AmeriCorps Utah STEM Initiative 2022 Evaluation Report

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September 2022

.

BOYS & GIRLS CLUBS
OF UTAH COUNTY

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INTRODUCTION

The AmeriCorps Utah STEM Initiative (AUSI) contracted with an external evaluator for the program's 2022 fiscal year. The evaluation services provided by the evaluator included the design and development of program evaluation strategies and instruments. In addition, evaluation data was provided to the external evaluator for analysis and review. The AmeriCorps Utah STEM Initiative 2022 Evaluation Report presents a description of evaluation methodologies and findings. These findings are shown in the following sections, first by individual programs and then collectively as the AUSI program.

AUSI PARTNER PROGRAMS & FINDINGS

The AmeriCorps Utah STEM Initiative partners with community programs in Utah County and other parts of the state to provide a variety of STEM programming, giving students an increased opportunity to engage in science, technology, engineering, and mathematics. The purpose of this section is to present evaluation methods and findings for each AUSI partner.

BOYS & GIRLS CLUB PROGRAMS

The Boys & Girls Club of Utah County helps coordinate several STEM initiatives embedded in local public schools. Although these programs differed in their mode of delivery (during/after school) and specific programming, they all shared the same goal to increase students' academic achievement and engagement in STEM subjects. These programs operated at the following sites during the 2021-2022 school year:

- Belknap Elementary
- Cherry Hill Elementary
- Fremont Elementary
- Milford Elementary
- Minersville Elementary
- Olene Walker Elementary
- Orem Junior High
- Parkside Elementary
- Provo Clubhouse
- Sharon Elementary
- Sunset View Elementary
- Timpanogos Elementary

Students participating in these programs during the 2021-2022 school year were evaluated with a holistic rubric on their academic performance, positive attitudes toward STEM, and confidence in approaching STEM subjects (Table 1). The purpose of the evaluation was to provide program facilitators with an opportunity to report student-specific growth while participating in the program. Each student was rated a 1, 2, or 3 based on their observed participation in the program. This holistic approach to evaluating students presented advantages over previous self-report methods – particularly with younger students. In addition, those doing the evaluations were able to observe students throughout their time in the program and note changes.

Aggregated results indicate that students experienced moderate to significant increases in their academic performance, positive attitudes toward STEM, and confidence in approaching STEM subjects. **The average ratings for Academic Performance, Positive Attitudes Toward Stem, and Confidence in STEM Subjects were 2.5, 2.5, and 3.0, respectively. The median rating in all aspects was 3.0**. Figure 1 depicts a distribution of ratings by evaluation aspect. **Overall, moderate to significant increases were shown in student academic performance (93.1%), confidence (93.7%), and positive attitudes (91.9%).**

Slight variations in student growth were found from site to site (Figure 2). However, the complexity of the evaluation context (e.g., diverse populations, differences in programming, and distinct raters) provides opportunities for introducing construct irrelevant variance. As such, strict comparisons of site evaluation results should be tempered, considering the potential for a large margin of measurement error.

Table 1: *BGC Holistic Evaluation Rubric*

	1	2	3
Academic Performance	The student showed little to no increase in academic performance in STEM. The student is close to the same level of performance of the target subjects when they started the program.	The student has shown a moderate increase in academic performance in STEM as a result of participating in the program.	The student has shown a significant increase in academic performance in STEM as a result of participating in the program.
Positive Attitudes Toward STEM	The student has shown little to no increase in positive attitudes toward STEM. The student is close to the same attitude about STEM as when they started the program.	The student has shown a moderate increase in positive attitudes toward STEM as a result of participating in the program.	The student has shown a significant increase in positive attitudes toward STEM, and the student's attitudes toward STEM are primarily favorable.
Confidence Approaching STEM Subjects	The student approaches STEM with little to no increase in their level of confidence. The student is close to the same level of confidence about STEM as when they started the program.	The student approaches STEM with a moderately increased level of confidence as a result of participating in the program.	The student approaches STEM with a significantly increased level of confidence and does not give up when facing challenges.

Figure: 1

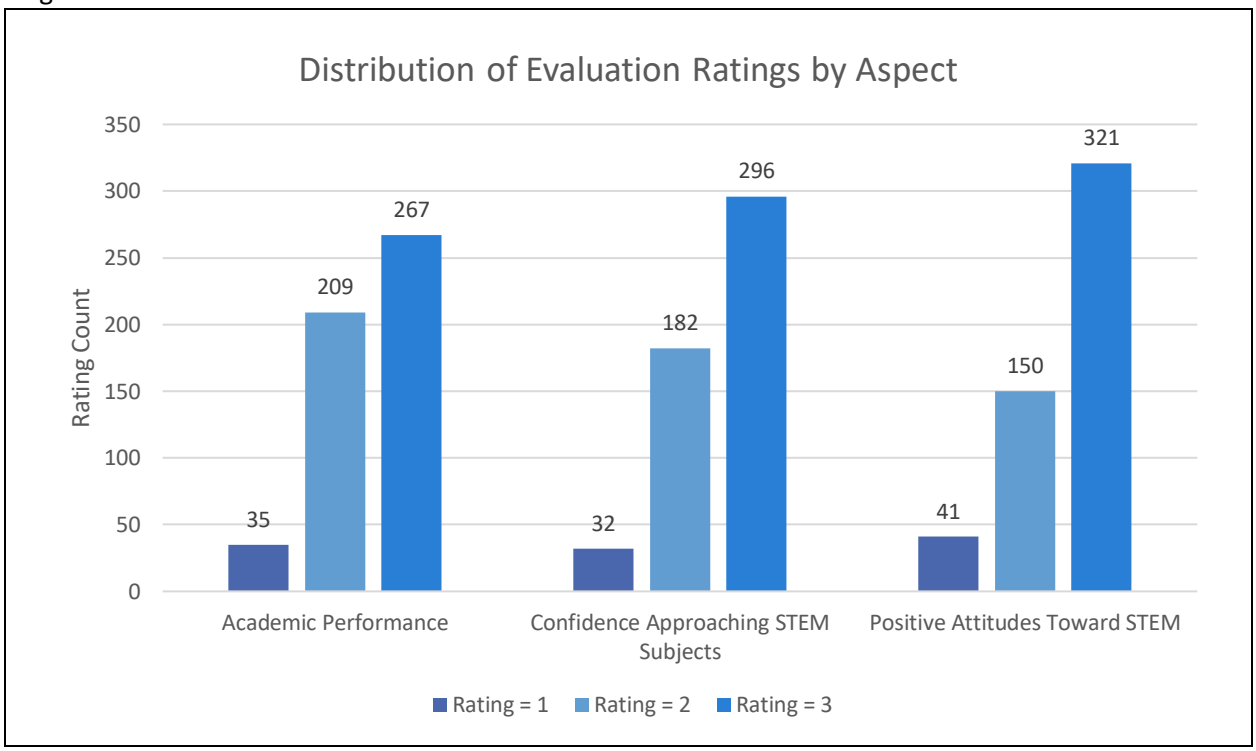
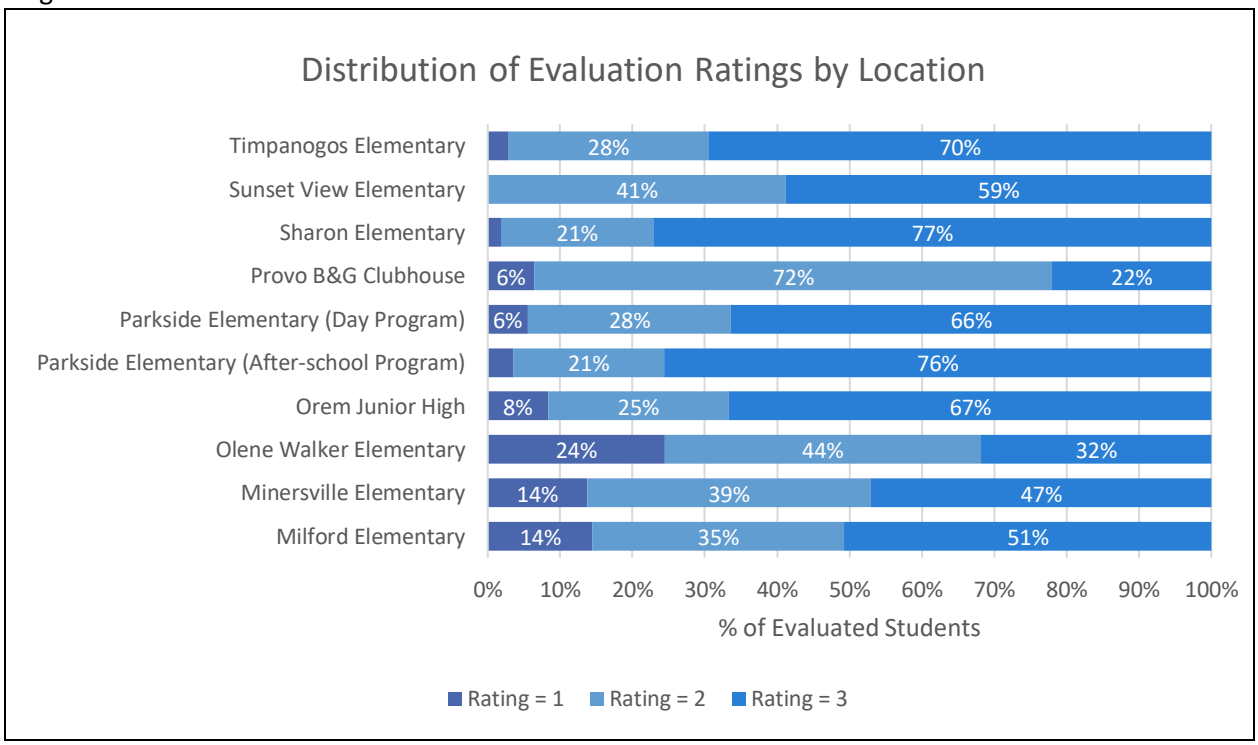


Figure: 2



UTAH TECH UNIVERSITY PREP

The Utah Tech University (UT) Precollege Program (PREP) is a no-cost seven-week summer school that challenges high-achieving 6th, 7th, and 8th-grade students who are interested in science, technology, engineering, and mathematics (STEM). Underrepresented females and first-generation students are encouraged to apply. UT PREP motivates and prepares high-achieving students for success in school and future STEM careers. UT PREP provides three summers of rigorous academic instruction. Students build their problem-solving skills and make new friends by participating in interesting courses, exciting field trips, and career presentations.

UT PREP reported on four of the different STEM classes offered to their participants. On average, **59% of students experienced increased academic abilities across all classes**, as demonstrated by subject-specific pre-post-tests. Students also showed an **average of a 29% increase in scores** from pre to post-test across all eight subjects. In addition, **84% of students experienced an increase in academic performance in at least one course.**

A retrospective survey was administered to students to gauge changes in attitudes toward STEM subjects (Appendix A). Students reported **gains in positive attitudes were statistically significant ($p < 0.05$) across all surveyed topics** (Science, Math, Technology and Engineering, Learning, STEM Careers, and Continuing Education). Positive gains in attitudes ranged from 5.4% to 13.3%, with an average post-program rating of 77 across all survey items (on a 100-point scale).

Exit surveys highlighted that the programs were both engaging and interesting. On a scale from 1 to 10, students, on average, rated UT PREP an 8.8 in terms of how engaging and interesting the program was. Likewise, parents reported high interest and engagement in their children, with an average of 8.9 on a 10-point scale. Students rated 8.2 out of 10 on the question, “My PA [AmeriCorps Volunteer] was effective in helping to answer questions, concerns, and provide help in the classroom.”

UTAH TECH UNIVERSITY STEM CENTER

Utah Tech University STEM Center offers summer camps and after-school programs in science, math, biology, geology, mechanical engineering, coding, and others. One of their primary goals is to build and sustain an educational pipeline to prepare students and fuel the economy. To do this, they offer over a dozen k-16 STEM summer camps and after-school programs focused on hands-on STEM learning experiences. AUSI volunteers play a critical role in supporting the operation of these programs.

AmeriCorps volunteers have been involved in Cybersecurity 1, Junior STEM Academy, Junior STEM Girls, LEGO Robotics, Scratch 2, STEM Girls, and Wear Tech 2. Each of these programs has targeted outcomes that are tracked and measured. Students are evaluated at the end of each program to determine the extent to which they met an acceptable level of proficiency for each outcome. Unfortunately, a change in program leadership introduced constraints that limited access to data specific to the 2022 evaluation year. **Considering no major changes to program offerings, 2021 data are provided below as an example of historical program performance.** Program proficiencies for individual programs in 2021 can be found in Table 2. In 2021, Utah Tech University STEM Center reported an average of 98% proficiency on program outcomes.

Table 2: ***2021*** *Utah Tech University STEM Center Proficiency Results*

Program	Ave. # Proficient	Ave. % Proficient
Cybersecurity 1	9	100%
Junior STEM Academy	28.25	97%
Junior STEM Girls	16	100%
LEGO Robotics	9	90%
Scratch 2	4	100%
STEM Girls	15	100%
Wear Tech 2	8.75	97%
Utah Tech University STEM Center Averages	12.86	98%

JORDAN SCHOOL DISTRICT PREP

The Jordan PREP is an academically intense, mathematics-based, six-week summer enrichment program that identifies achieving middle school students with an interest and aptitude in Science, Technology, Engineering, and/or Mathematics (STEM) to motivate and prepare them for success in STEM fields.

In 2022, Jordan PREP served 140 students. On average, students participating in Jordan PREP increased their academic performance in all 13 subjects. Students achieved an **average increase of 48%** between pre to post-test occasions. Students scoring an 80% or above on the post-test were classified as proficient. The percentage of proficient students ranged from 43% to 86%. Overall, **97% of Jordan PREP students demonstrated an increase in their academic performance while attending the program**.

SALT LAKE COMMUNITY COLLEGE PREP

Salt Lake Community College (SLCC) PREP is in its second year running a PREP program. In 2022 SLCC PREP offered various opportunities to students, including coursework in problem solving, logic, physics, and algebraic structures. Over 70% of students enrolled in the program were from traditionally underrepresented populations (i.e., Black/African American, Hispanic, Latinx, Pacific Islander). SLCC PREP reported pre-post test scores for students in six of the STEM classes offered to their participants. On average**, 67% of students experienced increased academic abilities across all courses**. Students also demonstrated an average of a 37% increase in scores from pre to post-test across all six subjects. In addition, **89% of students experienced an increase in academic performance in at least one course.**

SOUTHERN UTAH UNIVERSITY PREP

SUU PREP is a free summer academic program that provides three summers of rigorous academic instruction, hands-on educational projects, challenging homework assignments, and daily career awareness for 7th, 8th, and 9th-grade. The program focuses on students interested in Science, Technology, Engineering, and/or Mathematics. SUU PREP strives to provide opportunities for high-achieving students to pursue STEM studies and careers. In addition, underrepresented and first-generation students are encouraged to apply. The mission of SUU PREP is to enhance and encourage diverse middle-school-age students' academic backgrounds and interest in science, technology, engineering, and mathematics (STEM) to motivate and prepare them to overcome the challenges in achieving a STEM degree.

SUU PREP served 51 students in 2022. Students demonstrated academic growth through subject-specific pre-post-tests. The amount of growth varied from course to course and student to student. **On average, students increased their post-test scores by 39% over their pre-test scores.** The percentage of students

experiencing an increase in academic performance varied from course to course, ranging from 35% to 100%. On average, **84% of students experienced increased academic performance across all courses.**

A retrospective survey was administered to students to gauge changes in attitudes toward STEM subjects (Appendix A). Students reported **gains in positive attitudes were statistically significant ($p < 0.05$) across all surveyed topics** (Science, Math, Technology and Engineering, Learning, STEM Careers, and Continuing Education). Positive gains in attitudes ranged from 0% to 14.1%, with an average increase of 6.8%. The average post-program rating was 71 across all survey items (on a 100-point scale).

SOUTHERN UTAH UNIVERSITY STEM CENTER FOR TEACHING & LEARNING

The SUU STEM Center for Teaching and Learning is committed to bringing STEM to southern Utah through outreach events, professional development, and high-quality STEM programming. In addition, the SUU STEM Center provides support to surrounding areas through a STEM Resource Library, tutoring/homework help, and outreach events. Although all activities impact students, the tutoring/homework program directly impacts students' understanding of math and science subjects.

Tutoring services are provided to students free of charge online for grades K-12 and in person at select high school locations. Tutoring sessions provide students with individualized help with math and science subjects. The subjects and materials vary from student to student and session to session. Tutors are asked to complete a brief three-question survey following each tutoring session. Survey questions include:

1. How much progress did the student make in their academic performance as a result of the tutoring session?
    a. *None, A little, A moderate amount, A lot*
2. How well do you think the student understood the material AFTER the tutoring session?
    a. *Not well at all, Slightly well, Decently well, Extremely well*
3. Do you have any other notes on the student and/or tutoring session?
    a. *Free response*

Over a year, the SUU STEM Center tutors helped students from five Southern Utah counties with their homework. In select circumstances, tutoring surveys were completed to help track the impact of these services. In total, 169 tutoring surveys were completed in 2022. Survey results indicated that in **71% of tutoring sessions, students made a lot or a moderate amount of progress**. When evaluating how well the tutoring session went, tutors reported that **72% of tutoring sessions went extremely or decently well**.

TEENS ACT

Teens Act is an organization that aims to empower underserved students to graduate from high school and go on to higher education. Their effort to achieve this mission is accomplished through their College & Career Readiness Program. This program consists of student success classes, after-school tutoring, and parent support programs. Teens Act utilizes AmriCorp volunteers to run various aspects of these programs. They primarily focus on students who are struggling academically (a GPA of 2.5 or less), are first-generation college-bound, and are from low-income environments (qualify for free and/or reduced lunch). One way Teens Act has tracked and reported its impact on student academic performance is to

track how many classes students are failing. Table 3 presents the reported outcomes for the 2021-2022 school year. As shown below, **Teens Act achieved a 42% reduction in failing grades.**

Table 3: Teens Act Outcomes

Measure	Count
How many students were failing one or more STEM classes before participating in the program?	12
How many students reduced the number of failed STEM classes after participating in the program?	5

UTAH VALLEY UNIVERSITY PREP

UVU PREP is a free STEM Summer program for middle and junior high students, which provides three summers of rigorous academic instruction, hands-on educational projects, challenging homework assignments, career awareness speakers, and field trips. The program allows incoming 7th, 8th, and 9th (graduating 6th, 7th, and 8th) grade students who have an interest and aptitude in Science, Technology, Engineering, and/or Mathematics fields to receive accelerated curriculum in preparation for high school and higher education. UVU PREP strives to provide opportunities for underrepresented and first-generation students to pursue STEM studies and careers.

In 2022, UVU PREP served 219 students. As evaluated by course-specific pre-test and post-tests, students participating in UVU PREP demonstrated increased academic performance. Academic gains for individual courses ranged from 17% to 71%. On average, **students increased their performance by 37%.** In addition, an analysis of pre-post scores found that **99% of UVU PREP students demonstrated academic gains during the program.**

UVU PREP also administers a retrospective STEM Attitude survey to measure changes in confidence and attitudes toward STEM areas. Some of the questions with the largest gains in 2022 were:

- "I am good at science." (13% gain)
- "I expect to do well in next year's science class." (13% gain)
- "When something is hard, it makes me want to work more on it, not less." (13% gain)
- "Learning science can help me get a good job." (12% gain)
- "I keep trying to improve myself, even when it takes a long time to get there." (11% gain)

AMERICORPS UTAH STEM INITIATIVE COLLECTIVE FINDINGS

The collective impact of the AUSI is evident through the apparent success of its partner programs. The analysis of available data from partner programs highlighted only a portion of how these programs impact students. This year AUSI's goal was to increase students' academic performance in STEM-related subjects. They aimed to have 78% of students realize this increase in academic performance. The attainment of this goal can be evaluated by both the direct and indirect measures of academic performance conducted by partner programs. Table 4 provides a summary of these measures. It is reasonable to conclude from these measures that AUSI has exceeded its goal with an average of **81% of students increasing academic performance based on individual program measures.**

Table 4: AUSI Summary of Annual Findings

Program	Achievement Results
Boys & Girls Club Programs	93% of students with increases on associated measures
Utah Tech University PREP	84% of students increased their academic abilities in at least one class
Jordan School District PREP	97% of students with an increase in academic performance
Salt Lake Community College PREP	89% of students increased their academic abilities in at least one class
Southern Utah University PREP	84% of students increased their academic abilities in at least one class
Southern Utah University STEM Center	72% of tutoring sessions went extremely or decently well 71% of tutoring sessions helped students make a lot or a moderate amount of academic progress
Teens Act	42% reduction in students with failing grades
Utah Valley University PREP	99% of students with an increase in academic performance

Qualitative data was also collected to determine the degree to which AmeriCorps volunteers impacted programs and the students they serve. Again, **responses were overwhelmingly positive when asked how having AmeriCorps volunteer(s) impact their ability to run their programs**. Two main themes emerged from these data:

Impossible to run the program without volunteers

- "Without [AmeriCorps volunteers], I'm not sure our program would be able to run [our program] at all."
- "It would not be possible to run this community program without the help of the AmeriCorps volunteers."
- "We would not be able to run our program without AmeriCorps. Our program is totally free to the participants, so we depend on university, school district, and industry donations to function. The AmeriCorps program allows these dollars to go further which means we can accept more students into the program."
- "The AmeriCorps volunteers have been fundamental to the success of our program. As you know, 'It takes a village to raise a child', and these AmeriCorps volunteers are our village."
- "Having AmeriCorps volunteers was absolutely essential to running our program."

Increased reach of services

- "Without our members, we would reach half as many students, and the burnout rate of the remaining staff would probably reduce that even further. "
- "The AmeriCorps designation helps us to recruit really talented volunteers."

- “We've increased our program participation by 50% since working with AmeriCorps volunteers. This would not have been possible without the incredible volunteers we've been able to work with."
- "PREP is a free program for the participants, therefore keeping a low budget is something we need to consider, but without compromising the quality of the program. Our partnership with AmeriCorps not only provides us with the possibility of employing great staff, but also provides our staff a great experience that is well compensated."

Program leaders were also asked to describe the direct impact AmeriCorps volunteers had on the success and development of students. The primary theme that emerged from their responses was the **impact and importance of forming personal relationships with the students**. Several comments mention the positive impact these relationships have on academic and non-academic student success.

- "Our young learners look up to our AmeriCorps members as they teach after school programs each week. The members are welcoming and make the classes challenging and fun. Kids in our programs love to see members outside of the classroom and love that they know them by name and encourage them to try new things."
- "Our volunteers spent a lot of time with students over the course of the program. They were able to bond and develop friendships and mentoring relationships that have a lasting positive impact on the students."
- "The AmeriCorps members that volunteer with [us] really get to know their assigned group of students on an individual basis. They inspire and encourage students not only to overcome challenges in the program, but also to move forward in life knowing they are capable of doing hard things."
- "Our AmeriCorps volunteers work directly with the students in our program. They make sure they are safe, prepared and on time for classes and labs, and help them understand the material. But even more, they are mentors. They get to know the students, talk to them about interests, goals, and ambitions. They model success in academic pursuits and highlight examples of campus life to our students. We want our program participants to feel confident on a college campus and our AmeriCorps volunteers play a pivotal role in this. We would not be able to make the impact we seek in this arena without our AmeriCorps volunteers."
- "The AmeriCorps volunteers impact our program as they step in with a kind face, happy heart, and varied skill sets. They launch those students, pay attention to them, and help them know the sky is the limit on their dreams."
- "Our AmeriCorps members also function as mentors for our program participants. They talk with our participants about their educational journey and take an interest in their lives. Their impact is immeasurable. The students in our programs love their AmeriCorps member and frequently ask if they will be there next summer. Our students love the program because the AmeriCorps members create an environment where students feel safe, welcome, and excited to learn. I don't know what we would do without them."
- "For years after the program ends, the students will ask about different AmeriCorps members. They leave a legacy on the hearts and minds of the middle school students that we cater to. They also help the staff at UVU and we also find them invaluable. They come with their

strengths and help to stabilize our program. Many of the things they bring to us, become the backbone of our summer STEM program. We are so thankful for the AmeriCorps members who help us every summer. The growth and development of the students is directly related to our AmeriCorps members."

- "Our staff spend at least 6-7 hours per day with our students for six week. The impact our staff has on those kids is enormous. Honestly, the things the kids talk about the most is the challenging curriculum and the friendly and fun teachers and program assistants! The program would not be what it is without our [AmeriCorps volunteers]!"

APPENDIX A - STUDENT ATTITUDES TOWARD STEM SURVEY

Rating Scale Example



Survey Questions:
S1 I am good at science
S2 Learning science can help me get a good job
S3 I will study science in college
S4 I enjoy learning science
S5 I like doing science-related activities
S6 I see myself as a science person
S7 Others see me as a science person
S8 I expect to do well in next year's science class
M1 I am good at math
M2 Learning math can help me get a good job
M3 I will study math in college
M4 I enjoy learning math
M5 I like working with numbers
M6 I see myself as a math person
M7 Others see me as a math person
M8 I expect to do well in next year's math class
TE1 I see myself as an engineering person
TE2 Others see me as an engineering person
TE3 I see myself as a technology person
TE4 Others see me as a technology person
GM1 I like activities that challenge my thinking abilities
GM2 I like work that I learn from even if I make a lot of mistakes
GM3 When something is hard, it makes me want to work more on it, not less
GM4 I keep trying to improve myself, even when it takes a long time to get there
GM5 I enjoy thinking about new solutions to problems
C1 I am interested in careers that use science-related skills or knowledge
C2 I am interested in careers that use math-related skills or knowledge

C3 I am interested in careers that use technology-related skills or knowledge
C4 What job would you like to have when you grow up?

_____

C5 Why would you like to have this job?

_____

E1 I am interested in studying science after high school
E2 I am interested in studying math after high school
E3 I am interested in studying technology-related topics after high school
E4 What would you like to study after high school?

_____

E5 How far in school do you want to go?

- GED Only
- High school graduation
- Graduate with a 2-year college degree (Associate's)
- Graduate with a 4-year college degree (Bachelor's)
- Graduate from graduate school with a Master's degree or equivalent (2 more years of school after a Bachelor's degree)
- Graduate from graduate school (4+ years after a Bachelor's) with a Ph.D. (professor, researcher), M.D. (medical doctor), or other advanced degree (veterinarian, dentist, lawyer)
- I don't know yet

PF1 How satisfied are you with the PREP program?

- Extremely satisfied
- Moderately satisfied
- Slightly satisfied
- Neither satisfied nor dissatisfied
- Slightly dissatisfied
- Moderately dissatisfied
- Extremely dissatisfied

PF2 How likely are you to recommend PREP to a friend?

- Extremely likely
- Moderately likely
- Slightly likely
- Neither likely nor unlikely
- Slightly unlikely
- Moderately unlikely
- Extremely unlikely

PF3 What were the best parts of PREP?

_____

PF4 What were the most challenging parts of PREP?

_____

PF5 How could PREP be improved?

_____