K-12 FINAL REPORT

University of Alabama at Birmingham

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Promoting Engineering and STEM to Elementary and Middle School Students at UAB

Dr. Virginia P. Sisiopiku | University of Alabama at Birmingham

STRIDE | Southeastern Transportation Research, Innovation, Development and Education Center

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16. Abstract

The initiatives described in this report build on earlier efforts at the University of Alabama at Birmingham (UAB) to expand K-12 engineering workforce development and outreach programs that introduce engineering as a career to elementary and middle school students. The goal is to expose local students to engineering and science disciplines through interactive activities, presentations, and workshops; engage them in problem solving and critical thinking; and expand the image of the engineering and STEM professions as a positive force in improving the quality of life. The report describes two planned K-12 outreach activities at UAB sponsored through STRIDE that were organized and delivered in 2018-19: *Kids in Engineering Day* and *UAB Girls in Science and Engineering Day*.

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LIST OF AUTHORS

Lead PI:

Virginia P. Sisiopiku, Ph.D.
University of Alabama at Birmingham
vsisiopi@uab.edu
ORCID 0000-0003-4262-8990

TABLE OF CONTENTS

DISCLAIMER....ii
ACKNOWLEDGEMENT OF SPONSORSHIP AND STAKEHOLDERS....ii
LIST OF AUTHORS....iii
ABSTRACT....vi
EXECUTIVE SUMMARY....vii
1.0 INTRODUCTION.... 8
2.0 EDUCATIONAL PROGRAM 1: UAB Kids in Engineering (KIED).... 9
2.1 Narrative.... 9
2.2 Collaborations.... 10
2.3 Impacts.... 11
2.4 Recommendations.... 11
3.0 EDUCATIONAL PROGRAM 2: UAB Girls in Science and Engineering Day (GSED).... 12
3.1 Narrative.... 12
3.1.1 2018 Girls in Science and Engineering Day.... 13
3.1.2 2019 Girls in Science and Engineering Day.... 15
3.2 Collaborations.... 15
3.3 Impacts.... 16
3.4 Recommendations.... 18
4.0 CONCLUSION.... 18
5.0 ATTACHMENTS - KIED.... 19
5.1 Products.... 19
5.1.1 Sample Flier.... 19
5.1.2 Sample Event Announcement.... 20
5.1.3 Event Deployment Plan.... 21
5.1.3 Sample Lesson Plans.... 22
5.2 GSED Media.... 25
5.2.1 Sample event announcement on UAB website.... 25
5.3 KIED Photos.... 26
6.0 ATTACHMENTS - GSED.... 27
6.1 Products.... 27

6.1.1 Sample Fliers 27
6.1.2 Sample Website 29
6.1.3 Sample Registration Form 31
6.1.4 Volunteer Interest Form 35
6.1.5 Sample Letter to Request Donations 37
6.1.6 Workshop Leader Questionnaire 38
6.1.7 Pre-Event Survey Sample 41
6.1.8 Post-Event Survey Sample 44
6.1.9 Certificate of Participation 48
6.1.10 Event Summary Sample 49
6.1.11 2019 Pre-Event Survey Responses 50
6.1.12 2019 Post-Event Survey Responses 55
6.2 GSED Media 61
6.2.1 UAB News, May 11, 2018 61
6.2.2 Facebook Page 61
6.2.3 Ann's Cook 61
6.2.4 Fundraising Publicity, 2019 61
6.2.5 UAB Campus Calendar, 2019 61
6.3 GSED Photos 62
6.3.1 Highlights from 2018 UAB GSED 62
6.3.2 Highlights from 2019 UAB GSED 71
7.0 REFERENCE LIST 76

ABSTRACT

It is well recognized that there is a need to expose K-12 students to engineering and science concepts early and often in order to spark their interest in considering STEM as a future career path. This is of particular importance for girls and minorities that are still significantly underrepresented in engineering- and science-related careers.

The initiatives described in this report build on earlier efforts at the University of Alabama at Birmingham (UAB) to expand K-12 engineering workforce development and outreach programs that introduce engineering as a career to elementary and middle school students. The goal is to expose local students to engineering and science disciplines through interactive activities, presentations, and workshops; engage them in problem solving and critical thinking; and expand the image of the engineering and STEM professions as a positive force in improving the quality of life.

The report describes two planned K-12 outreach activities at UAB sponsored through STRIDE that were organized and delivered in 2018-19. The first activity is the *Kids in Engineering Day* that was hosted by the UAB section of the Society of Women Engineers (UAB SWE) and allowed students in grades 4-6 to take part in a variety of activities and competitions designed to provide insight into different types of science, technology, engineering and math (STEM) concepts. The second activity is the *UAB Girls in Science and Engineering Day* that engaged local middle school girls (6th-8th grade) in fun science and engineering activities led by professors, scientists, and students from UAB and our surrounding community. All girls participated in three different exciting workshops and had the opportunity to interact with female engineers and scientists throughout the day. Post-event surveys confirmed that that girls enjoyed the events and felt empowered and motivated to consider careers in engineering and sciences in the future. During the 2018-19 period, those programs were offered twice and allowed for a diverse group of nearly 300 students to participate and benefit.

The activities also created opportunities for collaborations between UAB faculty and students, engineering professional societies such as Society of Women Engineers (SWE), Institute of Transportation Engineers (ITE), Alabama Department of Transportation (ALDOT), and the local community. The volunteers benefited from sharing their passion for engineering and STEM, and serving as role models to younger students.

Keywords: K-12 Outreach; Kids in Engineering Day; Girls in Science and Engineering Day (GSED)

EXECUTIVE SUMMARY

Science, engineering, and technology play a vital role in addressing present and future needs of our society. However, studies show a decline in technological literacy of students in the U.S. and report a persistent lack of diversity of the engineering workforce, both of which put at risk the future U.S. competitiveness in the world market. To address these issues there is a need to engage K-12 students in STEM subjects early on in order to increase their awareness of engineering and science as career options and provide them with the necessary foundational knowledge in these fields. Efforts are also needed to address existing stereotypes and promote diversity in STEM workforce by empowering female students and racial minorities and encouraging them to go into engineering, science, and technology-related fields.

In addressing this call for action, the UAB K-12 activities during the 2018-19 period focused on two initiatives: UAB Kids in Engineering (KIED) Day and UAB Girls in Science and Engineering Day (GSED).

In celebration of engineering week, we offered the UAB Kids in Engineering Day on two consecutive Saturdays (Feb. 16, 2019 and Feb. 23, 2019) from 8 a.m. to 3 p.m. both days. The event targeted fourth and sixth graders from schools across north-central Alabama and featured fun and educational activities involving different types of engineering. Students from the surrounding school districts came to UAB and engaged in experiments related to engineering and STEM. Participants were grouped into teams and spent the day doing hands-on experiences with the five different disciplines of engineering offered at UAB - biomedical, civil, electrical, materials, and mechanical engineering with one common goal: the successful creation and race of their own Race Car. The event focused on the relationships between engineering disciplines, breaking them out of their respective silos, and emphasizing the connections between them.

Following our tradition, we also hosted the annual UAB Girls in Science and Engineering Day on May 19, 2018 and May 11, 2019. This event encouraged local middle school-aged girls (sixth to eighth grade) from the Birmingham area to spend a Saturday on the UAB campus (8:30 a.m. – 3:30 p.m.) learning about engineering and science disciplines through hands-on activities. The students rotated through different science and engineering workshops led by UAB professors, scientists, or graduate students. The workshops were scientifically-based, engaging, and designed to inspire and empower Birmingham-area middle school girls to achieve and excel in science and engineering fields. The GSED events reinforced the message that girls have all it takes to address engineering challenges, engaged them in planning, design, and problem-solving activities, promoted student creativity and teamwork, and provided a fun and positive experience for everyone involved.

1.0 INTRODUCTION

The demand for engineers is growing steadily; however, enrollment of students in many engineering fields is flat or declining. Thus, action is needed to ensure that the U.S. does not fall short of a highly competitive engineering workforce in the years to come. This can be achieved by exposing students and parents to engineering in K-12 and addressing any reservations, fears, and misconceptions they may have about the engineering profession. As students become familiar with technology and engineering principles and develop an understanding of the important connections between engineering and everyday life, they would be more likely to consider engineering as a career path and choose to pursue training in engineering and sciences.

A 2016 report by the National Academies of Sciences, Engineering, and Medicine states that the study of STEM fields can enrich individuals as they engage in multiple roles across society. The report also stresses the need for the nation "to develop talent from across society, including among those who may not in the past have been afforded a quality education or those for whom society has not had expectations for success in STEM fields", such as women.

The Commerce Department reported in 2011 that women hold less than 25 percent of jobs in STEM fields. According to the US Bureau of Labor Statistics, about 16 percent of chemical engineers, 12 percent of civil engineers and 28 percent of environmental scientists are women.

To address these issues, we offered the Kids in Engineering Day and the Girls in Science and Engineering Day events on the UAB campus. These two programs allowed local K-12 students to gain exposure to engineering and science disciplines through hands-on activities and to see how engineering and STEM professions address everyday challenges and improve the quality of life. The Girls in Science and Engineering Day further empowered girls to consider STEM as a career choice and had a positive impact on their self-confidence, engagement, excitement, and inspiration. We successfully reached participants from many local schools that, otherwise, might not have offered their students extracurricular STEM opportunities or exposure to these career fields.

By exploring engineering concepts and engaging in hands-on activities, participating students were exposed to the world of engineering and developed positive attitudes about engineering and sciences as possible career paths in the future.

2.0 EDUCATIONAL PROGRAM 1: UAB Kids in Engineering (KIED)

2.1 Narrative

UAB Kids in Engineering Day (KIED) was an educational day for fourth, fifth, and sixth grade students with an interest in STEM (science, technology, engineering, and math) education. KIED was offered on the UAB campus during Engineering Week. Participants engaged in interactive activities designed to cultivate creative thinking skills and immerse young thinkers in the world of science, technology, engineering and math. On Feb. 16, 2019 and Feb. 23, 2019, the UAB Chapter of the Society of Women Engineers (UAB SWE) hosted the 2019 Kids in Engineering Day (KIED) with the theme KIED 500!

The 2019 UAB KIED events focused on the relationships between engineering disciplines, breaking them out of their respective silos and emphasizing the connections between them. Kids formed into teams and had hands-on experience with the five different disciplines of engineering offered at UAB—biomedical, civil, electrical, materials, and mechanical engineering—with one common goal: the successful creation and race of their own Race Car.

Activities in this year's program included the following:

- Biomedical
    - Egg habitat, airbag, seatbelt
    - Talk about forces necessary to break an egg
- Civil/Environmental
    - Build car body
    - Environmental analysis (pollution, gas), ramp
- Electrical
    - Starting/launch circuit, LED lights (incorporate soldering)
    - Head/taillight LED lights
        - Series vs parallel
    - Possibly motor (with 9V battery), battery packs
- Mechanical
    - Possibly motor (with 9V battery), battery packs
    - Axles, wheels, preassembled
- Materials
    - 3D design (Tinkercad or LEGO®), drawing
    - Choosing materials, cutting out foam or cardboard

The event was held from 8 a.m. to 3 p.m. both days and was open to fourth through sixth graders in north-central Alabama. Registration was $30 and participants could choose either day to attend. In addition to interactive, hands-on workshops, participants enjoyed lunch and received a goodie bag, bandana, and special KIED medallion.

While students kept busy learning about engineering and STEM through interactive activities, UAB SWE hosted a panel of students and faculty in a Parent Educator Program

to answer parents' questions about the STEM field. Engagement of parents better ensures that the lessons learned at the event make a lasting impact on their children.

2.2 Collaborations

The event was hosted by UAB Society of Women Engineers (UAB SWE). Several other organizations were involved and provided volunteers and assistance with logistics. Contributing UAB organizations are listed below along with their leaders.

The Society of Women Engineers
Zoe Penko

Institute of Transportation Engineers
Troyee Saha

Tau Beta Pi
Morgan Mitchell

American Society of Mechanical Engineers
Zoe Penko

Pi Tau Sigma
Jordan Whitson

National Society of Black Engineers at UAB
Joydan Jones

American Society of Civil Engineers at the University of Alabama at Birmingham
Alicea Morris

Institute of Electrical and Electronic Engineers
Joey Richardson

Biomedical Engineering Society at UAB
Nicholas Dietschweiler

American Institute of Aeronautics and Astronautics
Jordan Whitson

Engineering Ambassadors at the University of Alabama at Birmingham
Jessica Pieczynski

American Foundry Society
Ryan Gilroy

Thirty-seven volunteers including numerous students were involved in the planning and delivery of the event. The main event organizers were SWE officers Ms. Zoe Penko and Ms. Emma Schmidt. Ms. Sahila Sarjana and Ms. Taniya, TREND Lab Graduate Research Assistants, volunteered on behalf of the UAB ITE Student Chapter along with Dr. Virginia Sisiopiku (Project PI).

2.3 Impacts

KIED has served local students each year since its inception in 2013. The 2019 KIED events exposed 101 students from schools across north-central Alabama to engineering and technology and featured 37 volunteers, primarily students and faculty in various engineering disciplines, and the UABTeach program.

In addition to providing a day of fun and teamwork, the KIED events demystified a complex subject (such as designing and building a race car) and gave young students the encouragement, mindset, and tools they need to pursue a career in a STEM-related field. Parents were invited to be active participants as well, to better ensure that the lessons learned at the event have- a lasting impact on their children.

An evaluation was not completed for the program but should be included in future offerings of the event. A survey tool will be drafted for this purpose and used post-event to document participants' attitudes toward engineering as a career choice, solicit feedback on the event structure and value, and allow for an evaluation of the impact of the KIED event. A sample of evaluation questions follows.

2.4 Recommendations

Participants had to pay a $30 fee at registration. While this assisted with the planning and logistics of the event and reduced attrition rates, the participation fee may be prohibitive for some local students. It is recommended that this issue be revisited in future offerings to eliminate potential barriers and encourage diversity and inclusion.

The UAB KIED has been a very successful event and we plan to repeat it next year as part of Engineering Week (February 2020). At that time, we plan to develop an evaluation form so that we can document participants' feedback and track impacts in a systematic way.

EXAMPLES OF EVALUATION QUESTIONS

Closed-Ended Questions

The following questions use the Likert scale (Strongly agree, Agree, Disagree, Strongly disagree)

- I learned a new scientific concept.
- I am more confident in my ability to learn science/engineering as a result of the activity.
- I learned about careers in science/engineering which I was not previously aware of.
- I learned about careers in transportation which I was not previously aware of.
- I feel more confident in my ability to find information about careers in science/engineering/transportation.
- I am more interested in learning about or working in transportation as a result of the activity.
- I would like to learn more about careers in science/engineering/transportation.
- I would like to participate in more activities like this one.
- I would recommend this activity to a friend.

Open Ended Questions

- What was the most interesting thing you learned?
- What would you like to learn more about?
- What did you learn about science/engineering/transportation that was most interesting to you?

Sample of Evaluation Questions

3.0 EDUCATIONAL PROGRAM 2: UAB Girls in Science and Engineering Day (GSED)

3.1 Narrative

The main goal of the UAB Girls in Science and Engineering Day (GSED) was to allow middle school girls from the Birmingham region, particularly minorities and girls from disadvantaged backgrounds, to explore STEM fields. The program aimed to inspire middle school girls to consider careers and fields of study in science and engineering, and help eliminate gender disparity in science, technology, engineering, and math career paths. The project expands K-12 engineering workforce development and outreach efforts at the University of Alabama at Birmingham (UAB) that introduce engineering as a career to female students and promote STEM education to female students.

The event offers a unique opportunity for girls to gain exposure to content and career areas that they may not have the opportunity to explore within other learning environments. The structure of the event puts female role models from UAB and the Birmingham community in close working proximity to participants through group hands-on activities. This encouraging atmosphere offers inspiration to girls in their consideration of STEM career possibilities. The small group structure improves girls' confidence through the creation of a positive collaborative working environment. This is of critical importance when considering the hesitations and obstacles that many girls, especially those from underrepresented backgrounds, often face when considering such careers.

Pre-event activities included developing promotional materials, fundraising, recruiting and registering participants, preparing poster boards and survey forms, ordering t-shirts or bandanas, making arrangements for food for participants and volunteers, purchasing materials for workshops, training volunteers, preparing folders with information for volunteers and workshop leaders, and stuffing give-away bags for the participants.

During the event, attention was given to the review of roles and expectations of volunteers, efficient check-in of participants, orderly dismissal of groups of participants to various workshops, proper handling of breakfast and lunch distribution and clean-up, engaging participants on interactive activities during breaks, welcoming and introducing the keynote speaker during lunch and facilitating the Q&A session, distributing and collecting pre- and post-event surveys, and ensuring safety procedures were followed during drop-off and pick-up of participants.

Following the event, processing and summary of pre- and post-event evaluations took place along with processing of reimbursements and thank you notes for volunteers and sponsors.

3.1.1 2018 Girls in Science and Engineering Day

The 2018 GSED event took place at UAB on May 19, 2018 from 8:30 a.m-3:30 p.m and was a great success! One hundred eleven (111) sixth through eighth grade girls from 15 different schools in the Birmingham, AL region attended the event and were introduced to the world of engineering and sciences through hands-on workshops and interactions with successful women in STEM. Over 45 UAB undergraduates, graduate students, and faculty volunteered for the event. The event gave engineering and science volunteers an opportunity to showcase their passion for STEM fields and encourage young girls to consider careers in science and engineering.

Using the technology of classrooms provided by Volker Hall, Business and Engineering Complex, Locomotor Control and Rehabilitation Robotics Laboratory, School of Optometry, MPAD, and Campbell Hall, GSED hosted the Alabama middle school girls for a day of hands-on activities and learning. Each girl participated in three STEM workshops

led by UAB faculty and students. Engineering-related workshops focused on environmental engineering, electrical engineering, and material science and engineering activities. Science workshops engaged students in building magnets while learning about MRI technology; using field guides to identify reptiles and amphibians; and building a sand mold and pouring metal to make their own trinket. Other workshops offered during the event included rehabilitation robotics, and virtual simulation in medicine and forensics.

The program also provided female role models in STEM fields. Each group of girls was paired with two student volunteers who spent the day with them and assisted with the workshops. Girls also participated in a fun scavenger hunt, which challenged their creativity as they moved between workshops. Dr. Suzanne Lapi, Director of the UAB Cyclotron Facility, gave the keynote address over a pizza lunch. She discussed her journey in STEM as a female scientist and answered questions from the participants.

The girls stayed engaged throughout the day and provided very positive feedback about the event and their experiences as participants. Analysis of surveys of participants confirm that the program was successful in raising the visibility of UAB STEM programs and making a difference in middle school girls' perceptions about STEM careers. At the conclusion of the event, over 88 percent of 2018 Girls in Science and Engineering day participants said that they want to pursue a career in STEM and 100 percent reported that they learned a new scientific concept at the 2018 GSED event.

2018 Girls in Science and Engineering Day; Volunteers and participants at the day of the event

3.1.2 2019 Girls in Science and Engineering Day

The 2019 UAB Girls in Science and Engineering Day (GSED) event took place at the UAB campus on May 11, 2019. Despite the rainy weather, 83 sixth through eighth grade girls attended the event, representing 32 different schools from north-central Alabama. The event also engaged 62 volunteers including 35 workshop volunteers who offered 9 STEM workshops throughout the day.

Similar to past GSED events, the 2019 UAB GSED program aimed at introducing young female middle school students to the world of engineering and sciences through hands-on activities and interactions with successful women in STEM fields. Girls also participated in a fun scavenger hunt, which challenged their creativity as they moved between workshops. Dr. Susan L. Bellis, a Professor in the Department of Cell, Developmental and Integrative Biology at the University of Alabama at Birmingham (UAB) gave the keynote address during lunch. She introduced her research on cellular mechanisms that promote cancer, discussed her personal journey in STEM, and answered questions from the student participants.

3.2 Collaborations

The 2018 event was co-sponsored by STRIDE, the UAB School of Engineering, and the UAB Office of the Provost. The leadership team included Ramsha Farrukh, Sameera Grandhi, Catie Scull, Shelly Nason, Virginia Camacho, and Sarah Dulson and the project PI, Dr. Virginia Sisiopiku who served as the event director.

2018 GSEC Organizing Committee

The organizing committee for the 2019 GSED included Emma Schmidt, Zoe Penko, Sameera Grandhi, Kayla Marshall, Mariam Massoud, Natasha Wright, Sahila Sarjana and Dr. Virginia Sisiopiku who served as the event director.

GSED is an collaborative effort between many different schools and departments at UAB that are all interested in sparking young girls' interest in science and engineering. UAB undergrads, graduate students, and faculty, as well as scientists from all over our community volunteer their time to make GSED successful. We are able to make GSED a free event for all participants year after year through the help of UAB schools including the Schools of Engineering, Health Professions, Medicine, Public Health, Education, and the College of Arts and Sciences, along with support from generous sponsors such as Shipt, Coca Cola, American Medical Women Association (AMWA), and individual donors.

Slide presentations providing highlights from both events are included in the attachments section (see 6.3 GSED Photos). Additional pictures from the 2019 GSED event are available in a Google Drive folder.

3.3 Impacts

The 2018 and 2019 GSED programs were received very well from both students and parents. When participants were asked what they learned at the event one student replied, "*I learned that it takes hard work and teamwork to finish a project,*" and another said, "*I learned you can do anything!*" Parents were equally excited. A quote from a parent's message following the event read: "*Thank you. Everything worked out wonderfully. My daughter and her friend K. had an awesome time today. Thank you again for offering such an invaluable program. gs*" Volunteers also benefited from the interactions with the girls and the opportunity to serve as ambassadors for their discipline. One wrote: "*It was my privilege to be a volunteer of the event. I enjoyed the day with school going kids. The girls liked the activities a lot and it meant a lot to them. T.*"

Apart from anecdotal comments, pre-event and post-event surveys were used to evaluate the effectiveness of the GSED. Sample pre-event and post-event questionnaires are available in the Attachments section (under 6.1.6 and 6.1.7 respectively). The results from the 2019 evaluation surveys were summarized and are available in the section (see 6.1.11 and 6.1.12). Some highlights from the analysis of responses are provided below.

Measuring Enjoyment from the Event Participation

- 99 percent of the girls said they enjoyed the day's events
- 100 percent of the girls agreed that their group leader was engaging and helpful
- 93 percent would recommend GSED to a friend next year

Measuring Scientific Skills and Confidence

- Every workshop met the requirement for being interactive
- 97 percent of the girls reported that they learned new scientific concepts during the event
- We saw a 21 percentage point increase in the way the girls viewed their own ability to understand scientific concepts (Strongly Agree: 46 percent before and 67 percent after the event).
- We also saw a 13 percentage point increase in girls who felt confident in asking questions and working with peers in a STEM setting (Strongly Agree: 46 percent before and 59 percent after the event).

These findings suggest that exposure to scientific concepts, exploration, and meeting female role models has the ability to increase confidence in STEM settings. Given the lack of self-esteem that often accompanies girls in middle school, these findings are incredibly important.

Support from Environment

- The pre-event survey noted that only 30 percent of girls believed that their teacher(s) and/or parent(s) have NOT suggested they consider a career in science despite the fact that 100 percent noted their parent(s)/teacher(s) support their academic interests.
- In the pre-event survey, 13.5 percent of girls reported that they do not know even one adult that can help them find more information about careers in science and engineering.
- The post-event survey results show that 88 percent of the girls felt like they gained a scientific or career role model after the event.

Career Outlook

- In the pre-event survey, 19 percent of the girls did not have a good idea of the types of future jobs available to them in the science and engineering fields.
- After the event, 95 percent said that they feel like they will be able to more easily find information about careers in science and engineering. 85 percent said they were exposed to new careers during the event.
- 93 percent of the girls reported that they planned on attending college.
- Before the event, only 35 percent of girls were strongly considering a career in science and engineering. After the event, 59 percent said they were strongly considering a career in science and engineering (a 24 percent jump).

This is another affirmation of the important impact of GSED and` similar programs on girls' thinking regarding career choices and their potential future involvement in a STEM career path.

General Attitudes about Girls/Women in STEM

- Before the event, 92 percent strongly agreed that girls are as capable as boys in areas of science and engineering. By the end of the event, the percentage rose to 95 percent.
- Before the event, 81 percent strongly agreed that girls are well suited for jobs in science and engineering. After the event, 87 percent held that belief.

This is significant because it shows that events like this that focus on exposure and role models can shift preconceptions that these girls have about women in STEM in general.

3.4 Recommendations

Due to the great value and success of this program we recommend that the program is offered again in the future. To make this happen, we applied for funding through STRIDE to fund another GSED program, two KIED offerings, and a new activity--a yearlong STEM camp focusing on autonomous vehicles.

One recommendation for the UAB GSED is to move the event to the fall semester, which is typically a less loaded time for promotion of engineering career programs than spring semester when UAB Engineering Week and other related activities (including the KIED program) are offered.

4.0 CONCLUSION

Scientific discovery and technological breakthroughs are the primary engines not only for expanding the frontiers of human knowledge, but also for responding in innovative, practical ways to the challenges and opportunities of the 21st century. As a result, high-quality science, technology, engineering, and mathematics (STEM) education is critical for the prosperity and security of our Nation. National studies and international comparisons have repeatedly shown that STEM education in the United States needs to be improved.

To strengthen and expand UAB's efforts to promote engineering and STEM careers through K-12 educational programs we offered two programs, namely the Kids in Engineering Day (Feb. 16, 2019 and Feb. 23, 2019) and Girls in Science and Engineering Day (May 19, 2018 and May 11, 2019).

Overall this project introduced nearly 300 Alabama upper elementary and middle school students to science and engineering fields through interactive activities in 2018-19. The main

outcome was exposing kids to basic STEM concepts, and providing them opportunities to explore engineering and science careers while interacting with faculty and professionals in the STEM fields. The ultimate goal was to spark an interest in participants (especially those from minority public school populations and female students) considering STEM disciplines as a future career option. Both the KIED and GSED initiatives were successfully organized and executed and well received by participants.

5.0 ATTACHMENTS - KIED

5.1 Products

5.1.1 Sample Flier

5.1.2 Sample Event Announcement

5.1.3 Event Deployment Plan

Kids in Engineering Day 2019 Deployment Plan
Morning set-up
Set up registration (check in kids/parents, bags/nametags, verify payment, forms, and pick up)
Sign in volunteers (pass out nametags and verify positions)
Set up each room (ensure each room has the appropriate kit/supplies)
Set up appropriate signage for each room
Floaters in parking lot to guide parents
Set up for morning rally (pull up PowerPoint, activity for early kids)
During the event
Volunteers post in appropriate rooms (according to shift sign up)
Group leaders guide students to next room during rotations
Floaters taking pictures, video clips, ensuring each room has enough supplies
Parent Educator Program set-up and execution
1Set up and serve lunch
PA System (announce race/heat)
Crowd control (keep kids/parents out of the way)
Set up race track (set up cars in heats, create bracket)
Egg recovery (edit bracket and remove cars/eggs)
Floaters taking pictures, video clips, verifying races are going smoothly
Set up and execute award ceremony
Event end
Check out kids and verify designated pick up person
Break down rooms, clean up, gather kits into a single room
Break down race track, outside clean up
Break down tables, inside clean up
Break apart kits in room, take inventory of parts, set up kit for next weekend

5.1.3 Sample Lesson Plans

Civil Engineering Room
BEC 315

Objectives:

- Learn about environmental implications of cars
- Expend excess energy

What is Civil Engineering?

- Civil Engineers deal with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewerage systems, pipelines, structural components of buildings, and railways.

What is Environmental Engineering?

- Environmental Engineers typically deal more with protection of human health and infrastructure from environmental dangers; protection of the environment, both local and global, from natural and human threats, including control of waste; improve environmental quality.

What is Traffic Engineering?

- Traffic Engineering is a branch of Civil Engineering that uses engineering techniques to achieve the safe and efficient movement of people and goods on roadways.

Are Electric Cars Really Green?
Discuss video with follow-up questions

Game 1

- The kids will all have pieces of paper taped to their back with either an engineer or its match
- The kids must ask each other about what they are and try to figure out what their match would be
- Once the kids believe they have found their match they must both go up to the room leader and check that it is correct

Structural Engineers match with Bridge
Environmental Engineers match with Tree and River
Construction Engineers match with Hard Hat
Transportation Engineers match with Train
Solar Engineers match with Solar Panel
Architect match with Skyscraper
Print pictures/labels/write on other side write match

Environmental Awareness for Kids Quiz

4 Corners Quiz Game

- Make the kids all stand in the middle and listed to the entire question before they can go to a corner
- Each option will be a different corner, again the kids cannot move until you have named all the corners
- Give a countdown (5 or so) and the kids have 20 seconds to pick their corner and go stand in it
- Any kid not in a corner when time is up is out
- Any kid not in the correct corner when time is up is also out
- Give the kids tallies or make them sit down once they are out

What can you NOT recycle?

- Glass
- Tin cans
- Paper
- **Pens and pencils**

What is the name of the type of fuel you put in your car?

- Water
- **Petrol**
- Firewood
- Coal

Which of these is considered "green energy"?

- A petrol pump
- A coal fire
- **A wind turbine**
- An electric cable

What is the best way to help save water?

- Leave the water running when you brush your teeth
- Flush the toilet as many times as you can
- Give your dog 2 baths a day
- **Take quick one minute shower**

Which of these modes of transport is best for the environment?

- **Bike**
- Car
- Bus
- Tractor

Mechanical Engineering Room
BEC 354

Objectives:

- Learn how cars are propelled
- Learn about different types of vehicle drives
- Choose type of drive for cars
- Assemble wheels and axles

What is a Mechanical Engineer?

- Mechanical Engineering is the discipline that applies engineering, physics, engineering mathematics, and materials science principles to design, analyze, manufacture, and maintain mechanical systems. It is one of the oldest and broadest of the engineering disciplines.

What kinds of things to Mechanical Engineers make?

- Air conditioners/heaters, refrigerators, cars, trains, robots, rockets

When you build a car, what are some of the most important parts?

- The wheels, otherwise you can't move

What is an axle? What goes on an axle?

What type of vehicle has two axles and two wheels?

- A motorcycle, bicycle

What type of vehicle has two axles and three wheels?

- A tricycle

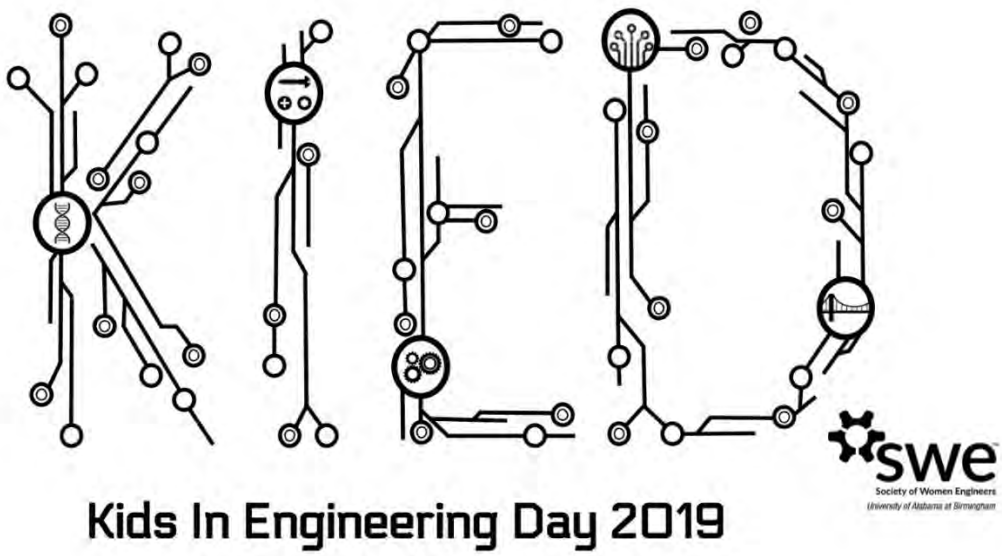
You have one motorized wheel on your car - you can decide if you want front wheel or back wheel drive by discussing with your group about whether you want a motorcycle or a tricycle, Talk with your group about what might happen in each scenario, play with your cars, and see how it will work. You can even get crazy and add 3 wheels on the axle!

Discuss and show examples of front wheel and back wheel drive, as well as how it affects steering. Drag the car across the table and show how the front axle is where most of the direction of the car will come.

5.2 GSED Media

5.2.1 Sample event announcement on UAB website

Kids in Engineering Day 2019



Hosted by UAB's Society of Women Engineers (SWE)

The UAB chapter of the Society of Women Engineers (SWE) will host its annual Kids in Engineering event during two days in February. Students in grades 4-6 can choose either **February 16, 2019 (8 A.M. - 3 P.M.) or February 23, 2019 (8 A.M. - 3 P.M.)**. A maximum of 50 students can be hosted per day, so please register soon to guarantee your spot!

As in years past, participants will take part in a variety of activities and competitions designed to provide insight into different types of science, technology, engineering and math (STEM) concepts.

"We invite parents and educators to come for a 1.5 hour workshop where we will discuss ways they can encourage their students' excitement through other STEM opportunities," says SWE President Zoë Penko. "This workshop will also include a panel of engineering students, engineers, and educators. We hope this will further the impact of Kids in Engineering Day, and allow parents and educators to leave with the ideas and tools they need to encourage STEM education throughout the year."

You Can Get Involved

Join us in making a lasting investment in the lives of school children throughout the state! Contributions of any amount will go a long way to ensuring the future success of Kids in Engineering Day.

5.3 KIED Photos

2019 KIED Event Highlights

6.0 ATTACHMENTS - GSED

6.1 Products

6.1.1 Sample Fliers

GIRLS IN SCIENCE & ENGINEERING DAY!

JOIN US ON MAY 13TH 8:30-3:30PM

Register at
https://www.uab.edu/girlsinscience/registration
Spots are limited so sign up as soon as possible!

A FREE day of fun science and engineering activities!
Open to all middle school girls

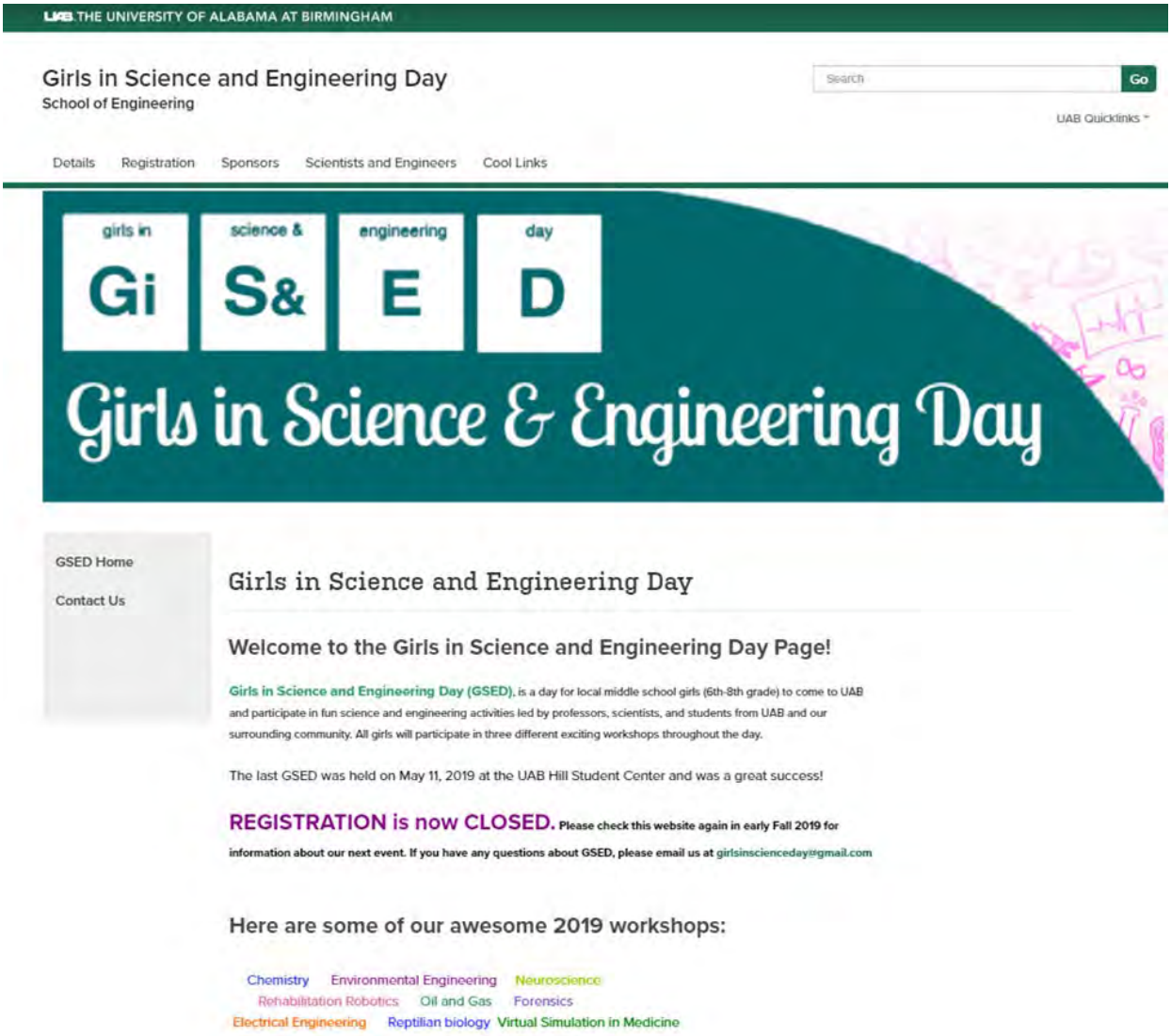
Workshops include:
Medicine - Forensics - Robotics
Chemistry - Electrical Engineering
Material Science - Reptilian Biology
& Many more!

All participants get a free lunch and a t-shirt!

WWW.UAB.EDU/GIRLSINSCIENCE | GIRLSINSCIENCEDAY@GMAIL.COM

UAB SCHOOL OF ENGINEERING STRIDE | Southeastern Transportation Research, Innovation, Development and Education Center UAB OFFICE OF THE PROVOST

6.1.2 Sample Website



Reach Out To Us:

Check out the rest of the Girls in Science and Engineering Day website for information about this event! You can find photos from past years and other cool info on our FACEBOOK page!

Questions? Email event directors at girlsinscienceday@gmail.com.

Interested in volunteering or have any special skills (videography, photography)?
Please email girlsinscienceday@gmail.com.

Interested in other STEM camps? Head over to Cool Links!

History of GSED:

Girls in Science and Engineering Day was created in 2011 as a unique event designed to inspire and empower Birmingham-area middle school girls to achieve and excel in science and engineering fields. The event was founded by UAB students Alison Bamard, DPT (class of 2012) and Farah Khan, MD (class of 2013), two friends who believe that all girls can be successful in science, math, engineering, or any subjects they desire to pursue!

The current leadership team includes Emma Schmidt, Zoe Penko, Sameera Grandhi, Kayla Marshall, Mariam Massoud, Natasha Wright, and Sahila Sarjana.These women along with the many event volunteers are passionate about STEM and grateful for the mentorships that they have had as students and/or engineering and science professionals. Dr. Virginia Sisiopiku serves as the event director.

To discuss or make your philanthropic commitment to GSED, please contact Robert Blakely, Director of Development for the School of Engineering.

enginfo@uab.edu
(p) 205.934.8400
(f) 205.934.8437

UAB SCHOOL OF ENGINEERING
The University of Alabama at Birmingham

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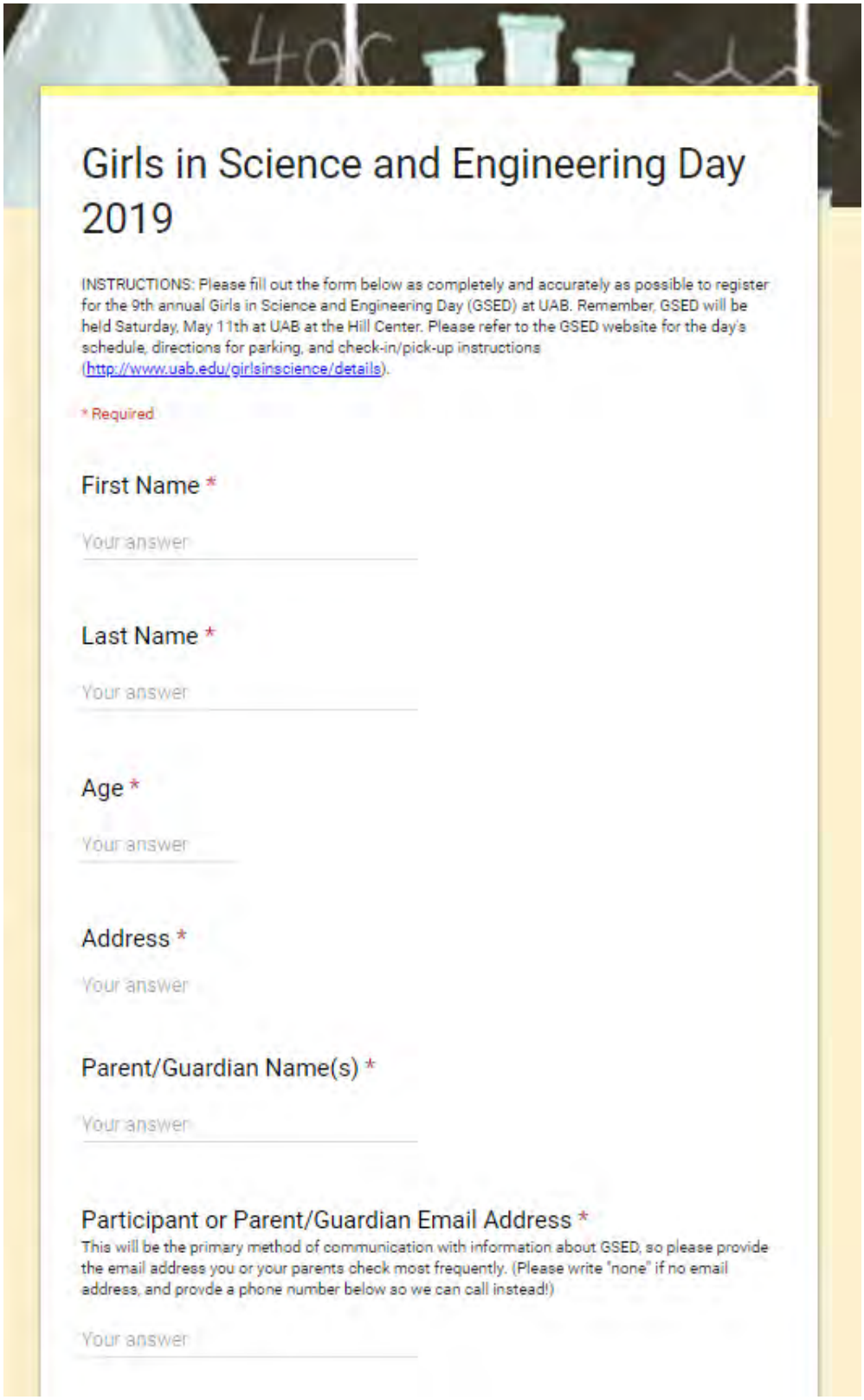
UAB is an Equal Opportunity/Affirmative Action Employer committed to fostering a diverse, equitable and family-friendly environment in which all faculty and staff can excel and achieve work/life balance irrespective of race, national origin, age, genetic or family medical history, gender, faith, gender identity and expression as well as sexual orientation. UAB also encourages applications from individuals

6.1.3 Sample Registration Form



Girls in Science and Engineering Day 2019

INSTRUCTIONS: Please fill out the form below as completely and accurately as possible to register for the 9th annual Girls in Science and Engineering Day (GSED) at UAB. Remember, GSED will be held Saturday, May 11th at UAB at the Hill Center. Please refer to the GSED website for the day's schedule, directions for parking, and check-in/pick-up instructions (http://www.uab.edu/girlsinscience/details).

* Required

First Name *

Your answer

Last Name *

Your answer

Age *

Your answer

Address *

Your answer

Parent/Guardian Name(s) *

Your answer

Participant or Parent/Guardian Email Address *

This will be the primary method of communication with information about GSED, so please provide the email address you or your parents check most frequently. (Please write "none" if no email address, and provde a phone number below so we can call instead!)

Your answer

Phone Number
Will be used only if email address is not provided.

Your answer

Middle School Name *

Your answer

Grade *

- 6th
- 7th
- 8th

Medical Concerns
Please list any allergies, medical conditions, or medication requirements that we should be aware of for the day.

Your answer

Other information
Please list any other information you think we should be made aware of for GSED.

Your answer

Emergency Contact Information

Emergency Contact Name (first and last) *

Your answer

Relationship to Participant *

Your answer

Emergency Contact Phone Number *

Your answer

Consent To Be Photographed, Filmed, and/or Interviewed

During GSED, the participant may be photographed, filmed, and/or interviewed. Do you consent to be photographed, filmed, and/or interviewed and further agree that the photo(s), film(s), and/or recording(s) may be used for informational, educational, and/or scientific purposes at UAB?

Consent to Photograph *

- ○ Yes, I consent
- ○ No, please do not photograph, film, or interview me

Have you attended GSED before?

- ○ Yes
- ○ No

Workshop Preference *

- ○ Electrical Engineering, Reptilian Biology, Oil and Natural Gas
- ○ Environmental Engineering, Neuroscience, Chemistry
- ○ How to build a Rover, Rehabilitation Robotics, TBD
- ○ Virtual Simulation in Medicine, Forensics, TBD

Waiver of Liability

I, the undersigned parent or guardian, do hereby authorize the volunteers of Girls in Science and Engineering Day ("GSED") to secure any and all medical treatment, should such be warranted, in the event I cannot be contacted. I further authorize any attending physician to administer appropriate medical attention, which he/she may deem necessary, in the event of any accident, illness or injury. I will be responsible for any and all costs of medical coverage and treatment provided not covered by insurance. It is understood that, if possible, an attempt will be made to contact the parent/guardian before treatment is started. I agree to indemnity, release, hold harmless and defend the Board of Trustees of the University of Alabama, the University of Alabama at Birmingham, their employees, officers, and agents from any and all claims, suits and damages, including injuries or illness (including death) relating to or arising out of the above referenced student's participation in GSED excepting only claims, suits and damages arising out of the sole negligence of the University. I also understand the participant of GSED is responsible for all personal belongings and equipment and that UAB will not replace or reimburse lost or stolen items.

For students participating in the materials science workshop, the following waiver also applies:

I, the undersigned, acknowledge that I understand and hereby consent as follows:

The above named individual with participate in a tour of the Materials Processing and Applications Development (MPAD) Center (hereafter "the event") on [May 11, 2019], to be held at the campus of the University of Alabama at Birmingham. I understand and acknowledge that the event will occur in a facility containing manufacturing machinery and products and that there are some risks involved with participation in the event, including but not limited to the risk of physical injury or death, and that I have been informed of those risks and agree to release and discharge The Board of Trustees of the University of Alabama ("the Board"), The University of Alabama at Birmingham ("UAB"), UAB Health System ("UABHS") and the University of Alabama Health Services Foundation, P.C. ("HSF") their officers, directors, employees and agents from any and all liability, claims, demands and causes of action or other loss suffered by the participant in connection with participation in the event excepting only liability, claims and expenses arising out of the sole negligence of the Board, UAB, UABHS, HSF or the officers, directors, employees and agents thereof.
I warrant and represent, to the best of my knowledge and belief, that I am healthy and able to participate in the event without unacceptable risk of injury, and I agree to notify event administrators of any allergies or other physical, mental or emotional condition that might limit my ability to safely participate in the event activities.

I give permission to UAB, UABHS and HSF employees or their designated representatives to provide such emergency care and treatment as in their judgment may be deemed necessary or advisable in the event that I should require emergency care while participating in the event. I agree to assume the costs of such emergency care and treatment, if any such costs are incurred.

PARENT/GUARDIAN Electronic Signature in Agreement of Waiver of Liability *

Your answer

Date *

Your answer

Thanks for filling out the GSED registration form. After you click submit, you are registered! Please double check all information before submitting, and contact us at girlsinscienceday@gmail.com if any of your contact information changes. We look forward to seeing you on May 11th!

SUBMIT

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6.1.4 Volunteer Interest Form

Girls in Science and Engineering Day (GSED) Volunteer Interest Form- Sat. May 11, 2019

Exciting, hands-on, science and engineering activities led by UAB students, scientists, and professors for middle school girls. Activity topics include environmental engineering, electrical engineering, reptilian biology, neuroscience, chemistry, medicine, and so much more! Thank you for sharing your time, and passion about STEM with middle school girls.

* Required

Name *

Your answer

I am... *

- an undergraduate student
- a graduate student
- an educator
- Other: _____

Email *

Your answer

Phone Number *

Your answer

What department are you with? *
Can be what you are majoring in or your graduate program

Your answer

GSED will be held on MAY 11th. Please let us know when are you available. *

The event will run from approximately 7:45am to 3pm. Please note that only ALL DAY volunteers will be selected to lead a group of girls.

- ○ All Day
- ○ Morning Only
- ○ Afternoon Only
- ○ Other: _____

Will you be available for a MANDATORY training before the event?

The date and time will be determined later.

- ○ yes
- ○ no

We love to know what our volunteers are up to! If you are involved in research, please let us know what project you are involved in.

Your answer

Why did you decide to go into a STEM field?

Your answer

SUBMIT

Page 1 of 1

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6.1.5 Sample Letter to Request Donations

3/20/19

Dear _____,

We are excited to announce that the planning process for the 9th Annual UABGirls in Science and Engineering Day (GSED) is well underway. We are writing to request your assistance in supporting this great event that will take place on May 11, 2019.

The main goal of the UAB Girls in Science and Engineering Day is to allow middle school girls, particularly minorities and girls from disadvantaged backgrounds, to explore STEM fields. This fundraising campaign will help cover the costs of GSED activities, ensuring that the event is free for all participants. SWE members and other UAB volunteers run the entire event. It has been a great opportunity for undergraduates, graduate students, and faculty from engineering to showcase their work and encourage young girls to consider careers engineering. All the funds raised directly support the costs of the event including food, beverages, t-shirts, security, and supplies.

Last year's gift from _____ in the amount of _____ was instrumental in helping us reach out to middle school students and cover expenses for the event. We hope that we can count on your financial support to help us make the 2019 GSED event our best one yet. **Please email vsisiopi@uab.edu by April 1, 2019 with your pledge of support.**

Thank you in advance for your consideration and for your support of the Girls in Science and Engineering Day initiative.

Sincerely,
Zoe Penko, Sameera Grandhi, Virginia Camacho, Emma Schmidt, and Laura Nixon
Girls in Science and Engineering Day Leadership Team

Dr. Virginia Sisiopiku (vsisiopi@uab.edu)
Girls in Science and Engineering Day Faculty Advisor

Girls in G Science & S Engineering E Day D

6.1.6 Workshop Leader Questionnaire

Workshop Leader Questionnaire

Thank you so much for your willingness to lead a workshop at our 9th annual Girls in Science and Engineering Day! Please fill out this questionnaire NO LATER THAN May 5th. If you have any questions, do not hesitate to reach us at emmasch@uab.edu or girlsinscienceday@gmail.com

Description of Event

Girls in Science and Engineering Day (GSED) is an annual event that brings together about 150 middle school girls from all over the greater Birmingham area. The event is completely free for the students.

The main purpose of our event is to enlighten and inspire girls to pursue a STEM path- and to have FUN! Each girl will participate in three exciting workshops throughout the day. The workshops are purposely clustered in different fields to show the girls how many robust opportunities there are in science and engineering!

This year the event will be held on Saturday May 11th, 2019.

Your role at Girls in Science and Engineering Day

The core of GSED is the community of professionals that dedicate their time to make this event a success. We ask that our workshop leaders plan hands-on activities that truly engage the students. Each workshop will be 1 hour and 15 minutes long. You will teach your workshop 3 consecutive times throughout the day at the following times:

9:15-10:30am
10:45-12:00pm
1:00-2:15pm

You are also invited to attend lunch with the participants and other volunteers from 12:15-12:45 in Volker, Lecture Hall A.

We try to keep the groups small, so there will be no more than 15 girls in each workshop. Each group will be accompanied by 1-2 college/graduate students, who will guide the girls to their different workshops and stay with them throughout the day.

NEXT

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Workshop Leader Questionnaire

* Required

Workshop Leader Questionnaire

Please fill out the information to the best of your ability to give us a better idea of how we can best assist you.

Name *

Your answer

Please provide a very general description of your workshop, keeping in mind that we highly encourage hands-on or interactive activities. *

Your answer

Please confirm that you or a designated workshop point of contact WILL be available on May 11th, 2019 from ~8:30am to 2:15pm (please allow ample time to set up your workshop and troubleshoot problems before the 9:15 start time). *

- Yes
- No

Will you be bringing anyone to help you during the workshop? *

- Yes
- No

If you will have helpers, please tell us how many additional people will be there.

Your answer

Please indicate the number of T-Shirts and sizes you need for yourself and your workshop helpers.

Your answer

We are committed to making our workshops fun and interactive for the girls who attend. In order to do this, we plan to support our workshop leaders to the best of our ability. Please list any supplies and their estimated costs that cannot be provided by your department/group.

Your answer

Please describe any requirements you have for the classroom in which your workshop will be held (computer hookup + projector, number of tables, outlets, etc.). Alternatively, if you plan to hold your workshop in a specific facility/lab/location to which you have weekend access, please list that location here. *

Your answer

Our main correspondence is typically done through email. Please let us know if there is another email address that you would like us to use.

Your answer

In case we need to troubleshoot any problems on May 11th, please provide at least one contact phone number for your workshop, and indicate whose number you are providing. This information will only be available to event organizers. Please indicate if it is OK to text this number on the day of the event. (e.g. 205-585-0372 - OK to text - Sameera Grandhi)

Your answer

Please describe any other concerns or questions you may have.

Your answer

6.1.7 Pre-Event Survey Sample

GSED pre-event

1. Believe that girls are as capable as boys in areas of science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

2. Believe that girls are as well suited for jobs in science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

3. I plan to attend collage

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

4. Considering career in science or engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

5. I know at least one adult who can help me find more information about careers in science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

6. I feel confident in asking questions and working with my peers in science classes

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

7. I feel confident in my ability to understand concepts in science

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

8. My teacher(s) and/or parent(s) have suggested I consider a career in science

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

9. I feel like my parent(s)/teacher(s) support my academic interests

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

10. I have a good idea of the types of future jobs available to me in the science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly disagree

SUBMIT

6.1.8 Post-Event Survey Sample

Post Event 2019

1. I enjoyed today's activities

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

2. I learned a new scientific concept today

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

3. I gained at least one new scientific or career role model from today's event

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

4. My group leader was engaging and helpful

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

5. Today's activities helped improve my confidence when working with my peers in a science setting

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

6. Today's activities made me confident that I am capable of understanding scientific ideas

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

7. Today's activities exposed me to careers in science/engineering which I was not previously aware of

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

8. I believe that girls are as capable as boys in areas of science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

9. I believe that girls are well suited for jobs in science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

10. After today, I feel like I will be able to more easily find information about careers in science and engineering

- ○ Strongly agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

11. I plan to attend college

- ○ Yes
- ○ No
- ○ Unsure

12. I am currently considering a career in science and engineering

- Yes
- No
- Unsure

13. I would recommend GSED to a friend

- Yes
- No
- Unsure

14. My favorite workshop

Your answer

Tell us something you learned today!

Your answer

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6.1.9 Certificate of Participation

Girls in Science & Engineering Day

G S E D

This certificate of achievement is presented to:

_____

on May 11th, 2019 for participation in the

9th Annual Girls in Science and Engineering Day (GSED)

2019 GSED Organizing Committee

Zoe Penko • Emma Schmidt • Sameera Grandhi
Laura Nixon • Natasha Wright • Dr. Virginia Sisiopiku

UAB SCHOOL OF ENGINEERING | SWE Society of Women Engineers | STRIDE Southeastern Transportation Research, Innovation, Development and Education Center

6.1.10 Event Summary Sample

2018 Girls in Science and Engineering Day

Girls in Science & Engineering Day

GSED is a free program to engage Alabama middle school girls in STEM activities through interactive workshops created and led by faculty and students at the University of Alabama at Birmingham (UAB).

INSPIRING THE FUTURE

GSED was held on May 19, 2018. Using the technology of classrooms provided by Volker Hall, Business and Engineering Complex, Locomotor Control and Rehabilitation Robotics Laboratory, School of Optometry, MPAD, and Campbell Hall, GSED hosted over 110 Alabama middle school girls for a day of hands-on activities and learning. The girls participated in STEM workshops led by UAB faculty and students such as:

- Learning how to suture and sheep heart dissection
- Building magnets while learning about MRI
- Using field guides to identify reptiles and amphibians
- Building a sand mold and pour metal to make their own trinket

The program also provided female role models in STEM fields. Each group of girls was paired with 2 student volunteers who spent the day with them and assisted with the workshops. The workshops were led by faculty and students from fields such as engineering, biology, optometry, and chemistry. Girls also participated in a fun scavenger hunt, which challenged their creativity as they moved between workshops. Dr. Suzanne Lapi, Director of the Cyclotron Facility, gave the keynote address over a pizza lunch. She discussed her journey in STEM as a female scientist and answered questions from the girls.

GSED was conceived as an opportunity to introduce local middle school girls, especially those from disadvantaged backgrounds, to the exciting world of STEM.

GSED 2018 FACTSHEET

111	Girls participated in the 2018 GSED
48	Alabama middle schools represented at GSED
12	Workshops including Reptilian Biology, Forensics, Environmental Engineering, Rehabilitation Robotics, Magnetism, Electrical Engineering, Material Science, Virtual Simulation, Dissection and Pathology, Sutures, Optometry, and Chemistry
46	STEM-related volunteers led the groups and workshops
88%	Of girls said they want to pursue a career in STEM
100%	Of girls learned a new scientific concept at GSED

Thank You!

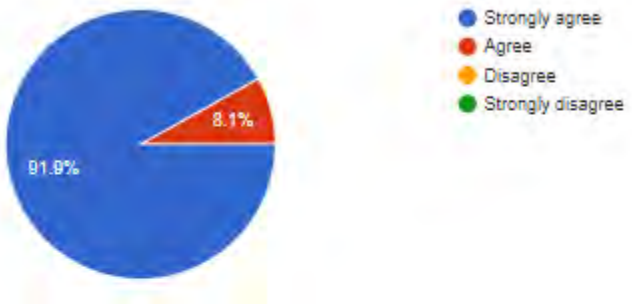
Your partnership and support of GSED made the event possible. Your contribution helped to inspire the next generation of female scientists and engineers. We appreciate all that you do to support UAB's mission to breakdown barriers in accessing education.

For more information, questions, or comments, please contact Dr. Virginia Sisiopiku at vsisiopi@uab.edu

6.1.11 2019 Pre-Event Survey Responses

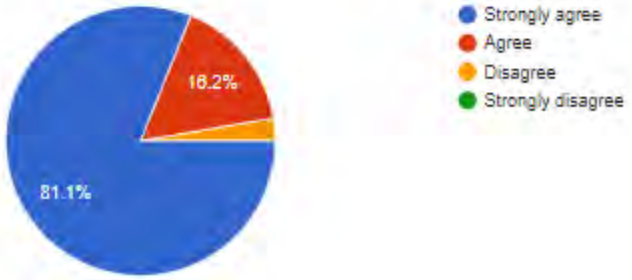
1. Believe that girls are as capable as boys in areas of science and engineering

37 responses



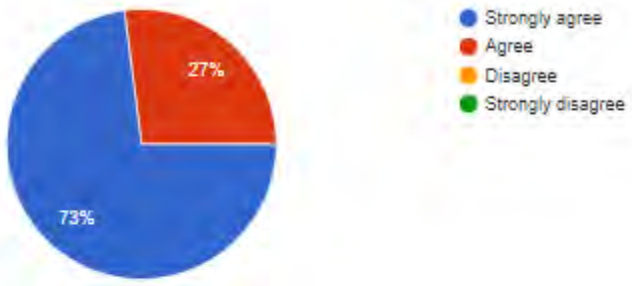
2. Believe that girls are as well suited for jobs in science and engineering

37 responses



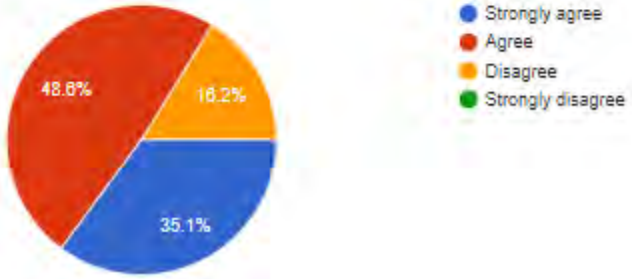
3. I plan to attend collage

37 responses



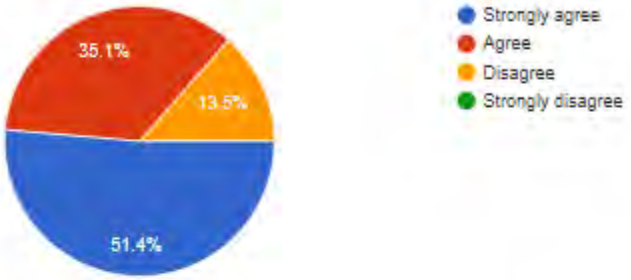
4. Considering career in science or engineering

37 responses



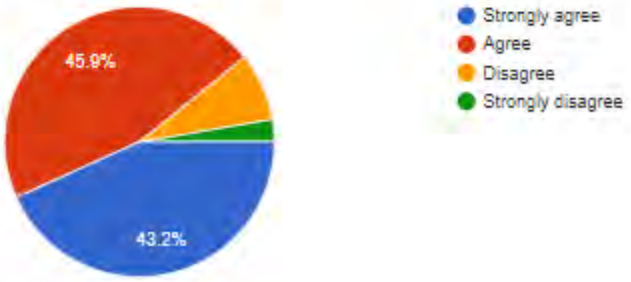
5. I know at least one adult who can help me find more information about careers in science and engineering

37 responses



6. I feel confident in asking questions and working with my peers in science classes

37 responses

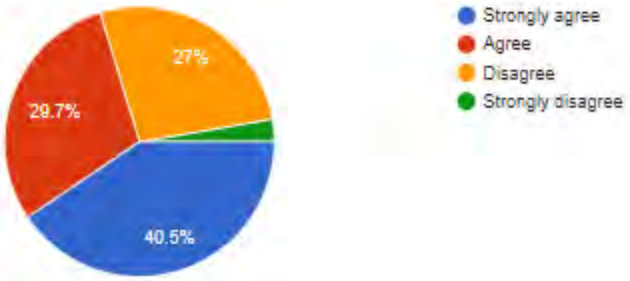


7. I feel confident in my ability to understand concepts in science

37 responses

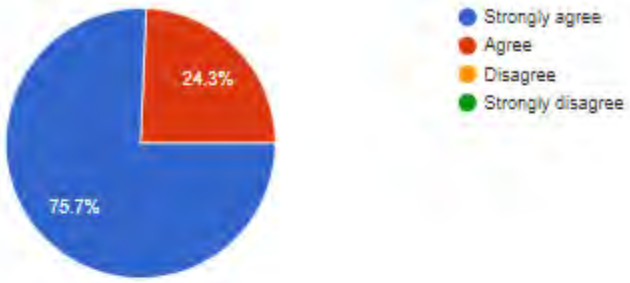
8. My teacher(s) and/or parent(s) have suggested I consider a career in science

37 responses



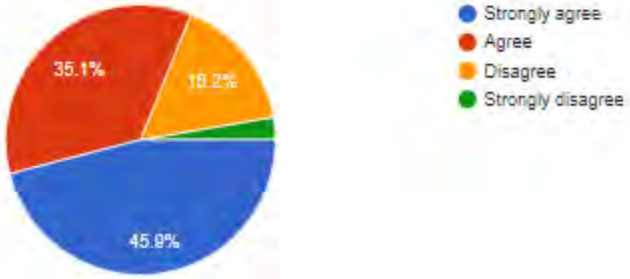
9. I feel like my parent(s)/teacher(s) support my academic interests

37 responses

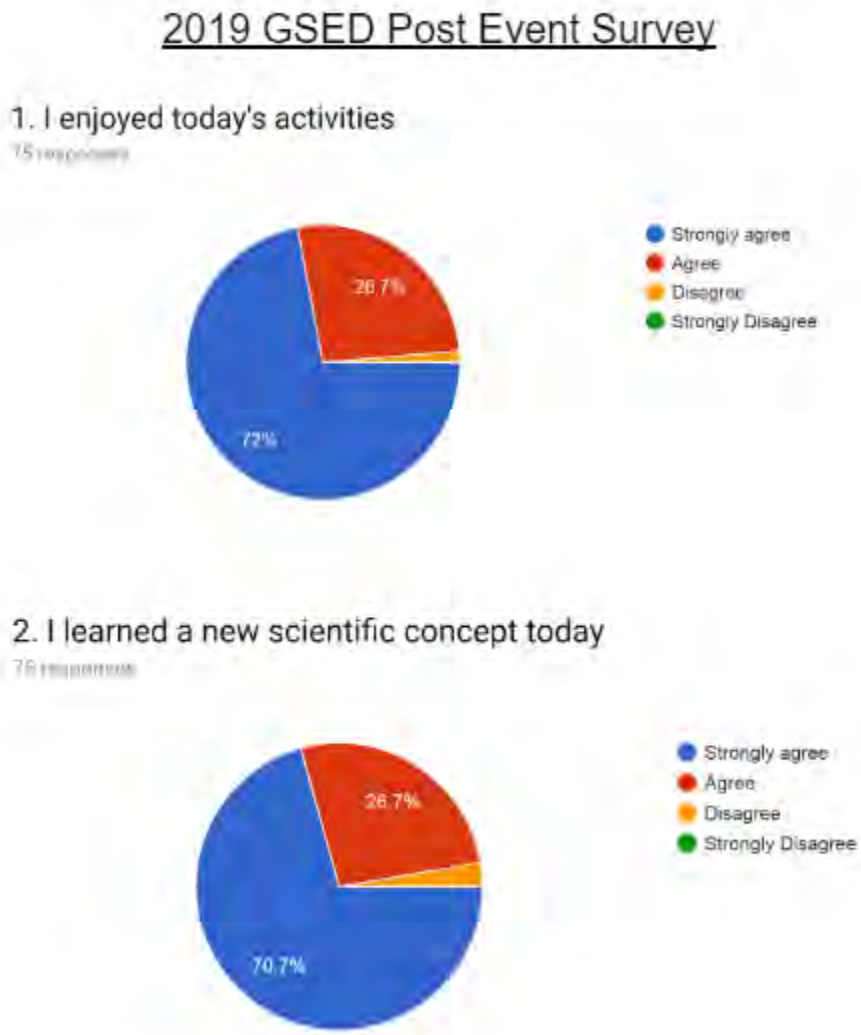


10. I have a good idea of the types of future jobs available to me in the science and engineering

37 responses



6.1.12 2019 Post-Event Survey Responses

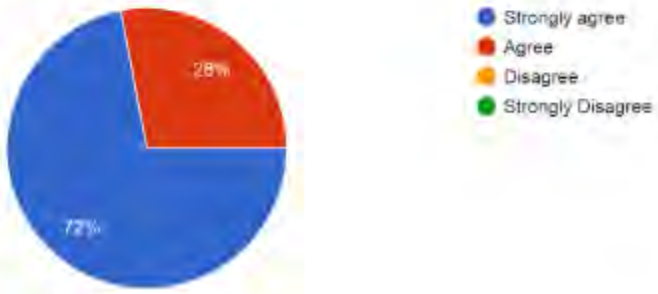


3. I gained at least one new scientific or career role model from today's event

74 responses

4. My group leader was engaging and helpful

75 responses

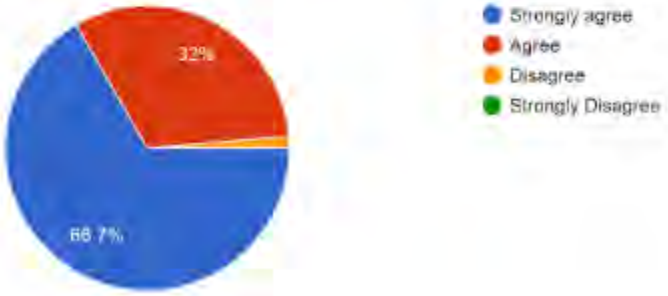


5. Today's activities helped improve my confidence when working with my peers in a science setting

75 responses

6. Today's activities made me confident that I am capable of understanding scientific ideas

75 responses



7. Today's activities exposed me to careers in science/engineering which I was not previously aware of

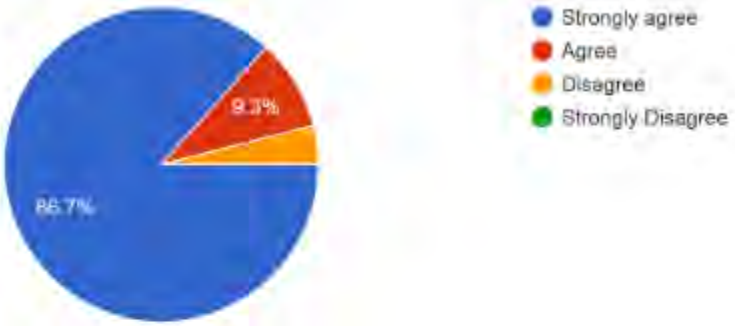
74 responses

8. I believe that girls are as capable as boys in areas of science and engineering

75 responses

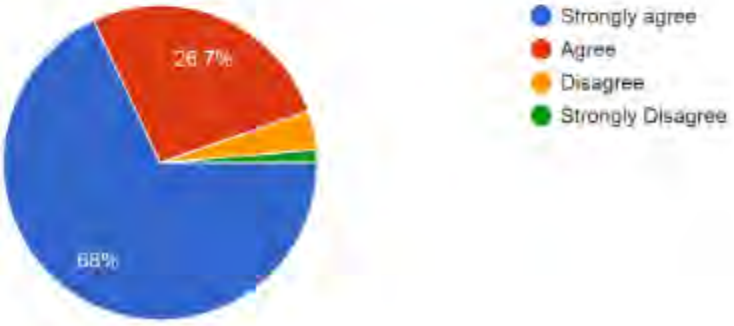
9. I believe that girls are well suited for jobs in science and engineering

75 responses



10. After today, I feel like I will be able to more easily find information about careers in science and engineering

75 responses



11. I plan to attend college

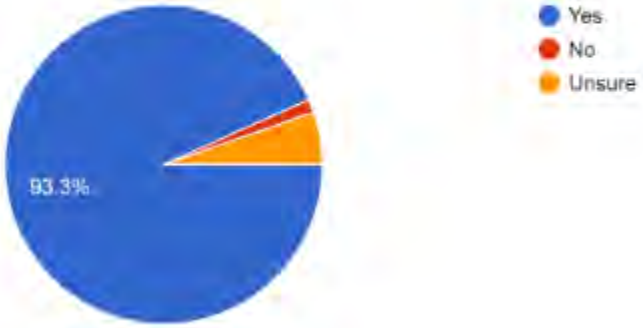
75 responses

12. I am currently considering a career in science and engineering

75 responses

13. I would recommend GSED to a friend

75 responses



6.2 GSED Media

6.2.1 UAB News, May 11, 2018

6.2.2 Facebook Page

6.2.3 Ann's Cook

6.2.4 Fundraising Publicity, 2019

6.2.5 UAB Campus Calendar, 2019

6.3 GSED Photos

6.3.1 Highlights from 2018 UAB GSED


Girls Do It Better!


Eureka!


Girls can't WHAT?


girls can't
WHAT?


Science Rules!


501


Making
Discoveries!

6.3.2 Highlights from 2019 UAB GSED

GSED 2019

Dr. Virginia P. Sisiopiku
Professor of Transportation Engineering
University of Alabama at Birmingham (UAB)

5/11/19

GSED

The Girls in Science and Engineering Day is an opportunity for middle school girls from the Birmingham, AL region and volunteers from UAB and the community to come together to share experiences about the wonderful world of STEM.

GSED is a day for:


Learning about STEM


Making Discoveries in the Labs
THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

Engaging in Hands-on Activities

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

Exploring the UAB Campus

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

Being Part of a Community of Learners

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

Interacting with Successful Women Engineers and Scientists

Getting to Know our Volunteers

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

Thanks to our Awesome Volunteers, Workshop Coordinators and Sponsors

SCHOOL OF ENGINEERING
Knowledge that will change your world

STRIDE | Southeastern Transportation Research, Innovation, Development and Education Center

SHIPT

swe

- School of Engineering
- School of Health Professions
- School of Medicine
- School of Public Health
- College of Arts and Sciences
- School of Education

Last but not least we would like to extend a warm personal thank you to all individuals who donated their time to help Girls in Science and Engineering Day become a success, including our wonderful student, faculty, and community volunteers.

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Knowledge that will change your world

7.0 REFERENCE LIST

National Academies of Sciences, Engineering, and Medicine. 2016. Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways. Washington, DC: The National Academies Press. https://doi.org/10.17226/21739.