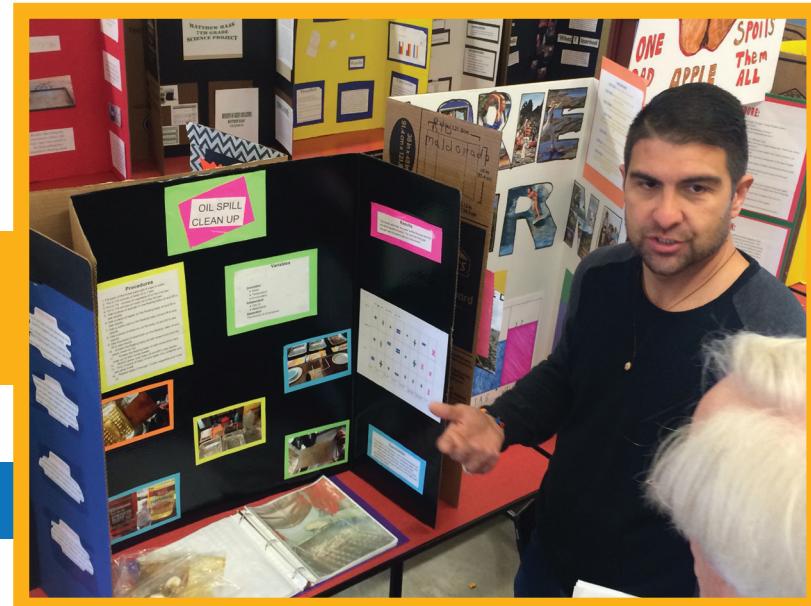
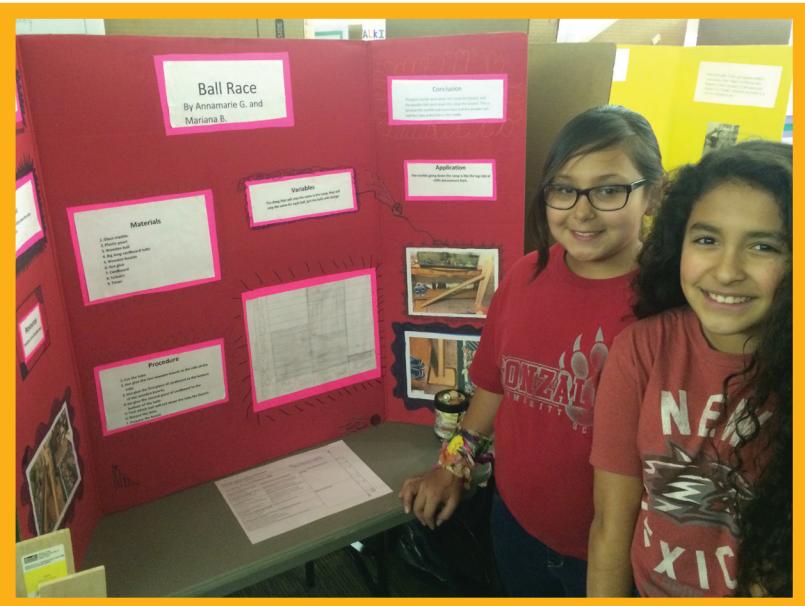


SANTA FE ALLIANCE FOR SCIENCE

Annual Report 2016



Volunteer scientists and engineers committed to strengthening the math and science skills of Santa Fe students

Dear friends,

Kids are innately curious about life and we want to encourage and strengthen the inner scientist in Santa Fe students. While not every student will pursue a job or career in STEM (science, technology, engineering and math), today's world demands a basic level of STEM proficiency among all youth.

Thanks to our 100+ cadre of volunteer STEM professionals, thousands of Santa Fe students have had a chance to interact with "real scientists" since our organization began in 2005. Our volunteers are the workhorse of this organization: they judge school science fair projects and mentor students during the science fair season; they tutor high school students in math and science; they visit elementary school classrooms to engage kids in hands-on science experiments; they speak at Science Cafes; they work behind-the-scenes updating our website, recruiting volunteers, and tracking volunteer hours; and for the most part, they have FUN doing it.

Here are a few highlights from our 2015/2016 school season:

- Our volunteers engaged more than 2,500 kids in hands-on experiments in our newest program, which grew from a few classrooms in 2014 to 98 classrooms this past year. We now have a volunteer team dedicated to this popular program.
- We judged 1,932 science fair projects at 26 fairs, including about 200 projects at the district's science

**"Tell me and I forget,
teach me
and I may remember,
involve me and I learn."**

— Benjamin Franklin

fair Expo. With our volunteer involvement, the number of science fairs in Santa Fe has quadrupled in eight years.

- We have expanded our resources for students and teachers on our new website – check it out at www.safs.org.

Each year we re-evaluate our programs to see how we can expand and strengthen our partnership with the Santa Fe Schools and ultimately, harness our unique talent pool to strengthen STEM learning for all Santa Fe youth. With your support--as a volunteer, donor, or STEM advocate--we look forward to inspiring our youth to be "STEM-ready" to explore and succeed in life. We hope you will join us!

Bruce Abell
Board President

Diane Smogor
Executive Director

Our Programs

Science Fairs ➤

Enhance science and math learning for Santa Fe students, teachers and parents:

- Get kids excited about science
- Link students and teachers with “real scientists”
- Provide opportunities for STEM learning in and out of the classroom
- Create partnerships in support of STEM learning

Classroom Visits and Mentoring ➤

Tutoring ➤

Science Cafes ➤

Science Fairs

SFAFS volunteer judges interacted with
2,216 students and judged **1,932 science projects** (Grades 4-12)
at **25 school fairs** and the district Expo.

1,060 hours of one-on-one contact with students

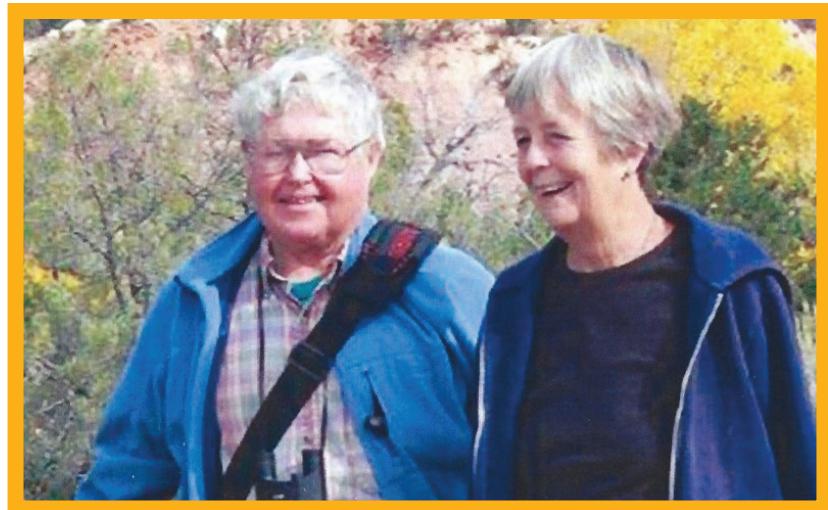
Meet Some of our Science Fair Judges

How a Dentist and Physics Professor Are Helping Santa Fe Students

If you have not met Ruth and Bob Howes yet, you should. This friendly and dynamic couple will undoubtedly make you laugh, and you will have a better sense of what's going on in Santa Fe schools and how volunteer tutors are supporting STEM learning for students and teachers.

Bob grew up in Los Alamos and worked at the Los Alamos National Laboratory as a dental student and dentist. He then moved to Oklahoma and taught basic sciences at the medical center for 27 years. Ruth taught physics for 25 years at Ball State University before chairing the physics department at Marquette University in Wisconsin. The couple met as undergraduates in Massachusetts and spent most of their adult lives commuting until retiring to Santa Fe in 2008. "He wanted his mountains and my only requirement for where we retired was it had to be in taxi and pizza delivery range," says Ruth.

In addition to being volunteer science fair judges "from the beginning," Ruth and Bob tutor high school and college students and Ruth also served on the Santa Fe Alliance for Science (SFAFS) Board of Directors in its early years. Ruth knew SFAFS co-founder Robert Eisenstein from a long time ago and says "Bob found me" when the couple moved permanently to Santa Fe in 2008.



Bob and Ruth Howes hiking at Ghost Ranch.

Not surprisingly, what they love most about judging science fairs is "Talking with the kids." Ruth continues, "The ones I love are the ones the kids are really interested in. One girl did a project on diabetes because many of her family members had the disease." I liked it because she was using the scientific method to solve a near and dear problem...I would like to see more of that."

Bob then recalls one of his favorite science fair projects "...done by a girl who had visited Arizona and learned techniques for choosing the best pinon nuts...through her project she described which pinon nuts are diseased, which ones are good to eat based on color and shape." He also remembers an excellent project that a first grader did on overhand versus underhand accuracy of

throwing a basketball and how he got his older brother to help calculate statistics for his project. Bob got interested in dentistry by studying fossils near Nageezi and vividly recalls his own science fair projects, studying pollen and running experiments with mutant guppies.

Ruth tutors students in math and science at the Santa Fe Community College (SFCC.) Bob, who studied medical terminology in Spanish, has taught courses in anatomy and physiology for students at the SFCC. They enjoy the community of tutors at the college and how the students see the volunteers learning from each other. Ruth explains she tutors in the spirit of the “dumb math error.” She explains “A dumb math error is something such as $2+2=5$. Kids make them; we all make them; some students feel that they can’t do math, but they can. I enjoy making them laugh as they learn.”

Ruth and other SFAFS volunteers also tutor students in math at Larragoite High School, which she describes as “the last chance high school.” Ruth goes on, “The students haven’t done well in conventional schools. Some have been sick for long periods of time; some have drug problems; some are homeless, but they are ALL very dedicated to getting an education. One day, I was supposed to be helping with a girl with math but she told me that she had an interview with Walmart in an hour. I did a mock interview with her, and the next thing you know, the entire class had joined in to coach her.”

Ruth says the most effective method for tutoring is to have volunteers work directly with teachers. “I want to help...where do you need me?” she says enthusiastically. The Santa Fe Alliance for Science wants to better identify where tutors are needed. Are you interested in becoming a tutor? Are you a teacher who knows students that need extra help in school? Contact us so we can connect more incredible volunteers, like Ruth and Bob, with students who need extra help.

— www.sfafs.org/be-a-volunteer.html

Meet Caroline!

- 8 years with SFAFS
- Science fair judge
“professional”
 - 20+ years experience
- Born in Yorkshire, England
 - currently in White Rock, NM
- PhD, Inorganic Chemistry
 - worked at LANL for 30 years
- Enjoys flower gardening
- Studies Russian with
her husband Rod



What works in STEM Education?

“Third graders should be outside watching beetles to learn about science.”

Meet “Mr. Science”

When you meet Hubert van Hecke, you quickly appreciate why kids love “Mr. Science.” Hubert bikes everywhere he can in Santa Fe with his leopard print bicycle saddle cover, which he explains he bought in Holland as he travels there every few years with his family. “In Holland people use it for rain but here it protects my bike seat from the sun,” explains Hubert, who always seems full of energy and excitement.

He was born in Amsterdam and after studying a few years at the Delft University of Technology in Holland, he came to the U.S. to finish his PhD in high energy particle physics at Syracuse University. Recently retired from the Los Alamos National Laboratory, Hubert smiles and says “I’m 2 weeks short of 32 years at LANL.”

Hubert’s been a board member with our organization since the beginning, but is known to many Santa Fe students as “Mr. Science.” In 1996 he began visiting his son and daughter’s sixth grade classrooms at Wood Gormley Elementary School as a guest scientist, to help the teacher with electricity kits. Now, 20 years later, he says “One thing led to another and I’ve been going there ever since.” Hubert’s ‘kids’ are now college graduates, but he still visits the school weekly, alternating between three classrooms each week. He explains, “It’s not ideal, only covering one subject a



Hubert in the classroom

month,” because he divides his time between three classes, but he hopes other volunteers can join him in the future to reach more kids. “I would like to go back to a single class, with more time, and cover a new subject each week – with plenty of time for questions,” Hubert remarks. He keeps a record of his science experiments and teaching tips in a web-based “library” and is eager to share his knowledge and tools with others.

He enthusiastically talks about some of the students’ (and his!) favorite demonstrations, such as “fun with liquid nitrogen” that he likes to conduct each fall; measuring the speed of sound in the playground with just a pot and spoon; creating a five-foot tornado in

a box; and launching water rockets and measuring how high they go (usually the last lesson of the year.) He goes on to say, "There's always one about space, planets, black holes..." and says he tries to align the lessons with what teachers are covering in class. He often starts off the first class asking the kids "What do you want to know about? You can ask me anything." He explains there is no question that cannot be dealt with to help the kids learn about science.

"Occasionally I build things...simple things with cardboard and duct tape and do demos with things

"Whenever I get a request I go, I never say no." – Hubert van Hecke

you have in your kitchen," Hubert explains. Hubert's also heavily involved with Santa Fe's maker space, Make Santa Fe, where families can build things together if they don't have the materials at home. Hubert's also mentored some physics students over the years and helped revamp our organization's website, which we invite you to visit at sfafs.org.

Hubert says he enjoys working with sixth graders because "...they don't sit in the back and roll their eyes. Girls equally with the boys are fascinated." Hubert notes that he always encourages girls to speak up. Through his classroom visits, Hubert aims to "Add enough spark where kids say science is cool and won't drop it in middle school." And the kids

do remember him! This past Halloween a "trick-or-treater" came to his house (he always dresses up for them) and said "Hey, it's Mr. Science." In this report, you can also read about Faris Wald, an eighth grader from Capshaw Middle School, who also remembered the positive impact "Mr. Science" had on him.

Hubert continues to spark science interest among Santa Fe youth and we need more volunteers following in his footsteps. Want to be "Mr. or Ms. Science?" Let us know!

Visit www.sfafs.org/be-a-volunteer.html

Classroom Visits and Mentoring

Engaged **2,525** elementary
and middle school students
in hands-on science experiment in
98 classrooms

Mentored **407** high school students

Volunteer hours in classrooms = **340**

Santa Fe 8th Grader Wins at State

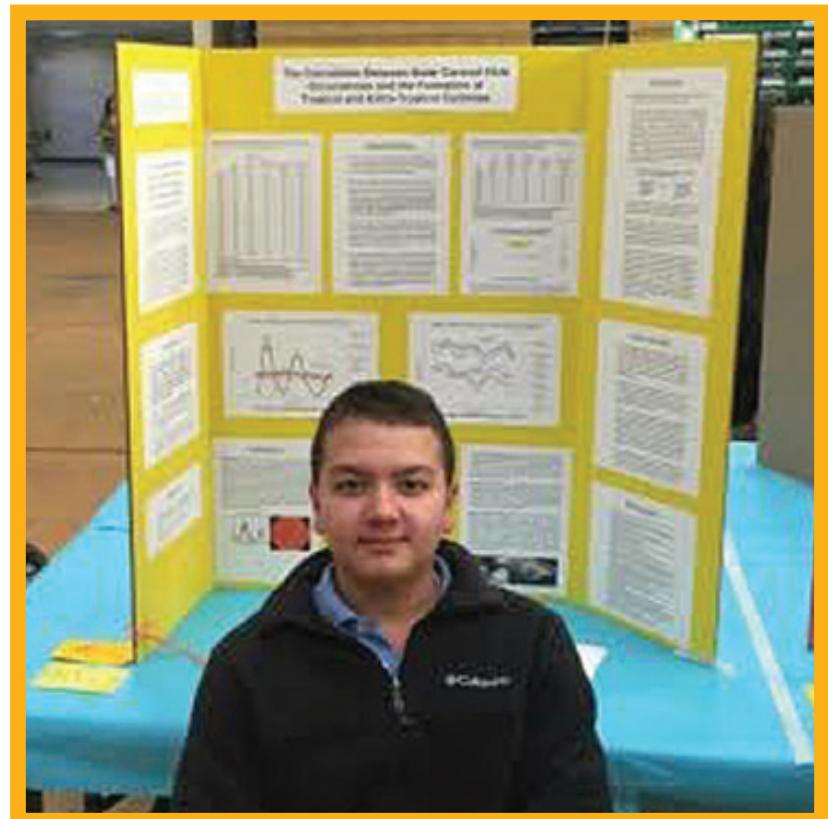
"Science fairs allow students to go off the path...learn something else that they're not learning in school."

Faris Wald – 8th grade student, Capshaw Middle School

Faris Wald's science fair project on the "correlation between solar coronal hole occurrence and the formation of tropical and extra tropical cyclones" was not your typical 8th grade science fair project, and it won first prize in the Capshaw Middle School science fair, first place in the district's Expo, and first place and several other awards at the state Science and Engineering Fair.

SFAFS volunteers visited Faris' class in fall, thanks to an invitation from science teacher Christy Krenek, Capshaw's Science Fair Coordinator. The volunteers conducted a hands-on experiment with the students in preparation for the science fair season. According to Faris, "The ruler drop presentation helped students prepare for their science fair project...it talked about variables."

Faris goes on to say "The best ways to convince more students to do science fairs is to do more labs. I learn the best this way." Faris also recalls "a guy called Mr. Science who visited his class in 6th grade and made it fun." That "Mr. Science" is Hubert van Hecke (see previous article) a Santa Fe Alliance for Science board member who has been getting Santa Fe students



Faris Wald, 8th grade local and state science fair winner

excited about science for approximately 20 years through his interactive classroom presentations. "I remember when we did rockets....and he brought a contraption to see sun spots on the sun...and made a giant cardboard box to see a twister...I thought that was very cool," explains Faris.

Faris said that his interest in science stems back to when his parents took him to the astronomy center at the Santa Fe Community College when he was in

second grade. Faris says he was devastated when the program closed, "I loved it."

He got his idea for this year's science fair project by watching a NOVA documentary about the sun. He was impressed with the large amounts of energy emitted by the sun. He learned about the immensity of storms and energy on the Weather Channel, and wanted to find out if there was any correlation between sun spots, coronal holes, and tropical storms. "The most challenging was finding coronal hole data...I researched the internet until I found it," explains Faris when asked what was most difficult about his project.

Through internet research, Faris found data on sun spots and coronal holes and used data from the National Hurricane Tracking Center. He used data from 1986-2014, ran calculations, and then graphed his findings for his science project. "I found no correlation between sun spots and tropical storms but some correlations for coronal holes...I found it amazing!"

When asked about what he likes best about science fairs, Faris exclaims, "It gets you out of school." But then Faris continues to explain, very articulately, how doing a science fair helps kids with public speaking. "You need to learn how to communicate with people and by doing science fairs you learn how to communicate with adults, which is very important in the modern world. For school science

fairs, first you have to do a PowerPoint presentation and communicate to the entire class, then you create a board, then you learn how to talk to a judge and get your message across, and you need to tell them what you did and what you learned from it."

Faris believes that these types of experiences help students to learn about the scientific method and how to use science to explore the world and find out new things. At regionals, he was disappointed that he didn't see more students from Santa Fe. Faris goes on to say, "I would like more encouragement for students in grades 6-8 to attend the regional science fair...I saw amazing projects that blew my mind away." He explains that students don't have to win at their school fair or at Expo to participate in regionals.

When asked how else we can get kids interested in science, he recommends "More field trips! You learn a lot from field trips, you connect science with personal experience."

Thanks to our volunteer network of STEM professionals, thousands of Santa Fe students, like Faris, get a chance to talk with scientists and engineers and other STEM professionals through the science fair and classroom visiting programs. These students are discovering their own "inner scientist" and gaining valuable skills to help ensure students are "STEM ready" to explore and succeed in life.

Tutoring

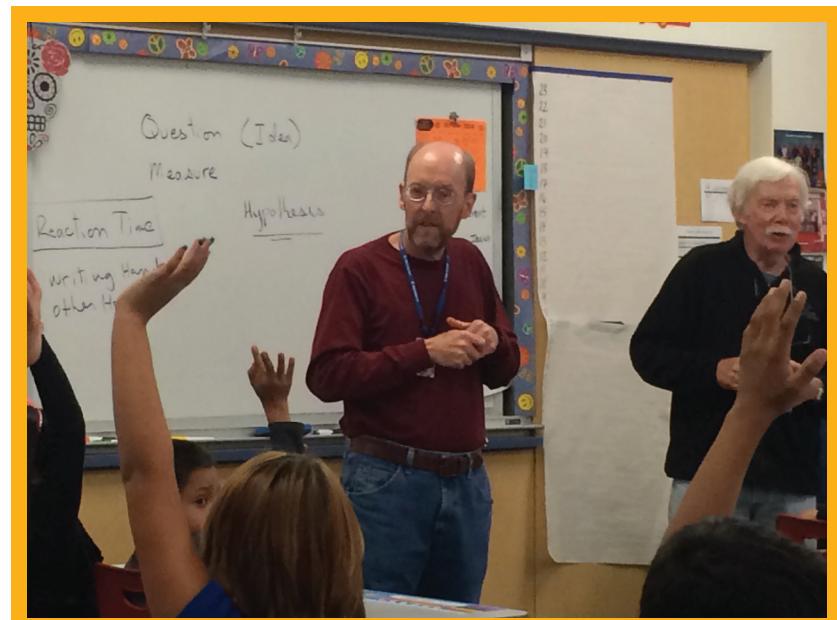
During the 2015-16 year, 15 SFAFS volunteer tutors had more than 1,400 interactions with K-14 students in the high schools, middle schools and elementary schools in Santa Fe, and at Santa Fe Community College.

- Thanks in part to intense math tutoring provided by a dedicated core of SFAFS volunteers, the New Mexico School for the Arts received a Blue Ribbon Award from the U.S. Department of Education in recognition of their progress in closing academic achievement gaps.

Science Cafés for Young Thinkers

The Café evening series of presentations has been a “go-to” resource for students, parents and teachers to enjoy a peek at frontiers of science across an enormous range of topics.

- Last year we hosted our 60th Science Café, which marked our tenth year of conducting Science Café presentations.
- Presenters shared their knowledge of the brain, math, solar systems, ornithology, underwater camouflage and climate change in the American Southwest with 280 Café participants.
- Teachers use our Science Café videos in the classroom to reach additional students throughout the year.



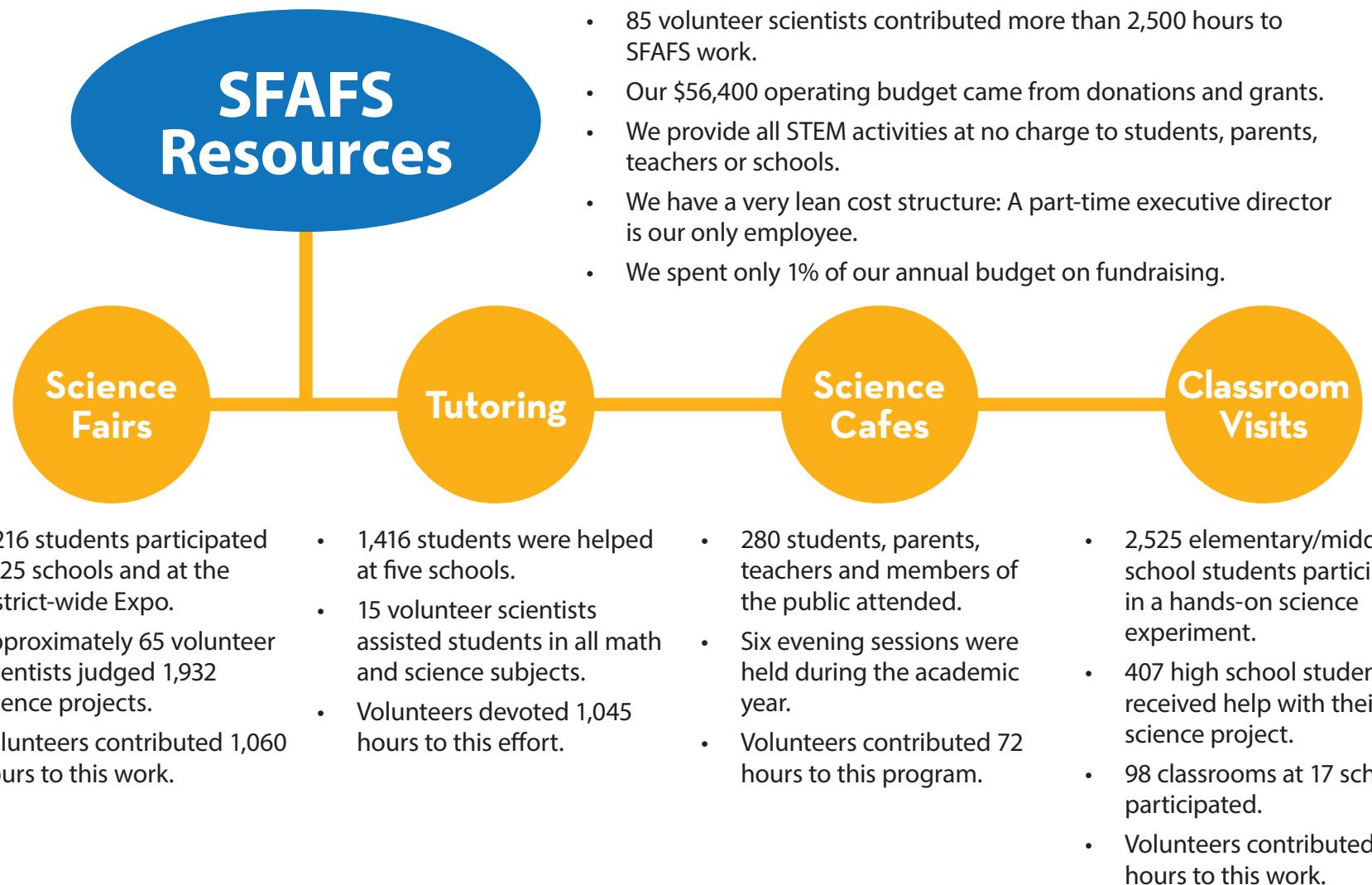
One of 98 classroom presentations



Ron Yeo, Science Café presenter.

Our 2016 Impact on STEM Education

Our impact on STEM education in Santa Fe is made possible by the generosity of our friends—individuals, businesses, foundations, and grant agencies—and the priceless contributions of our remarkable scientist volunteers. We leverage traditional classroom STEM education by connecting students, teachers, and parents with volunteer scientists through Science Fairs, Science Cafes, in-class demonstrations, and tutoring.



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Hubert van Hecke



At the March for Science, April 2017

Our Supporters

We are grateful to the many individuals who have made donations to our organization.

In addition, we want to acknowledge the following organizations and businesses for their support:

Avalon Trust
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Karen Cantor (Silversmith Fund)
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