expanding your horizons

motivating young women in science + mathematics

Santa Fe Fall
Expanding Your Horizons
STEM Conference for Young Women
5th-8th Grade
Saturday, October 15, 2016
Santa Fe Community College

http://www.expandingyourhorizons.org/conferences/SantaFe/

Presented by:
NMNWSE
AAUW of Santa Fe, New Mexico
STEM Santa Fe

Summary Report
Prepared by: Kate Gomez

Mission:
The mission of Expanding Your Horizons (EYH) Network is to inspire girls to recognize their potential and pursue opportunities in science, technology, engineering and mathematics (STEM). Through EYH conferences, we provide STEM role models and hands-on activities empowering girls to see themselves as future participants in STEM-related careers. Our ultimate goal is to motivate girls to become innovative and creative thinkers ready to meet 21st Century challenges.

Conference Schedule:

8:00-9:00	Check In & Games
9:00-9:40	Welcome & Keynote Address
9:45-11:45	Adult Workshop
9:45-10:55	Workshop I
11:00-12:10	Workshop II
12:15-1:30	Lunch, Raffle, Group Photo
1:30-3:00	STEM & College Fair
2:30-3:00	Pick up in the Jemez Rooms

Keynote Speaker: Sara Del Valle

Sara Del Valle was born in Mexico and moved to the U.S. at the age of 16. As a child, she always loved school and fell in love with mathematics when she was introduced to algebra. Looking around on the web for a Research Experience for Undergraduates (REU) program during her senior year at the New Jersey Institute of Technology (NJIT), she came across the Mathematical and Theoretical Biology Institute (MTBI). This REU program exposed her to mathematical epidemiology, which became her career path. With both a bachelor's and a master's degree in Applied Mathematics from NJIT, she enrolled in the Ph.D. program at the University of Iowa. While in graduate school, she moved to Los Alamos National Laboratory (LANL) to continue working on her thesis there. After receiving her Ph.D. from Iowa, she joined LANL in a postdoctoral position and has now been working at LANL for over 13 years. Sara Del Valle is an applied mathematician who works on mathematical and computational models for infectious diseases. The main thrusts of her research are to improve the understanding of human behavior and their impact on disease spread as well as to develop disease-forecasting systems. She has developed mathematical and computational models to understand the impact of infectious diseases such as HIV, smallpox, influenza, malaria, and most recently Ebola and Zika. She is also one of the pioneers in investigating the role of internet systems on monitoring and forecasting disease spread. Sara is a science geek, fashion enthusiast, daughter, sister, wife, and mother of a marvelous 2.5 year-old girl named Zoey. During her spare time, she enjoys being with her family and encountering new adventures. "Being a scientist doesn't mean that you have to wear boring clothes, you can be fashionable and wear things that makes you happy". — Sara Del Valle

Student Workshops and Presenters

Why empty matters? (Kateryna Artyushkova and Erica Douglas): What is a vaccuum and how can we use it to further our scientific knowledge? Learn about gravity, air resistance, and sound in space!

A Hands-on Introduction to Arduinoand LilyPad (Sandy Frost): Build a simple circuit with and LEP and program the Arduino software to control it! This is specially designed for e-textiles and wearable projects!

Physics of Flight and More! (Elizabeth Hunke): Have you ever wondered what makes an airplane fly? How pilots communicate? Come and learn about the physics of flight, aircraft design, navigational charts and more!

***Tails of Veternarian! (Gretchen Yost DVM)*:** Come and be a veternarian for the day! Learn how to adminster injections, interpret radiographs, and complete sutures on (stuffed) animals!

***DNA Detective (Joann Mudge and Anitha Sundararajan)*:** We will have the girls work through a bioinformatics module on the computer (or two if we have time). These are case studies where you use actual DNA sequences to solve a problem.

Exploring Exponential Functions with Skittles (Kathe Kanim): For this workshop on exponential functions you will run an experiment using skittles, make predictions and calculate a mathematical model. Then compare it to recent outbreaks.

***Robotics without Borders (Lori Hanson)*:** Program and remote control drive full-sized Tetric MAX robotos. Use probability and participate in a mock-robot tournament! **(Cancelled due to emergency)**

***Raspberry Pi, not a fruit or a pie (Teri Roberts)*:** Use binary digits and Boolean Logic to explore Microporocessors and Rasberry Pi (snap together) computers!

***Social Life of Pennies (Vanessa Job)*:** Is it possible for 25 pennies to be placed flat so each penny touches exactly 3 other pennies? Use logic and probability to solve mysteries in this exciting workshop!

***Light, Color, and Sparkles (Alex Saari and Laurie Waters)*:** Explore the wave nature of light and the electromagnetic specturm using lasers and other amazing light transmitting tools!

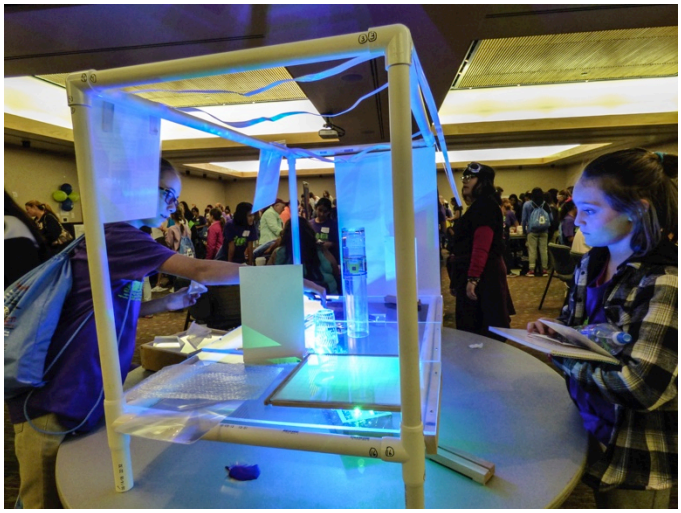
***Snoozing Plants (Turin Dickman)*:** How does light affect plant leaves? Experiment with leaves to see how light effects a plants' cycle.

***Density in Action! Make Your Own Lava Lamp (KarenAnn Caldwell and Charlotte Stalker)*:** How does temperature and relative density effect different materials? Come see with this hands-on demonstration!

***Computer Hacking Queen of the Hill (Shelby Trujillo and Neale Pickett)*:** Hands-on working with breaking secret codes, exploiting poorly-written software, counting like a computer (binary, hexadecimal), and more! Work on a team with your friends to break through the most puzzles and become Queen of the Hill!

Adult Workshop: Mathematical Circles (James C Taylor): Math Circles bring K-12 students or teachers together to work on interesting problems or topics in mathematicsin a setting that encourages a sense of discovery and excitement about mathematics through problem solving and interactive exploration.

STEM & College Fair Participants
Girls, Inc.
Explora
Supercomputing Challenge
Fractal Foundation
Bradbury Scientist Ambassador
NM MESA
Big Sky Learning
Simtable LLC
National Center for Genome Resources (NCGR)
Rio Grande Norte 99s
Make Santa Fe
Navajo Technical University
Northern NM College
Santa Fe Community College
Dona Ana Community College
St. John's College



Sponsors

New Mexico Network for Women in Science and Engineering
American Association of University Women of Santa Fe, NM Inc.
STEM Santa Fe
Santa Fe Community College
Hestia Fund of Santa Fe
Sandia National Laboratories
Los Alamos National Laboratory & LANS, LLC
Flow Science, Inc.
New Mexico EPSCoR
Infinite Possibilities Fund at Santa Fe Community Foundation
Los Alamos National Bank
Los Alamos Women in Science (LAWIS)
Arthur and Mary Jensen

This conference was brought to you by the tireless efforts of the Fall EYH-Santa Fe Planning Committee:

Lina Germann, co-chair
Kate Gomez, co-chair
Shirley Aune, volunteers coordinator
Jenn Baker, STEM & College Fair coordinator
Ruth Howes, PR and Media coordinator
Mary Jensen, Registrar
Laurel Winter, Workshops coordinator

With a special thank you to our volunteers*:

Karen Thomas, Krisztina Boda, Craig Bruce, Marie A. Garcia, Art Jensen, Lily Nathanson, Zoe Ledbetter, Janeth Quijada, Tatiana Pineda, George Aune, Shelly Rossbach, Beatrice Montoya, Patricia Rael, Molly Timmins, Monioque Gurule, Sandra Bradley, Shannon Casey, Anastasia Piliouras, Ailin Liu, Elizabeth Simons, Carolyn Cook, Luanne Moyer, Susan Mathews, Grigory Ovanesyan, Olga Serafinova, Elizaebth Coronado, Victor Coronado, Lori Dauelsberg, Kimberly Juarez, Karen Blazosky, Bobby Kosowski, Jeanne Patrick, Jack Storace, Liz Ruedig, Sarah Fassett, Gabrielle Gerholt, Anastasia Piliouras, Alishiya Kapoor, Judy Pino

And our Group Guides:
Jordan Kamauoha, Anna Romero, Rachel Huber, Basia Cruz, Amani Bidwell, Michelle Hanson, Allyson Holley, Caroline Kirkpatrick, Josephine Kilde, Nohemy Bojorquez-Flores, Kelly Malone, Deanne Brown, Jan Frigo

And our photographers:
Virginia Lee Lierz and Matthew Snead

And the **STEM and College fair presenters** (20 participants)

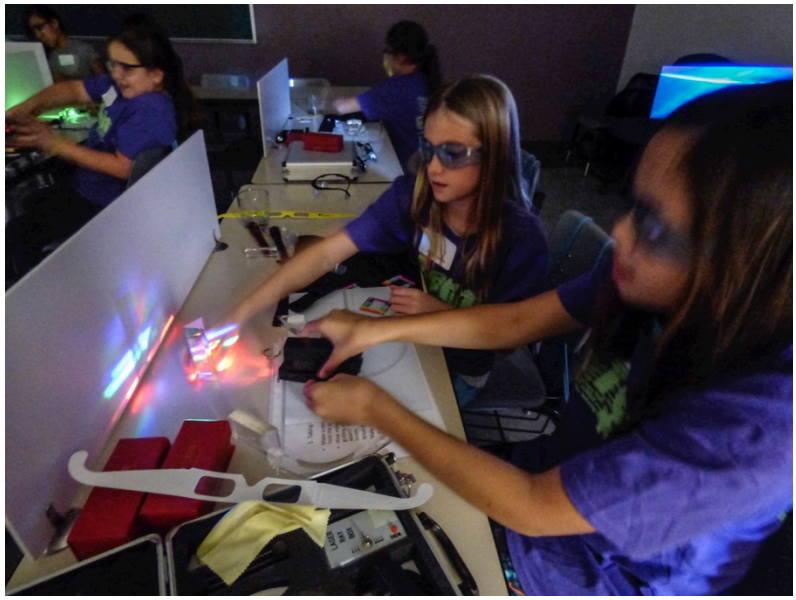
A special thanks to our **workshop presenters and keynote speaker** (14 participants)

Total number of volunteers: 87!

*We apologize if we forgot anyone… or misspelled anyone's name.

Many thanks to the donors of goodies for the girls' swag bags and raffle prizes:
AAUW of Santa Fe, Los Alamos National Bank, Santa Fe Community College, LAWIS, Whole Foods, Ingersoll Rand, Meow Wolf, and Santa Fe Botanical Garden.

Also our thanks to Santa Fe Public Schools for their support



Outcomes

Number of participants:
Student registered to attend: 190
Student participants (based on check-in at conference): 168
Student evaluation forms received: 163
Students receiving scholarship to attend: 14 out of 168 (8% of attendees)
Student receiving outside funding from schools/other organizations: 45 out of 168 (26%)
Adult workshop participants: 21 (teachers and parents)
Adult Volunteers total: 87

Demographics of student participants:
Demographic data on school of origin, grade level, and ethnicity of students collected from student evaluation materials completed onsite and pre-registration forms.

Table 1: Grade Level of Participants (based on registration sign-in)

Grade	Number of Participants	Percentage
5th	67	40%
6th	47	28%
7th	34	20%
8th	20	12%
Total	168	100%

Graph 1: Grade Level of Participants (based on registration sign-in)

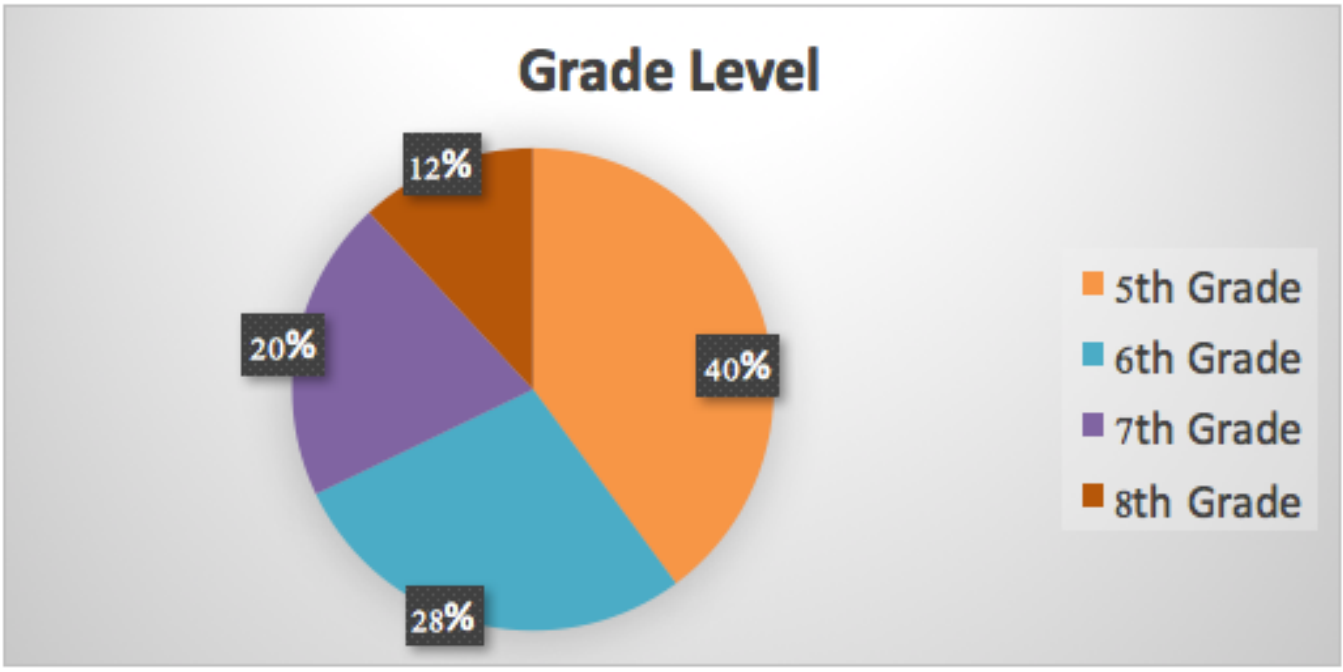


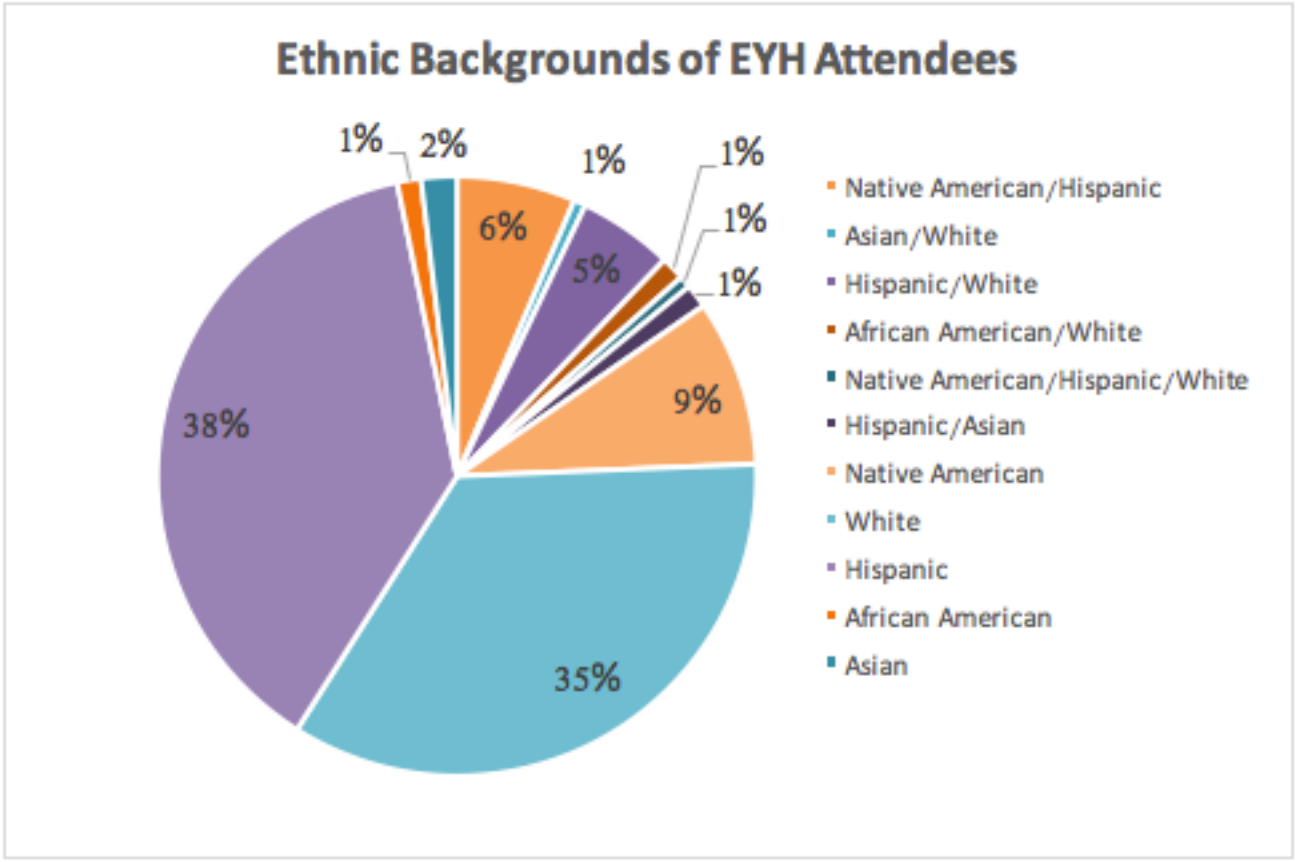
Table 2: Represented Schools (based on registration sign-in).

School	**#**	**School**	**#**
Academy for Technology and the Classics	2	K12 Online Academy	1
Acequia Madre Elementary School	1	La Mariposa Montessori School	4
Albuquerque Academy	1	Los Alamos Middle School	3
Amy Biehl Community School	10	Mandela International Magnet School	2
Anansi Charter School	7	Monte del Sol Charter School	2
Atalaya Elementary School	1	Mountain Elementary School	1
Barranca Mesa Elementary School	1	Nava Elementary School	4
Capshaw Middle School	2	Nina Otero Community School	3
Carlos Gilbert Elementary School	4	Ortiz Middle School	2
Carlos Vigil Middle School	1	Penasco Elementary School	1
Cesar Chavez Elementary School	1	Pinon Elementary School	9
Chamisa Elementary School	2	Pojoaque Valley 56A	1
Chaparral Elementary School	4	Pojoaque Valley Intermediate School	11
Cimarron Elementary Middle School	17	Pojoaque Valley Middle School	4
EJ Martinez Elementary School	4	Ramirez Thomas Elementary School	1
El Camino Real Academy	2	Saint Michael's High School	2
El Dorado Community School	13	Santa Fe Girls School	5
Eutimio Tim Salazar III Elementary School	2	Santa Fe Indian School	12
Fayette Street Academy	1	Santa Fe Preparatory School	1
Gonzalez Community School	6	Santa Fe School for the Arts and Sciences	1
Homeschooled	1	Sweeney Elementary School	8
James Monroe Middle School	1	Tutorial School	2
		Wood Gormley Elementary	1

Table 3: Ethnicity of Student (Based on Evaluation Forms)

Ethnicity	Response Count
Native American/Hispanic	10
Asian/White	1
Hispanic/White	8
African American/White	2
Native American/Hispanic/White	1
Hispanic/Asian	2
Native American	14
White	54
Hispanic	59
African American	2
Asian	3
No Response	12
Totals	168

Graph 2: Ethnicity of Student (Based on Evaluation Forms)



Socioeconomic status:
The number of students who have requested scholarships has steadily declined over the past three years. For the 2015 conference 27 attendees received scholarships and 27 received sponsorship from their school or another organization. This year 14 attendees received scholarships and 45 received sponsorship from their school or another organization. When these two groups are combined approximately 35% of attendees received financial support to attend.

Evaluation of Conference Sessions

Keynote Speaker:
Table 4: Keynote Panel content rating.

Answer Options	Response Percent	Response Count
Boring	1%	1
Just OK	8%	13
Mostly Good	24%	38
Fantastic	43%	71
No Response	24%	39
Totals	100%	164

Workshops:
Table 5: Workshop rating

Workshop	Rating of Mostly Good/Fantastic	Average Difficulty Rating
Computer Hacking Queen of the Hill	90%	2.3 (Just Right
Why empty matters	90%	2.3 (Just Right)
A Hands-on Introduction to Arduinoand LilyPad	70%	2.1 (Just Right)
Physics of Flight and More!	87%	1.9 (Just Right)
Tails of Veternarian!	100%	1.9 (Just Right)
DNA Detective	91%	2.0 (Just Right)
Exploring Exponential Functions with Skittles	58%	1.6 (Just Right)
Raspberry Pi, not a fruit or a pie	97%	2 (Just Right)
Social Life of Pennies	79%	2.4 (Just Right)
Light, Color, and Sparkles	96%	2 (Just Right)
Snoozing Plants	96%	2
Density in Action! Make Your Own Lava Lamp	100%	1.9 (Just Right)

Table 6: Workshop ratings

Q8 Did this conference make you want to take more STEM classes?

Answer Options	Response Percent	Response Count
Yes	80%	132
No	4%	6
No Response	16%	26
Totals	100%	164

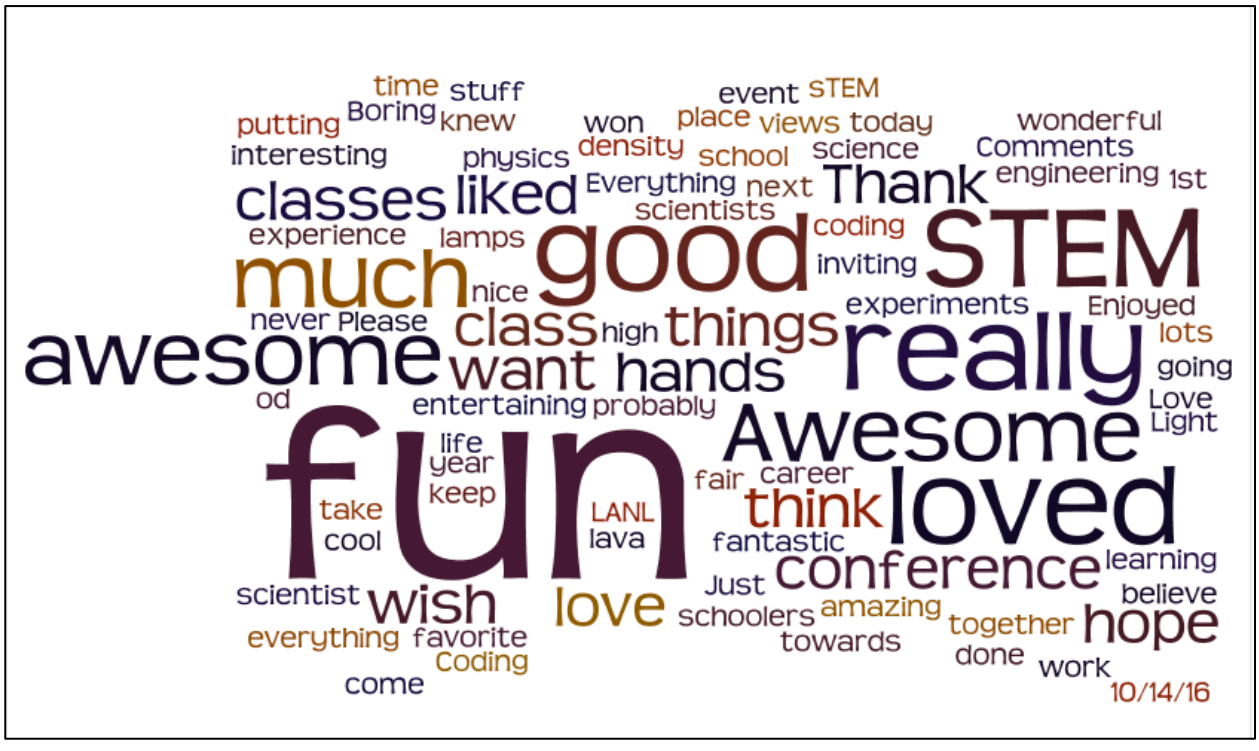
Q9 Did this conference change your attitude about STEM?

Answer Options	Response Percent	Response Count
Yes	58%	95
No	26%	42
No Response	16%	27
Totals	100%	164

Q10 Did this conference change your view of scientists, engineers, technologists and/or mathematicians?

Answer Options	Response Percent	Response Count
Yes	70%	115
No	14%	23
No Response	16%	26
Totals	100%	146

Comments:



Concluding Thoughts:

Every year brings new challenges and new triumphs to the Santa Fe Expanding Your Horizons Fall conference. This year we had a particularly strong steering committee with amazing enthusiasm which in turn brought about the highest registration for the fall conference in the past seven years and an increased number of volunteers for the day of the event! Their efforts brought about the following results:

- → Our conference capacity was 190 participants. 168 participants of 190 registered attended. This is an 86% attendance rate.
- → Participants came from forty-five different educational institutions! The majority of participants attended public schools, but several charter, private, and even homeschooled students were able to attend! This is six more schools than the previous year.
- → Students from schools as far as Cimarron, NM attended. This furthers our strong belief that *more* STEM related opportunities need to be offered throughout the state.
- → 65% of participants identified their ethnicity as either Hispanic, Native American, African-American, Asian, or multiple ethnicities. All of these ethnicities are under-represented in STEM fields.
- → 88% of participants rated the Keynote speaker as either Fantastic or Mostly Good.
- → Three additional workshops were included this year for a total of 13 workshops, but one workshop had to be cancelled due a family emergency.
- → 10 out of 12 workshops received were rated at Fantastic or Mostly Good by more than 80% of their participants!
- → The number of individual participants requesting scholarships continues to decrease, but the number of girls who participate through supporting organizations has increased! Only 14 participants received scholarships from EYH, but 45 participants were sponsored by their school or another organization. This is particularly exciting! The value of STEM experience is being increasingly recognized by schools and community organizations!

The core of our mission is to encourage young women to pursue STEM careers by providing STEM role models and hands-on activities for 5th-8th grade girls. Based on evaluation results, the Fall 2016 EYH Conference was incredibly successful in this mission! Our evaluation found that the majority of participants rated their workshops as "just the right" difficulty level and "fantastic" for its content!

This year we had a sophisticated method of distributing participants into their most highly sought-after workshops. **Nick Bennett of Friday Networking Lunch, LLC** volunteered to run the participants' workshop preferences through an algorithm to sort them. The algorithm accounted for their workshop preferences, grade level, and if they requested to be placed into the same group as a friend. This was an incredible tool and we found that we had less last minute changes in group assignments the day of the event.

Schools were challenged to increase the number of participants they sent this year, and they responded with enthusiasm! Several schools were represented this year that have not been in the past three years. While several schools outside of Santa Fe sent groups of students to participant, thirty of the forty-five schools represented are located within the city of Santa Fe. The other 15 schools represented were from Albuquerque, Cimarron, Taos, Los Alamos and Pojoaque. For the majority of these areas, the Santa Fe EYH conference is the closest one in the state for them to attend.

Finally, this year there was near 100 volunteers signed up to assist with this event. The sheer number of helping hands available and smiling faces greeting participants was astounding! Many of the girls participants' first "real" interaction with a STEM professional happened because of the workshop presenters' willingness to share their work with them. Participants were greeted with a smile and given key information at the registration table. They were guided through the day by inspiring young women interested in science. Participants were able to further interact with STEM professionals during the afternoon STEM & College fair. This event was made possible by our amazing volunteers.

We hope that we can continue the momentum of this year into the next. Our Steering Committee will remain largely intact, and the ideas to improve are already percolating. While this conference alone will not guarantee an increased representation of women in STEM, it is certainly the right place to start. We recognize a high need for similar events and activities throughout the year. Many thanks to all of our sponsors, supporters, donors, and volunteers for their dedication to this cause!