraged Robinson and Zajicek's (2005) Youth Life Skills Inventory. This measure was adapted from the Leadership Skills Inventory (Townsend & Carter, 1983) to be applicable for measuring skills of students who are in grades 3–5.

YOUTH LIFE SKILLS



The Engineering Identity Development instrument was developed by Capobiano et al. (2012) to determine how elementary school students develop their sense of identity within engineering. The instrument has established validity and reliability for academic and engineering career identity within the elementary school context and can be used within science and engineering education settings.



Parent Satisfaction

Parent satisfaction and parent "buy in" are very important to SEEK. We consider parents' feedback a high priority. Responding to our survey gave SEEK parents an opportunity to be reflective and provide feedback about how NSBE can improve the program and increase our SEEK students' STEM proficiency and engagement, thus contributing to the program's success. We received an average rating of 93% for overall parent satisfaction!

- **90%** of parents agreed they were satisfied with the quality of the curriculum
- **92%** of parents agreed they were satisfied with the overall program
- **91%** of parents agreed SEEK met their child's needs
- **97%** of parents would recommend SEEK to a family member or friend

There were several recommendations parents believe SEEK could provide to improve parents' ability to help their children with engineering related tasks within the program:

EDUCATIONAL RESOURCES

- Free coding and cybersecurity courses
- Websites, YouTube channels, books and programs related to engineering available in their city
- Information about what their children were learning during the camp
- Links to YouTube videos and other online tutorials for STEM learning
- Science experiments, videos and interactive field trips related to engineering

TAKE-HOME PROJECTS

- Projects and activities that can be done at home using household materials
- Engineering kits, workbooks or websites that provide hands-on STEM experiences

CONTINUED LEARNING OPPORTUNITIES

- Games and online resources for practice after the program ends
- Monthly or quarterly virtual sessions with NSBE for check-ins and updates
- Webinars, workshops and virtual STEM programs

INFORMATION AND COMMUNICATION

- Parent guides explaining the SEEK curriculum and concepts covered
- STEM vocabulary words, syllabus and instructions
- Newsletters, magazines or videos highlighting engineering concepts and careers
- Videos and animations explaining engineering concepts and the engineering process

EXPOSURE AND MENTORING

- Opportunities for exposure to various engineering fields and professionals
- Mentoring by engineering professionals, and opportunities for shadowing

WHY PARENTS DECIDED TO REGISTER THEIR CHILDREN FOR SEEK:

INTEREST IN STEM

Many parents expressed that their children had a strong interest in science, technology, engineering and math subjects, and they saw the SEEK program as a way to further nurture and develop this interest.

HANDS-ON EXPERIENCE

The program's emphasis on hands-on projects involving learning, building and creating was appealing to parents who wanted their children to have practical experience with engineering concepts.

REPRESENTATION

The opportunity for children to see mentors and instructors who looked like them and came from similar backgrounds was a significant factor. Parents appreciated that the program provided role models and representation of their group in the field of engineering.

EXPOSURE TO ENGINEERING

Parents wanted to expose their children to the field of engineering, allowing them to explore different aspects of the profession and potentially sparking a lasting interest.

POSITIVE PAST EXPERIENCES

Parents who had previously enrolled their children in the SEEK program shared positive experiences, including their children's increased knowledge of, engagement with and enthusiasm for STEM subjects.

mentor/instructor

SEEK employs mentor/instructors, site directors and virtual moderators from all over the United States, who guide our students through the program's in-person and virtual programming, giving them exposure to diverse role models. Our mentors, site directors and virtual moderators allowed the students a personalized, relatable experience with a leader with whom they could enhance their engineering identities. SEEK implements a near-peer mentor model in which students can see themselves in their classroom leaders. Our SEEK mentor/instructors, site directors and virtual moderators are dedicated to student success in every capacity.

Many of the mentor/instructors of SEEK 2023 had participated previously in the SEEK program. They came from a variety of engineering and educational backgrounds and had college/university majors such as engineering, computer science, education and computer engineering. Our survey enabled the mentor/instructors to be reflective and provide feedback about how to improve the program and increase SEEK students' STEM proficiency and engagement.

NUMBER OF SEEK MENTOR/INSTRUCTORS AND SITE DIRECTORS:

100

TOP AREAS OF STUDY OF SEEK MENTOR/INSTRUCTORS:

- 36% engineering
- 15% computer science
- 9% education
- 6% computer engineering

RACE OR ETHNICITY OF MENTOR/INSTRUCTORS

RACE/ETHNICITY	COUNT	PERCENT
Unknown	33	33%
Asian	1	1%
Black/African American	59	59%
Multiracial	2	2%
Hispanic/Latino	2	2%
White	3	3%
Total	**100**	**100%**

GENDER OF SEEK MENTOR/INSTRUCTORS

GENDER	COUNT	PERCENT
Female	56	56%
Male	41	41%
Not Known	3	3%
Total	**100**	**100%**

mentor/instructor survey

SEEK 2023 mentor/instructors generally reported a positive and successful SEEK experience, expressing that they found the program valuable and effective in promoting STEM interest and skills among students while also enhancing their own leadership abilities and commitment to diversity and inclusion in STEM fields.

- **16%** of mentor/instructors had previously participated as a SEEK mentor/instructor twice or more.
- **96%** of mentor/instructors agreed that the curriculum was appropriate for students.
- **74%** of mentor/instructors believed competitions ran smoothly.
- **74%** of mentor/instructors agreed that students' attendance was good.
- **96%** of mentor/instructors agreed that they enjoyed the overall experience.
- **93%** of mentor/instructors agreed they learned valuable new information.
- **47%** of mentor/instructors were satisfied with the stipend amount.
- **88%** of mentor/instructors agreed students were actively engaged.
- **96%** of mentor/instructors agreed their students gained valuable experience.
- **79%** of mentor/instructors saw progress in their students' classroom behavior.
- **88%** of mentor/instructors agreed that their students became aware of the roles that science plays in their daily lives.
- **89%** of mentor/instructors agreed students became more interested in science.
- **89%** of mentor/instructors agreed students improved their science skills.
- **81%** of mentor/instructors agreed students became aware of the roles that math plays in their daily lives.
- **98%** of mentor/instructors agreed SEEK improved their leadership skills.
- **96%** of mentor/instructors agreed that they had become more committed to increasing STEM representation for underrepresented groups.

Mentor/instructors said they believed the following strategies can improve students' interest in math:

ENGAGING ACTIVITIES
Introduce engaging activities like math games, interactive challenges and competitions to make learning math enjoyable and interactive.

REAL-WORLD RELEVANCE
Demonstrate how math is applied to solve real-world problems and address societal challenges. Use examples that highlight the impact of math in various fields.

VISUAL LEARNING
Incorporate visual aids, drawings and objects to explain math concepts, catering to different learning styles and making abstract ideas more concrete.

INTEGRATION WITH OTHER SUBJECTS
Show how math is connected to other subjects and how it plays a role in fields like engineering, science and technology.

FUN AND GAMIFICATION
Integrate fun elements, prizes and rewards to make math learning a more enjoyable experience.

SOCIAL MEDIA AND COMMUNICATION

This year, we were able to broaden the visibility of SEEK through social media. We noticed an increase in public awareness of the program and in overall engagement!

We also found increased communication with parents to be vital to SEEK. More frequent contacts with the parents allowed them to be more engaged and in tune with their children's learning experience and brought about a substantial increase in parent involvement this year. This result was proven by a higher percentage of opened emails and email clicks from our SEEK parents!

email

TOTAL EMAILS DESIGNED AND SENT: 17

+750% growth over last 6 month period

TOTAL CLICKS: 3,700+

+348% growth over last 6 month period

OPEN RATE: 53.5%

+6.5% growth over last 6 month

creative

1 commercial video (with custom voice over talent)

1 program flier for print

1 program one sheet digital

13 custom social media content

2 original templates for e-mail newsletters

social

TOTAL POSTS: 66

ADS

Impressions: 129,763
Clicks: 2,494
Spend: 41,928.49
Cost per click: $0.77

FACEBOOK

Total reach: 162,936
Total impressions: 59,608

+516% increase

INSTAGRAM

Total reach: 30,300
Total impressions: 17,345

2023 SEEK PROGRAM PARTNERS

Anchoring Partners

- Northrop Grumman
- Shell
- Ann Theodore Foundation
- Bechtel Corporation
- 3M
- General Motors
- Honeywell

Champion Partners

- John Deere
- BP
- Target
- Trane Technologies

National Partner

- Chevron

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SUMMER ENGINEERING EXPERIENCE FOR KIDS

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