



Girls Exploring Science, Engineering & Technology Event

Thank You!

***Girls Exploring Science,
Engineering & Technology
Event
April 10, 2007***

hosted by
The Society of Women Engineers (SWE) Rocky Mountain Section
Lockheed Martin
Raytheon
Junior Achievement of Rocky Mountain, Inc.
and
Agilent Technologies

Summary of Success
Final Report
August 26, 2007



Raytheon



Girls Exploring Science, Engineering & Technology Event Final Report

FACT SHEET

WHAT:

The fifth annual *Girls Exploring Science, Engineering & Technology* event, designed to stimulate and encourage girls in 6th and 7th grade to pursue careers in science, engineering and technology, included motivational speakers, hands-on workshops, volunteer mentors and educational exhibits and was hosted by Lockheed Martin, Junior Achievement, Raytheon, Agilent Technologies, and the Society of Women Engineers – Rocky Mountain Section.

WHEN: Tuesday, April 10, 2007 from 9:30 a.m. to 1:15 p.m.

WHERE: The Colorado Convention Center in downtown Denver

WHY:

We want to encourage girls to pursue careers or interests in science, technology, engineering, and math (STEM) because:

- Only 4% of Colorado girls specify engineering as a career interest on SAT tests
- A scant 1% of girls in Colorado indicate an interest in a computer science career
- Women make up 46% of the Colorado labor force but only 26% in technical fields
- Women account for only one in five undergraduate engineering students and make up only 10% of the nation's engineering workforce

WHO:

- 1397 6th and 7th grade girls attended
- 200 adult chaperones (parents and teachers) and 263 volunteers attended
- 148 presenters conducted 50 hands-on workshops
- 72 public and private schools were represented from 26 different school districts
- Denver Public Schools students made up 32% of total attendees, Jefferson County 18%, Littleton and Aurora Public Schools 12% each
- 45% minority participants
- Exhibit Booths showcased 17 exhibitors from higher education, community/professional organizations and governmental/educational entities

HOW:

- 22 organizations and individuals contributed \$85,724 to cover direct expenses
- Corporate partners and other organizations provided in-kind services valued at over \$39,000
- Sponsors included: ♦ Agilent Technologies ♦ American Council of Engineering Companies (ACEC) of Colorado ♦ Ball Aerospace ♦ Ch2MHill ♦ CLIF BAR ♦ Colorado School of Mines ♦ Coors ♦ Golden Thought ♦ Holmes Roberts & Owens ♦ Innovative Construction Solutions, Inc. ♦ Institute Electrical and Electronics Engineers ♦ Junior Achievement of Rocky Mountain, Inc. ♦ Leonard Rice Engineers ♦ Lockheed Martin Corporation ♦ Merrick & Company ♦ Raytheon ♦ Rocky Mountain Section American Water Works Association (RMSAWWA) ♦ Scanlon Consulting Services, Inc. ♦ Society of Women Engineers Rocky Mountain Section ♦ Technically Speaking, Inc. ♦ Washington Group International, Inc. ♦ Xcel Energy Grant

IMPACT:

- See Survey Statistics Sheet (below)

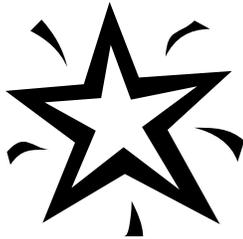
MEDIA COVERAGE:

- Television news coverage on 9 News (NBC) 4PM and News 2 (WGN) at 9PM
- 9 News web site coverage (9news.com)
- Rocky Mountain News coverage on 4/11/07
- Media Advisory/Press Releases by Washington Group International, Lockheed Martin, and Raytheon
- Internal Corporate sponsor communiqués
- Follow-up article in the May issue of SWE Magazine

AWARDS:

- 2006 and 2005 Xcel Energy Foundation Grants
- 2004 Society of Women Engineers Corning Career Guidance Incentive Grant Honorable Mention
- 2003 Corning and Exxon Mobil Career Guidance Program Awards

Quotes from Participants ...



"I learned a lot today about science and technology and want to learn more so I can share with other girls." - **Dorian, student at Mrachek Middle School**

"There was amazing cooperation within each team to solve the problems presented. Although the girls were all from different schools, there were no conflicts, and they worked together as if they were the best of friends."
- **Phil, volunteer and Chief Engineer at Raytheon**

"...I didn't know engineers did this type of work...I knew I could do this."
- **student at All Souls**

"I am going to go home and make my scooter solar powered!!"
- **Charlotte, student at Littleton Middle School**

"...our sixth grade girls...had a fantastic time and learned so much. The presentations provided great information and had the girls thinking that math and science can be fun! We are already looking forward to next year."
- **Lydia, Chaperone and Teacher at Saint Joseph School**

"No one told me that engineers can be creative!" - **Ciera, student at Eaton Middle School**

"What I liked best about the workshop session was the ability to be honest and not being judged..."
- **Riley, student at Strasburg Junior High**

"I've worked too hard not to finish!!" -
student at Solar Powered Car workshop

"This is the most fun I've had all day...because this stuff is cool!!" - **Kara, student at Euclid Middle School**

"I would have died if I wasn't allowed to join everyone today. I really, really enjoyed every minute of this" - **Fiona, student at Golden!**
- **Fiona, student at Golden**

STUDENT SURVEY STATISTICS SUMMARY

In continuation of the mission to promote science, technology, engineering, and math fields of study and encourage girls to pursue careers in these fields, the fifth annual Girls Exploring Science, Engineering, and Technology (GESET) event was successful. This report summarizes student participants' responses to the survey.

Major Findings

- 94.3% of respondents were in 6th and 7th grade.
- 47.4% of girls said that *learning new things* is the single most important aspect of the GESET event to them.
- 24.5% of girls said *learning about career possibilities* is the most important part of an event like the GESET.
- 16.4% of girls said *hands-on activities* were the most important aspect of the GESET.
- 60.5% of girls said this event encouraged them to pursue careers in science, technology, and engineering.
- 60.5% of attendees said participating in the GESET made them want to take more high school classes in the fields of science, engineering, and technology.
- 57.9% of attendees learned what high school classes to take to enter the fields of science, engineering, and technology as a result of GESET
- 50.7% of girls reported wanting to pursue jobs in the fields of science, engineering, and technology because of the GESET event.
- 50.8% of girls said they are confident they would be good at a career in science, engineering or technology.
- 95.6% of girls said they would like to come back to GESET next year
- 94.4% of girls said they would tell other girls to come next year
- Over half (54.4%) of girls said they would still take a class even if it were all boys, and another 34.7% said they would take the class if they could convince a friend to take it with her.
- 38.5% of girls said they wanted to have a certain job because they wanted to help people or animals.

Girls Exploring Science, Engineering & Technology Event Final Report

EXECUTIVE SUMMARY

SUMMARY OF SUCCESS

The fifth annual *Girls Exploring Science, Engineering & Technology (GESET)* event was a huge success. Highlights are summarized below. Planning details and statistics are included in this report.

Confirmed registrations totaled 1397 6th & 7th grade girls, filling all available spaces for attendees. In addition, there were 200 chaperones in attendance with the girls. These statistics are very gratifying for the 2007 event, as we increased available capacity by 16% and funding by 1%. We were filled to capacity for the fifth straight year, and the demand once again indicated there would have been more registrants if there had been additional slots available. The event registration filled to capacity in the first 12 hours it was open.

Fundraising efforts by the planning committee raised \$85,724 from 22 organizations and individuals. Expenses totaled \$75,193. Registration was capped based on funding available based on sponsor commitments as of the registration opening date. Carry over funds will help cover deposits for the 2008 event, which are required at the time of booking. Several companies, including Raytheon, Lockheed Martin, Washington Group, and Agilent Technologies provided in-kind services valued at over \$39,000.

The complete list of hosts, sponsors, and in-kind contributors includes:

- ◆ Agilent Technologies ◆ American Council of Engineering Companies (ACEC) of Colorado
- ◆ Ball Aerospace ◆ Ch2MHill ◆ CLIF BAR ◆ Colorado School of Mines ◆ Coors
- ◆ Golden Thought ◆ Holmes Roberts & Owens ◆ Innovative Construction Solutions, Inc.
- ◆ Institute Electrical and Electronics Engineers ◆ Junior Achievement of Rocky Mountain, Inc.
- ◆ Leonard Rice Engineers ◆ Lockheed Martin Corporation ◆ Merrick & Company ◆ Raytheon
- ◆ Rocky Mountain Section American Water Works Association (RMSAWWA)
- ◆ Scanlon Consulting Services, Inc. ◆ Society of Women Engineers Rocky Mountain Section
- ◆ Technically Speaking, Inc. ◆ Washington Group International, Inc. ◆ Xcel Energy Grant

Over 260 volunteers provided invaluable support to the event mostly as guides, and as coordinators and support staff. The planning committee consisted of individuals from the hosting organizations.

Seventeen exhibitors were slated to share information about programs or resources for girls. With one exhibitor unable to participate due to business emergency, the exhibitors included: SWE-RMS; Junior Achievement; Lockheed Martin; Raytheon Math Moves You; CABPES; CSM Women in Science, Engineering and Mathematics; Colorado MESA; CU - Women In Engineering Program; Multi-Purpose Engineering Program (CU); American Council of Engineering Companies of Colorado (ACEC); Department of Wildlife; Ch2MHill; American Institute of Aeronautics and Astronautics (AIAA); UCAR Windows to the Universe; Science From CU – A Science Discovery Program.

A survey was provided at the conclusion of the event. Full survey results are included in a separate Survey Addendum.

This annual event is repeated each March-April to support National Engineers Week and the *Introduce a Girl to Engineering* Program. The hosts have already agreed to again co-host the event in 2008, as well as setting higher goals for fundraising and sustained attendance.

Girls Exploring Science, Engineering & Technology Event Final Report

In comparison with the 2006 event, in 2007 we:

- ✓ Increased funding by 1% (\$85,724 vs. \$85,090) and increased in-kind donations by 30% (\$39,000 vs. \$30,000).
- ✓ Increased attendees by 16% (1397 vs. 1207) due to new venue and increased funding.
- ✓ Increased chaperones by 20% and volunteers by 57%.
- ✓ Decreased the number of exhibitors by 10% due to late start on recruiting exhibitors
- ✓ Received event coverage on Colorado NBC and WGN news, Rocky Mountain News follow-up coverage the day after the event, and press releases by Washington Group International, Lockheed Martin, and Raytheon

THE ISSUE

Girls of today are presented with gender biases and stereotypes that sometimes steer them away from careers or interest in the fields of math, science, engineering, computers and technology. We are working to change those perceptions. A coalition of organizations and businesses has come together to provide a space for girls to explore, to question, to do, and to learn. The girls walk out of this event inspired by the wonders of technology, and inspired by the incredible people who hold positions in those fields today. The girls learn about careers that support the very communities in which they live and improve our quality of life.

Participants in the workshops experienced hands-on lessons in everything from forensic science and simulations for living and working in space, to creating websites and constructing and programming computer robots made of LEGOS. (A complete list of workshops is included at the end of this report.)

Consider today's imperative:

The U.S is in the middle of an undergraduate enrollment surge; however rates of enrollment in emerging economies and populations are growing even faster at startling rates. For example, in China, rates are expanding at ten times those in the U.S. and 2/3 of Chinese students earn math, science and engineering degrees compares to about 1/3 of American students. (Source: Business-Higher Education Forum)

Over the decade ending in 2008, jobs requiring science, engineering, and technical training will increase by over 50%, representing a rate four times faster than overall job growth – as predicted by the U.S. Department of Labor. By 2008, approximately six million job openings will exist for scientists, engineers and technicians.

With women representing only 9% of American engineers, there is a significant opportunity – an actual necessity – to expand, as well as diversify, the talent pool. This event represents a commitment on the part of the volunteers and sponsors to take action that directly impacts increasing the student pipeline in science, engineering, and math.

“GESET provides a unique opportunity to see and experience hands-on glimpses into a number of exciting jobs and career fields,” said Sandra Scanlon, P.E., president of Scanlon Consulting Services, Inc., and GESET event chair. “Jobs in these career fields are significantly increasing over coming years, and there is a growing need for diverse and qualified talent to continue the path of innovations we enjoy today. Having coordinated this event four times now, it still amazes me how energizing it is to work with these girls. They are so eager to learn about the opportunities available to them. It is equally satisfying to work side-by-side with tireless educators to get the message out that math and science are important for numerous careers facing future generations.”

For additional discussion and statistics on this issue, please see GESET Summary of Success Final Reports from 2003, 2004, 2005, and 2006 available from our website, www.swe-rms.org.

Girls Exploring Science, Engineering & Technology Event Final Report

EVENT DETAILS

There were three components to the event: The **Welcoming and Opening Remarks** set the stage for what the girls could expect to accomplish and enjoy throughout the day. Three **Interactive Workshops** focused on hands-on activities and demonstrations of various areas of science, engineering and technology. Lastly, at **Lunch** everyone convened for closing remarks and door prizes. Each student received a tote-bag full of information on careers in science, engineering and technology; information on necessary courses to take in high school; scholarship and career guidance information from local minority and engineering organizations; as well as pens and other give-aways.

EVENT MISSION

To combine female 6th & 7th grade students, parents, teachers, and counselors with science, engineering and technology professionals in order to create a unique learning experience for all involved and to get pre-college students excited about math, science, engineering and technology.

EVENT OBJECTIVES

- Introduce female middle school students (middle school as defined by each school district) to real world aspects of science, engineering and technology and to the many diverse fields available.
- Give female middle school students, their parents, teachers, and counselors a chance to interact with engineering and technical professionals to show engineering and technology is fun.
- Introduce networking and mentoring basics to female middle school students.
- Introduce students, parents, teachers, and counselors to the local organizations within the science, engineering and technology community and the programs and resources available.
- Provide an opportunity for local companies, their employees, and the community to come together and support students to succeed in math and science.

IMPACTS / EXPECTED RESULTS

The overall goal of the event was to introduce science, engineering and technology careers to girls who may not otherwise be exposed to role models in these careers. Additionally, the importance of math and science were explained and presented as “cool” subjects in school.

The whole event served as a source of information on science, engineering and technology for a group of students who may not have much contact with engineers or scientists, and in particular women in those fields. This will also give us a chance to expose teachers and counselors to the fact that women can become engineers and scientists, and hold jobs in technology fields. Interacting with industry can provide them with information on what courses students need to take in order to pursue a science, engineering or technology career.

SPONSOR OBJECTIVES

- Stress the importance of math and science classes in middle and high school, in order to prepare for a college major that can lead to a well-paying and fulfilling job.
- Give the students and professionals a chance to learn and practice mentoring, which will hopefully encourage engineers, especially women, to attain high levels of professional achievement and to become role models.
- Feed the science, engineering and technology employment pipeline.

Sponsorships were solicited from 2006 event supporters and local companies. Our senior level sponsors were: Agilent; Ch2MHill; Lockheed Martin Corporation; Raytheon; Washington Group International, Inc.. Our junior level sponsor was Xcel Energy Grant. Sophomore sponsors included: Holmes Roberts & Owens; Hewlett Packard; Merrick & Company. Our freshman sponsors were: American Council of Engineering Companies (ACEC) of Colorado; Ball Aerospace; Coors; Golden Thought; Institute of Electrical and Electronics Engineers; Innovative Construction Solutions, Inc.; Rocky Mountain Section American Water Works Association (RMSAWWA); Society of Women Engineers Rocky Mountain Section. The sponsorship opportunities offered are illustrated in Appendix A.

Girls Exploring Science, Engineering & Technology Event Final Report

ATTENDEE SURVEYS

A survey was provided at the conclusion of the event. Full survey results are included in a separate Survey Addendum. In summary, relative GESET event content, over 83% of the girls indicated they want to take more science, engineering, and technical classes, more than 79% said that they learned what high school classes to take to enter STEM fields, and 76% of the girls responded that they want a job in a STEM field as a result of GESET. In response to questions specific to the event itself, close to 95% of the girls indicated that they would like to return to GESET next year, and 93% said they will tell other girls to attend next year.

The Alliance for Technology, Learning, and Society (ATLAS) Evaluation and Research Group at the University of Colorado at Boulder helped again to refine our surveys from last year. In addition, they administered the surveys and tabulated the results. The major findings and recommendations will be very helpful to improve this event and provide even more targeted workshops and information to encourage girls to explore science, engineering and technology careers as well to enroll in more math and science classes.

The ATLAS Evaluation and Research Group at the University of Colorado at Boulder conducts research on increasing under-represented groups in Information Technology (IT) disciplines. The ATLAS Evaluation and Research Group, coordinated the surveys and analysis for the *Girls Exploring Science, Engineering & Technology* event for the third straight year. They are the recipients of two National Science Foundation grants to study 1) curricular programs of study in higher education, in particular, the nature of learning environments in different curricular programs and 2) the types of messages and methods that can successfully persuade middle school girls to participate in computing programs of study.

The ATLAS Evaluation and Research Group at the University of Colorado at Boulder provides multidisciplinary curricular, research, and outreach programs that integrate information technology with a wide variety of disciplines and people, both inside and outside the University. They also founded the National Center for Women and Information Technology, in collaboration with the Anita Borg Institute (formerly Institute of Women in Technology), a number of universities, corporations, and the Girl Scouts of the USA (among others). (<http://www.ncwit.org>) The Society of Women Engineers has a memorandum of understanding with the Girl Scouts of the USA to support outreach activities geared towards math, science, and engineering. The ATLAS Evaluation and Research Group and the GESET planning committee are continuing discussions on a potential longitudinal study to analyze influences on young girls related to the pursuit of STEM careers.

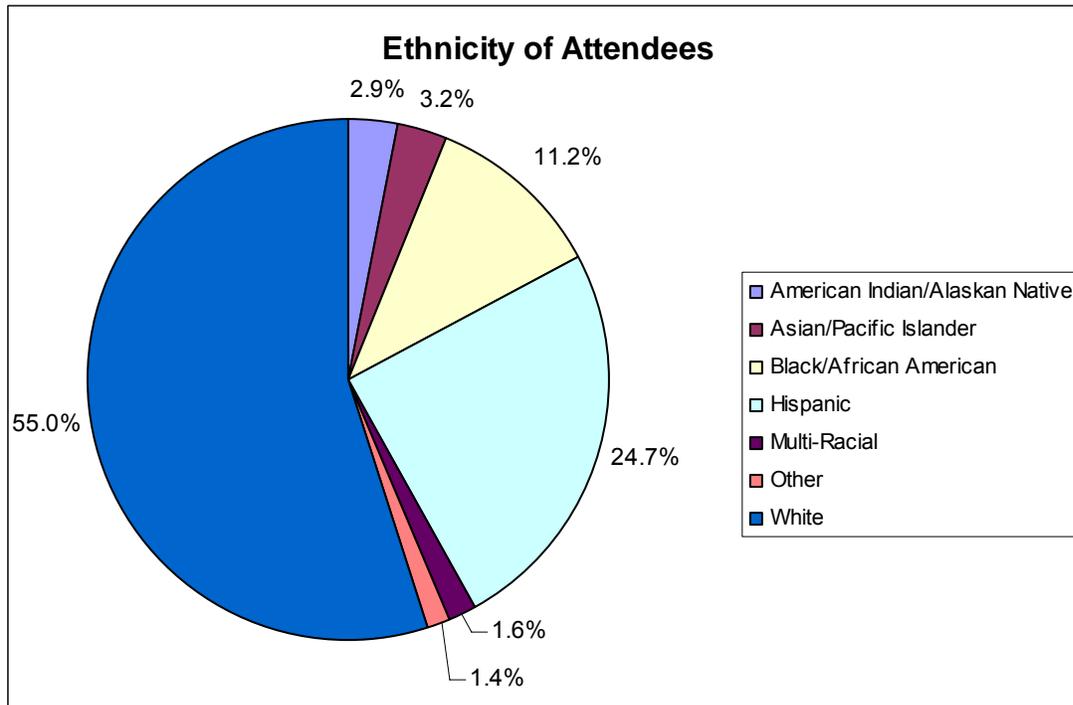
REGISTRATIONS

Registration in 2007 again used a new on-line registration system from the one implemented in 2006. Registrations were recorded on a first-come first-served basis through the on-line system, requiring first the chaperone to register, then for the chaperone to register each student. This new system allowed the chaperone to select three 45-minute or two 70-minute workshops per student, based on their preferences and workshop availability. As each workshop filled to capacity, that workshop became unavailable for selection. Popularity of the GESET event caused registration capacity of 1400 students to virtually fill in approximately 12 hours from registration opening. The system allowed registration to be closed when event capacity was reached.

The rate of registration indicated that demand was commensurate with the overwhelming amount of desire shown in each of the past four years. Due to various firewall and security protocols on the user side of access to the registration system, there were numerous difficulties encountered by some of the chaperones attempting to register. Plans for 2008 include a modification to the hosting of the registration system link and additional guidance to potential registrants regarding system requirements to allow smoother access.

Of the students who responded, 45% specified a demographic other than white. There was great response in gathering this voluntary statistic.

Girls Exploring Science, Engineering & Technology Event Final Report



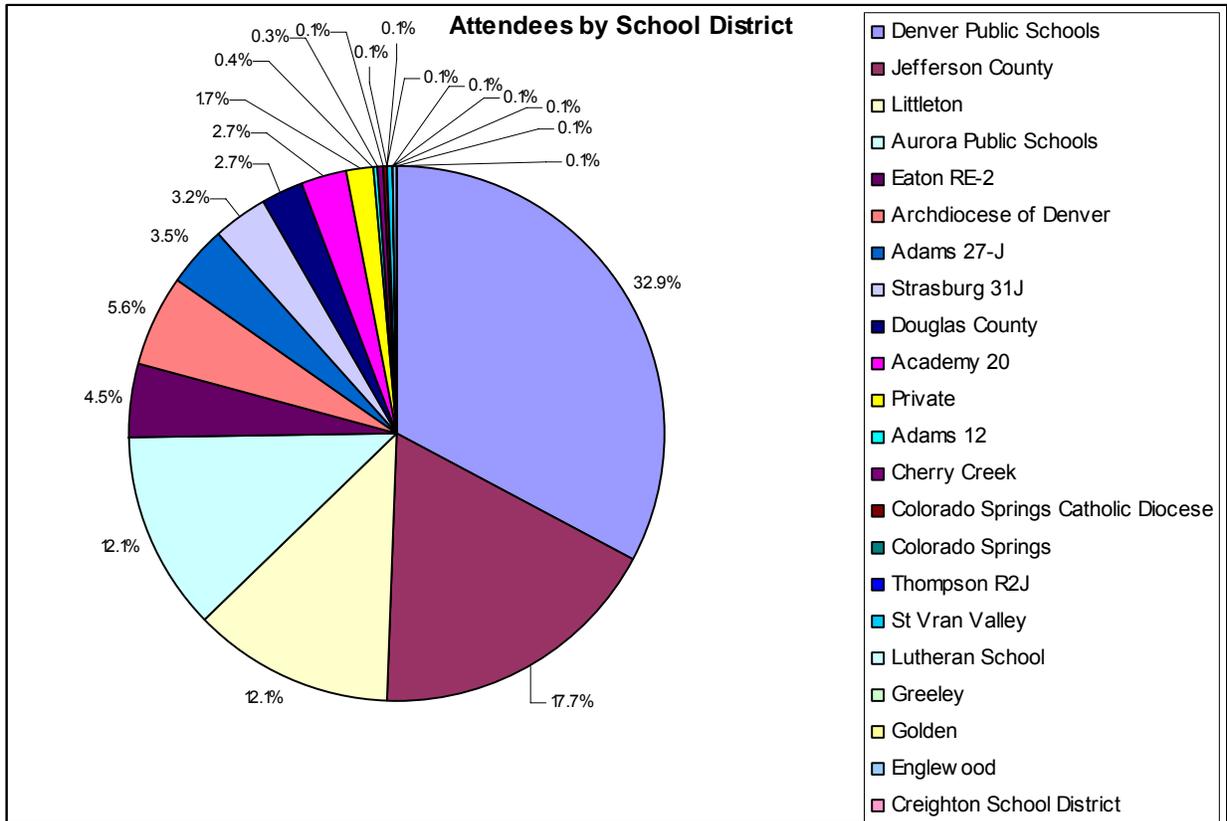
Compared to the Race/Ethnicity of Colorado school children, Latina/Hispanic girls and African-American girls were under-represented. Compared to the demographic makeup of Denver Public Schools, white girls were over-represented, while Latina/Hispanic and African-American girls were under-represented. The American Indian/Alaskan Native percentage seems high relative to this ethnic demographic from the school districts participating, and may be attributed to this ethnic selection being first in the registration selection menu for this data.

By comparison, in 2006 we had over 40% specify a demographic other than white and demographics for 1% of the 2006 attendees were unknown.

Of the 1397 student attendees representing more than 72 different schools from 26 districts or groups, 33% were from students in the Denver Public School (DPS) system. Jefferson County represented over 18%, and Littleton and Aurora Public Schools each represented 12% of the attendees. The remaining 17 school districts or groups that attended each had between 0.1 and 6%. Of those attending, 49% were 7th graders and 50% were in 6th grade, with the remainder being 1% 8th graders.

By comparison, in 2006, we had 207 girls from over 66 schools. While DPS schools made up over 31% of the attendees in 2006.

Girls Exploring Science, Engineering & Technology Event Final Report



FUNDING AND BUDGET

In comparison with the 2005 event, in 2006 we:

- ✓ Increased funding by 1% (\$85,724 vs. \$85,090) and increased in-kind donations by 30% (\$39,000 vs. \$30,000).
- ✓ Increased attendees by 16% (1397 vs. 1207)
- ✓ Increased chaperones by 20% and volunteers by 57%
- ✓ Received event coverage on Colorado NBC and WGN news, Rocky Mountain News follow-up coverage the day after the event, and press releases by Washington Group International, Lockheed Martin, and Raytheon

We do not charge any admission to this event. We rely solely on sponsors, in-kind donations, and volunteers.

Hosting the event at the convention center included subcontracts for security, show management, and fire safety and medical personnel. The catering contractor as well as the show management contractors worked very close with us to control expenses, especially in the areas of food and audio/visual.

We were once again able to secure donated plastic tote bags therefore, allowing us to eliminate bags from the budget. We will continue to seek sponsorship for this item in the future. The bags are necessary for the girls to take home information handouts and giveaways from sponsors.

Girls Exploring Science, Engineering & Technology Event Final Report

The budget included coffee for the volunteers and chaperones this year, in response to comments from adult surveys from past years and as a way of thanking the numerous volunteers and chaperones for their time and efforts.

The thirteen LEGO Mindstorm™ robotic kits owned by GESET were put to good use again in workshops during the event this year.

PROGRAM SCHEDULE

Tuesday, April 10, 2007

- 8:45 a.m. – 9:30 a.m. Check-in / Information for all participants
- 9:30 a.m. – 9:50 a.m. Welcome / Opening Remarks
- 9:55 a.m. – 12:30 p.m. Workshops including hands-on demonstrations and activities
 - 9:55 a.m. – 10:40 a.m. Various 45 minute workshops
 - 10:50 a.m. – 11:35 a.m. Various 45 minute workshops
 - 11:45 a.m. – 12:30 p.m. Various 45 minute workshops

OR (depending on assigned workshops)

- 9:55 a.m. – 11:05 a.m. Various 70 minute workshops
- 11:15 a.m. – 12:25 a.m. Various 70 minute workshops
- 12:30 p.m. – 1:15 p.m. Lunch / Closing Remarks / Door Prizes.

The event was opened by GESET Event Chair and SWE representative, Sandra Scanlon, with a welcome, brief discussion of logistics for the day, and an introduction of Eve Aguilar. Eve Aguilar, a freshman at Colorado College in Colorado Springs, received a full scholarship through the El Pomar Foundation. She volunteers with several organizations, tutoring and mentoring elementary and middle school students. Eve spoke from her heart about staying in math and science, highlighting many of her own experiences and the variety of academic and career choices she has available to her because of this background. She also addressed giving back to the community through volunteer work. Eve really resonated with the girls as she spoke from their perspective, being not far removed in age and experience from the attendees. She closed her remarks by suggesting the broad potential in these girls to pursue an inspiring and thrilling future in science, technology, engineering, and math fields – and that it can be rewarding and cool. This was a motivating kick-off for the 2007 event.

Eve Aguilar was followed by Kelly Condon, representing Lockheed Martin, who engaged the girls with questions about the reason for being there and encouragement for the future of girls in science, engineering and technology careers. Next, Mary Petryszyn from Raytheon took a few moments to connect with the girls to excite them about the day and the imperative to get students interested in pursuit of engineering, math and science careers for our future. Finally, Melissa Canaday, Junior Achievement, made remarks that encouraged the girls to enjoy the day's program and provided instructions for where to proceed next, how to navigate through the day and when to return to the ballroom.

This year's event also featured lunch speakers. Patty Keck, Ch2MHill, provided brief remarks addressing areas the girls learned more about in the workshops and connecting the importance of taking appropriate math and science in high school to prepare for the future. She then introduced the next speaker, Jackie Schirmer, representing Washington Group International, who discussed what her company does and why they sponsor the GESET event for the girls based on their need for engineers. Finally, Jackie introduced Jean Mooney, representing one of GESET's hosts – Agilent, for a few positive words of endorsement of the GESET event and to lead door prize announcements, drawing of tickets, and distribution of prizes. She was assisted by Jackie Schirmer. Sandra Scanlon then provided closing remarks and farewell.

A description of the 43 different workshops presented is included at the end of this report.

EXHIBITS

Girls Exploring Science, Engineering & Technology Event Final Report

In order to provide an avenue for the chaperones to learn about local organizations within the science, engineering and technology community, an exhibit area was again provided. Only one exhibitor cancelled the day of the event due to car trouble.

Seventeen exhibitors were slated to share information about programs or resources for girls. With one exhibitor unable to participate due to business emergency, the exhibitors included: SWE-RMS; Junior Achievement; Lockheed Martin; Raytheon Math Moves You; CABPES; CSM Women in Science, Engineering and Mathematics; Colorado MESA; CU - Women In Engineering Program; Multi-Purpose Engineering Program (CU); American Council of Engineering Companies of Colorado (ACEC); Department of Wildlife; Ch2MHill; American Institute of Aeronautics and Astronautics (AIAA); UCAR Windows to the Universe; Science From CU – A Science Discovery Program.

HANDOUTS / GIVEAWAYS

The following items were sent home with each attendee: a 26-page “Explore Engineering Activity Book” complete with answers (this activity book was created by a SWE-RMS member and Raytheon employee, and printed by Washington Group International); “Three Cheers to Engineers,” a popular student brochure reprinted from Girls' Life magazine, provided by Agilent; brochures listing what courses to take in high school; descriptions of various engineering disciplines; websites listing career guidance and scholarship information; and various trinkets from sponsors (notepad, pens, pencil, highlighters); a SWE Facts brochure. The chaperones each received the same items, as well as participant certificates for each girl provided by Raytheon.

To encourage the girls (and adults) to complete the post-event surveys, door prizes were offered. The door prize drawing was held at the end of the event and included: four daily passes to Elitches Gardens sponsored by Leonard Rice Engineers; two daily passes to Elitches Gardens sponsored by SWE-RMS; 3 picnic game backpacks, and 25 Math Moves U yo-yo's and mouse pads sponsored by Raytheon; Goodie bag sponsored by Lockheed Martin; 2 portfolios, jewelry case, Genji perfume, 3 Velocity moisturizers, and Belara shower gel and body lotion sponsored by Scanlon Consulting, Inc.; Target, Wal-Mart, and Sam's gift cards; 1 canvas carrying bag, 1 t-shirt, 1 stuffed animal, 1 CD case, 1 water bottle, 1 baseball hat, and 1 ID holder sponsored by Colorado School of Mines.

VOLUNTEERS

Our volunteer coordinator this year was new, and continued the tradition of recruiting and coordinating an excellent turn-out of 2006 event volunteers. She used her skills in the human resources career field to manage a detailed process to coordinate the 263 GESET volunteers. Our previous volunteer coordinator provided guidance and support to make the transition smooth.

The goal for the event was to provide one mentor (or guide) for every 10 girls. Volunteer support is an opportunity for the sponsoring companies to flourish. The majority of our volunteers come from the major sponsors. We had enough volunteers come forward that we were able to achieve our desired 10:1 ratio. Usually, events or organizations struggle to recruit enough volunteers. Our success with volunteers is one more indicator of the power of this event and the desire by individuals and companies to encourage more girls to pursue math and science and ultimately feed the employment pipeline.

The majority of our volunteers came from Lockheed Martin, with 134 volunteers, Raytheon with 30, and Agilent with 20. Washington Group International provided 18 volunteers, Merrick & Company provided 7, ULA provided 6 and Qwest provided 5. Fifteen of the volunteers were SWE-RMS members. The following companies also provided volunteers the day of the event: Black & Veatch, SA Miro, Computer Sciences Corporation, HDR Engineering, Northrop Grumman, Acura Engineering Colorado, Ball Aerospace, Burns and McDonnell, Colorado School of Mines, Colorado Springs Utilities, Dacey Technical Associates, Department of Defense, EnCana Oil and Gas USA Inc., First American REO, Institute of Electrical and Electronics Engineers, Communications Society, Leonard Rice Engineers, National Society of Collegiate Scholars, Omitron, Inc., Scanlon Consulting Services, Inc., spiral of life coaching, Sun Microsystems, TCB, Inc., Technically Speaking, Inc., The Engineering Network, University of Colorado, URS Corporation, V3 Companies of Colorado.

Girls Exploring Science, Engineering & Technology Event Final Report

Some individuals who volunteered did not specify whether their company was sponsoring their participation or whether they took the day off as personal time, and therefore we were unable to account for their participation by company. Workshop presenters volunteered their time for the event and are listed separately in the workshops descriptions below.

WORKSHOPS

Invisible Forces from Agilent replaced Prosthetic Devices the evening before the event as the original presenter was ill and couldn't attend.

This was a 45-minute workshop to be presented three times. Invisible Forces replaced the first 2 sessions but did not have enough materials for the last one. The third session was covered by Letting Your Voice Be Heard - a last minute workshop from Raytheon.

Food Safety at Home and on the Go did not take place as the presenter was in an auto accident on the morning of the event. Letting Your Voice Be Heard from Raytheon (where the girls learned that it was okay to voice their own opinions) covered the first two sessions. The girls in the third session were distributed to several other workshops.

The following 50 workshop descriptions were provided to the attendees:

Around the World in Seconds – How GPS Satellites Work, Cindy Sarmiento and Lockheed Martin employee volunteers, Lockheed Martin, www.LockheedMartin.com
Workshop attendees simulate an interactive satellite system to understand how information is gathered and conveyed between the earth and orbiting satellites.

Presenters are all graduates from universities nationwide with degrees in fields such as aerospace engineering, chemical engineering, and computer science. All grew up interested in science and math and now, with technical degrees, apply their interests to the world of space.

Build a Bridge, Laura LaRiviere, PE, Kleinfelder, www.kleinfelder.com and Angela Blea, Roadway Engineer, URS Corporation, www.urscorporation.com
Students learn about civil engineering careers and go on to design, build and test their own paper bridges.

Laura is a registered professional engineer in the State of Colorado with degrees in civil engineering. Angela has civil engineering and economics degrees.

CBI Forensics, Amy Beatty, Jacqui Battles, Carrie Thor and Pam Schaner, Colorado Bureau of Investigation, www.cbi.state.co.us
Girls investigate a mock crime scene, test their powers of observation, learn about handwriting impressions, DNA analysis and fingerprints.
Presenters have degrees in chemistry or biology and work as specialized Laboratory Agents in Denver.

Chemistry and Crime, Major Michelle Rauch, Assistant Professor, United States Air Force Academy, www.usafa.af.mil
Students will conduct simple experiments to help understand the clues in a "who done it" mystery and determine the responsible party.
Major Rauch has multiple degrees in chemistry and teaches biochemistry at the Air Force Academy.

Cleaning Dirty Water, Sarah Dominick, Denver Water, www.denverwater.org and volunteers from: Boyle Engineering, CH2M Hill, Burns & McDonnell Engineering, Carollo Engineers and Church OWC.
Students will participate in cleaning dirty water using common water treatment techniques such as coagulation, flocculation, and filtration.
Sarah has degrees in civil engineering and environmental science.

Code Stepping, Tina Lombard, Senior Software Engineer and Ann Morrell, Engineer, Raytheon, www.raytheon.com
Using a list of commands, girls will learn the basics of writing software by moving a person to a specific destination using only a given list of commands.
Tina has a BS in computer science and mathematics. Ann has degrees in mathematics.

Girls Exploring Science, Engineering & Technology Event Final Report

Computer Game Creation, Michael Lewis and Jennifer Bergthold, Bits, Bytes and Bots, LLC, www.bitsbytesbots.com

Girls will use laptops to create a video game that they will take home on a CD.

Michael and Jennifer are pursuing degrees while teaching students about technology.

Computer Pieces and Parts, Angie Blackwell, Sr. IT Manager, Junior Achievement, www.jacolorado.org
Girls will take apart scrapped computers to learn about the hardware components that make a PC work and determine which one is missing.

Angie has a BA in history and has done coursework at several local community colleges in order to maintain and repair a computer network servicing 25 people.

Dive Into Athletic Training, Darryl Miller, Sports Medicine/Athletic Trainer and students from Denver Public Schools, www.dpsk12.org

Students will practice evaluating injuries, and take turns taping and bracing each other.

Darrell has degrees in industrial education, physical education and exercise physiology and is an EMT.

He is also an athletic trainer for the USA Wrestling team.

Eggstraordinary Landers, Lockheed Martin employee volunteers, Lockheed Martin, www.lockheedmartin.com

Students will design, build and test a system to protect an egg from a 10 foot fall using simple materials such as cardboard, tape and cotton.

Employees have a variety of engineering degrees and are eager to share their knowledge with young people to build incredible landers.

Electronics – Portable Lab, Fred Gluck, Instructor, Science from CU, www.colorado.edu/sciencediscovery

Hands-on workshop introducing basic electronics and electronic components. Students work in pairs to perform experiments, and design and implement their own circuits.

Fred is an engineer with degrees in mathematics, electrical engineering and computer science. In addition to teaching, he volunteers in Boulder public schools teaching and tutoring in math and science.

Geographic Information Systems, Robb Menzies, GIS Specialist, Denver Public Schools, www.dpsk12.org

Girls will learn about many uses of Geographic Information Systems as they map their favorite rides at Elitch Gardens or animals at the Denver Zoo.

Robb has extensive GIS experience in both public education and the commercial world.

Glider Competition, Willie Daniels and Zaida Gomez, President and student, Shades of Blue, www.ourshadesofblue.org

Participants will learn about the science of flight, build and launch gliders in a competition.

Willie is an experienced United Airlines pilot who believes strongly in educating children to pursue careers in aviation and aerospace.

Gumdrop Domes & Paper Bridges, Deb Lasich and Melody Shum, Colorado School of Mines, www.mines.edu

This two-part workshop has the students building a dome structure using only gumdrops and toothpicks. Part two involves learning about bridges and building one from everyday materials.

Deb has degrees in sociology, and community and regional planning. Melody is a graduate assistant with a degree in computer science pursuing an additional degree in engineering and technology management.

Heart Dissection, Kristen Jensen, Youth Programs Assistant Coordinator, Denver Museum of Nature & Science, www.dmns.org

Dissection workshop will familiarize students with the human circulatory system and give them the opportunity to dissect a sheep's heart.

Kristen has a BS in anthropology and organizes the Camp-In and After School Science Quest programs at the Museum.

Girls Exploring Science, Engineering & Technology Event Final Report

How High Does the Atmosphere Go? Rebecca Matichuk, Department of Atmospheric and Oceanic Sciences, University of Colorado at Boulder

Students will understand the relative thickness of the very thin layer of the atmosphere that includes the troposphere and stratosphere. Students will build a model of the atmospheric layers.

Rebecca is a Ph.D. candidate at the University of Colorado at Boulder doing research on developing an offline three-dimensional model to investigate biomass burning smoke plumes.

Hydrogen Fuel Cell Model Car Competition, Carolyn Elam and Jill Gruber, Project Managers, U.S. Department of Energy, www.nrel.gov

Girls will construct model fuel cell cars to understand hydrogen production and storage.

Together, Carolyn and Jill have degrees in mathematics, chemistry and chemical engineering. They both manage hydrogen production, analysis, and education projects.

Ions, Electrons and Polymers, Shannon Burglin-Greivel, Research Scientist and volunteers from the Colorado School of mines, www.mines.edu

Students will set up a miniature electrolysis apparatus to conduct an experiment and observe a photolysis to make a polymer.

An early patent in electrodeposition led Shannon to graduate studies including a Ph.D.

Invisible Forces, Agilent employee volunteers. Agilent Technologies, www.agilent.com

Girls experiment with electrical currents and magnetic forces making an electric motor.

Agilent Technologies works to inspire minds and enrich lives in local communities by supporting programs that increase student interest and achievement in science. Workshop volunteers are technical and support employees.

Lego Robots, Stacey Fornstrom, Teacher, Thomas Jefferson High School and several community volunteers, www.computermagnet.com

Girls learn how to modify and program a robot to obey their every command by working with Lego Mindstorm robots. They create a program, download it to the robot and test their work.

With an extensive background as a software consultant, Stacey now teaches in the Denver Public School System.

Letting Your Voice Be Heard, Ann Rossino, Gretchen Collings and Lou DiPalma, Raytheon, www.raytheon.com

Workshop was designed to promote self-esteem, self-awareness and respect for individual differences in girls resulting in an enhanced capacity for leadership.

Presenters all have degrees in engineering and/or human relations and enjoy working with young people.

Make an Aquifer! Kristina Wynne, Graduate Student, University of Colorado, Department of Geology, www.colorado.edu/geography

Students learn about aquifers, design and build one using different sediments of their choice, and strategize to build one that will hold the most water.

Kristina has a degree in environmental science and is working on her Ph.D. in fluvial geomorphology.

Marco Polo: Using Your Ears to See, Lisa Aldrich, Systems Engineer, Raytheon, www.raytheon.com

Girls will learn how submarines use sound to learn where other submarines are. The impact of sonar on wildlife will be discussed.

Lisa is an electrical engineer pursuing a masters degree.

Math Moves U, Terri Matthews, Stephanie Moore, Vickie Brown, Raytheon, www.raytheon.com

Students will do fun math problems and learn about Raytheon's Math Moves U website.

Terri Matthews has degrees in mathematics and computer science.

Navigation Techniques, Bob Shiflet, Lockheed Martin, www.lockheedmartin.com

Girls will learn a bit about the history of navigation and different types of equipment used. They will make a compass, sextant and learn how to use them.

Girls Exploring Science, Engineering & Technology Event Final Report

Bob has degrees in biology, chemistry and computer resources management. He is retired military and works with several youth groups.

Nitrogen Cycles, Christine Wiedinmyer, Scientist, National Center for Atmospheric Research, www.ncar.ucar.edu

Girls will be given a “passport” and travel to different “reservoirs” within the room to learn how nitrogen travels from system to system.

Christine has several degrees including a Ph.D. in chemical engineering and works as a research scientist at NCAR.

Oil Spill and Clean Up, Agilent employee volunteers. Agilent Technologies, www.agilent.com

Girls will simulate an oil spill, investigate and use various materials to clean it up.

Agilent Technologies works to inspire minds and enrich lives in local communities by supporting programs that increase student interest and achievement in science. Workshop volunteers are technical and support employees.

Ozone Chemistry, Cynthia Singleton, Scientist, Laboratory for Atmospheric and Space Physics, University of Colorado, www.lasp.colorado.edu

Students will role play various atoms and molecules to understand the formation and destruction of ozone in the stratosphere.

Cindy has a Ph.D. and has worked on quantifying stratospheric ozone loss from satellite observations and comparing this to modeled ozone loss calculations.

Process Technology, Chuck Beck, Program Coordinator, Red Rocks Community College, www.rccc.edu

Girls will create a polymer-like substance similar to silly putty learning the process principles of proper proportions and batch processing.

Chuck is a graduate chemical engineer with vast experience in the energy, food, and beverage process industries.

Roadway Planning, Michelle Hansen, Transportation Engineer, Stolfus and Associates, www.stolfusandassociates.com and Jessica Myklebust, Environmental Scientist, Felsburg Holt & Ullevig, www.fhueng.com

Girls will work in groups to define a roadway alignment between points A and B surmounting several obstacles and learning about topography, traffic patterns and the impact on natural resources.

Michelle is a professional engineer with a degree in civil engineering. She works on a variety of projects while Jessica is an environmental scientist with a degree in geography and environmental science and focuses on natural resource and environmental awareness.

Rocket Science 101, Brittany Albrandt, Cathy Andrulis, Engineers, Lockheed Martin, www.lockheedmartin.com

Students learn about rockets and how they are produced in a factory in Denver and transported to Cape Canaveral. They will build paper rockets and launch them to find which ones go furthest.

Presenters are graduates from universities nationwide with degrees in fields such as aerospace engineering, chemical engineering, and computer science with interests in science and math. Now, with technical degrees, they apply their interests to the world of space.

Rocks from Space – Meteorites, Suzanne Traub-Metlay, Fiske Planetarium, <http://fiske.colorado.edu>

Girls will learn the properties of meteorites and how scientists analyze them. Using magnets and magnifying glasses, they will identify actual meteorite samples.

Suzanne has degrees in history, science, geology and planetary science. Teaching is her passion.

Sands and Time Secrets, Shannon Mahan, Research Geologist, U.S. Geological Survey, www.usgs.gov

Girls will learn several ways to date earth resources from counting tree rings to examining different sands from all over the world.

Shannon has a degree in geology and now directs the USGS Luminescence Dating Lab.

Saturn’s Rings, Barbara Sande, Sr. Staff Engineer, Lockheed Martin, www.lockheed.com

Students learn how to plot orbiting speeds and distances of Saturn’s rings. They will also read and evaluate the biographies of Cassini Mission scientists to prepare for plotting their own career paths.

Girls Exploring Science, Engineering & Technology Event Final Report

Barb is an electrical engineer with an MBA and enjoys working with students.

Separating Blood to Save Lives, Beth Ebmeier and volunteers from Gambro BCT, www.gambrobct.com
Students will learn about the science of blood separation and have an opportunity to practice with a non-blood solution.

Presenters have degrees in mathematical engineering, manufacturing engineering, chemical engineering and industrial engineering.

Solar Racers, Morgan Curley, DOE Department Manager, National Renewable Energy Laboratory, www.nrel.gov

Students will construct their own electric cars powered by solar cells.

Morgan has degrees in physics and education with extensive teaching experience.

Solar Vehicles, Agilent employee volunteers. Agilent Technologies, www.agilent.com

Girls will build their own solar-powered cars and watch as the sun's energy powers their vehicles.

Agilent Technologies works to inspire minds and enrich lives in local communities by supporting programs that increase student interest and achievement in science. Workshop volunteers are technical and support employees.

Spinning in Space, Carol O'Leary, Challenger Learning Center, www.clccs.org

Learn how the Barany Chair tests the impacts of microgravity in the human body systems. Students have the opportunity to simulate space travel by spinning in the chair and using vision-shifting glasses.

Carol has degrees in physiology and science education. She is President of the Colorado Consortium for Earth and Space Science Education.

Starlab, Gwen Eccles and Teresa Ross, Fiske Planetarium, <http://fiske.colorado.edu>

The girls will participate in a portable planetarium show on the structure of the solar system.

Gwen has a degree in astronomy and is on staff at Fiske to teach astronomy programs. Teresa will graduate in May from CU Boulder with a degree in astrophysics and planetary sciences.

Sunset Colors and Wavelengths, Teri Eastburn and Kyle Mumford, National Center for Atmospheric Research, www.ucar.edu

Girls will expand their knowledge of light, atmospheric optics, climate change and technological tools utilizing light for atmospheric research to increase their knowledge of weather and climate.

Teri has degrees in developmental psychology and human development with plans to pursue a Ph.D. in educational technology.

Vibration and Sound, Agilent employee volunteers. Agilent Technologies, www.agilent.com

Girls will build their own thumb piano learning about vibration, frequency and pitch. Sheet music and encouragement will be provided to help them master their new instruments.

Agilent Technologies works to inspire minds and enrich lives in local communities by supporting programs that increase student interest and achievement in science. Workshop volunteers are technical and support employees.

Virtual Anatomy, Adam Lawson, Touch of Life Technologies, www.toltech.net

Girls will explore the virtual body in three dimensions and see corresponding cross-sections for every millimeter of the human body.

Adam has degrees in liberal arts and evolutionary psychology while continuing his studies in anatomy and computers.

Water and Wildlife, Kalie Nye and Peggy Mott, Colorado Division of Wildlife, <http://wildlife.state.co.us/>

Girls learn about wildlife habitat and the importance of unpolluted water to wildlife. They will layer an aquarium to model an aquifer.

Kalie and Peggy have degrees in civil engineering, environmental engineering and physics. Both practice conservation engineering.

Water Ecosystems, Meghan Rubinstein, Denver Zoological Foundation, www.denverzoo.org

Girls Exploring Science, Engineering & Technology Event Final Report

Girls will study aquatic ecosystems, conduct four types of water quality tests and sample local pond water.

Meghan has a degree in biology and enjoys teaching outreach programs for the Zoo.

Water Flow and Drainage, Andrea Faucett and Nikki Randall, Ayres Associates,
www.ayresassociates.com

Girls will explore the world of water resource engineering and work with a portable demonstration channel (flume) to learn about roadway drainage.

Andrea and Nikki have engineering degrees and work in water resource engineering including urban drainage design.

Water Problems in Developing Countries, Nancy Stewart and Nina Miller, Water for People,
www.waterforpeople.org

This workshop addresses the plight of people in countries that lack safe drinking water and adequate sanitation. Girls will learn about simple affordable technologies to address these issues.

Nancy and Nina are experienced educators speaking widely on water issues to all age levels.

Water Quality Tests, Dorothy Noble and Volunteers from City and County of Broomfield,
www.ci.broomfield.co.us

Girls will rotate among several stations to test chemical and microbial differences in water samples.

Presenters have degrees in several fields including biology and chemistry. All have extensive experience in water quality issues in many countries.

What a Brain, Lisa Treviso, Speech Language Pathologist, University of Colorado Hospital,
www.uch.edu

Working with play dough, the girls will make a model of the brain and learn about the functions of each area and how areas are affected by stroke, injury or disease.

Lisa has degrees in speech language pathology and a great deal of clinical experience.

Wind Engineering and You, Linda Lung, Manager, Department of Energy's Office of Science, National Renewable Energy Laboratory, www.nrel.gov

Students will build and test a model wind turbine.

Linda has degrees in social work and psychology. She manages the Department of Energy's Office of Science overseeing its student and teacher programs.

You Can Win at Math & Science, Michele Towers, Engineer/Life Coach, New Directions Coaching LLC,
www.coaching4newdirections.com

Girls will learn through fun activities the 10 keys to succeed in math and science.

Michele is a mechanical engineer with a passion for helping others reach their full potential.

Girls Exploring Science, Engineering & Technology Event Final Report

APPENDIX A

“Girls Exploring Science, Engineering & Technology” Event April 10, 2007

Sponsorship Levels:

Senior Sponsors – \$10,000

Sponsors in this level will receive all Junior level benefits plus the following:

- The sponsor’s banner hung in the ballroom near podium/stage for the event.
- An opportunity to extend a personal welcome to the guests on behalf of the sponsor during breakfast or lunch.

Junior Sponsors – \$5,000

Sponsors in this level will receive all Sophomore level benefits plus the following:

- An invitation to the SWE Rocky Mountain Section Awards and Recognition Banquet in June 2006 where sponsor will be recognized for supporting GESET.

Sophomore Sponsors – \$2,500

Sponsors in this level will receive all Freshman level benefits plus the following:

- Sponsor level listing provided to all media covering the event.
- Podium recognition of sponsorship level.

Freshman Sponsors – Up to \$2,499

Sponsors in this level will receive the following:

- Sponsor level listing in all program materials and reports.
- A final report covering the event, including letter of appreciation, statistics and picture.

Specific Sponsorship Opportunities:

As a sole sponsor of one of the following, the sponsor will have signage at the event indicating as such. Any printed materials, advertising, etc. will list this sponsorship as well. Sponsorship of the following will be acknowledged at the appropriate sponsorship level.

- Breakfast sponsor
- Lunch Sponsor – In addition to sponsoring lunch, the sponsor may provide company logo stickers that can be placed on the boxed lunches or the sponsor may provide nylon lunch bags, which have the company logo and event name screened on them
- A/V Equipment Sponsor
- Computer Sponsor (Computers are used in numerous workshops on-site)
- Tote Bag Sponsor – The bags (plastic or otherwise) may have company logo
- T-shirts for the attendees and volunteers
- Registration Area, including coffee service for volunteers and chaperones
- On-Line registration (in kind services), initial programming, support and web server hosting
- Copying and Postage (in kind services) for registration packets to schools
- Workshop Presenter, including all materials and handouts
- Exhibits Participant

“Adopt-A-School” Sponsorship Opportunities:

Select a participating school to “adopt” as the sole sponsor for that school. Adoptive sponsor will have signage at the event indicating as such. Any printed materials, advertising, etc. will list this sponsorship

Girls Exploring Science, Engineering & Technology Event Final Report

as well. In addition, each adopted school will receive a GESET certificate recognizing the adoptive sponsor.

Provide funding (\$600) for a school to bring up to 40 students to the event. Funding covers bus transportation and substitute teacher costs. Most schools offer this event as a field trip and as such, costs associated with attending the field trip must come out of the schools field trip budgets. Many schools can only afford two field trips per year per class. {Registration is free to attendees.}

Student Sponsorship Opportunities:

Provide funding for a student to attend the event. Sponsor one or more students at \$30 each which covers the cost of hosting the event for that student. {Registration is free to attendees.}

Other In-Kind Sponsorship Opportunities:

Provide 1,600 giveaways, one for each attendee and chaperone, with company name/logo.

Provide a career guidance handout to go in the bags for the attendees to take home. The handout may have company info and logo, job line/website, and highlight philanthropic activities the company has sponsored in the local community or career guidance activities the company has sponsored or participated in locally.

Allow employees to volunteer the day of the event. Volunteers may wear company logo attire at the event. Volunteers will receive a certificate and lunch for volunteering at the event.