RURAL EDUCATORS SPEAK
What Teachers Really Need to Teach Science and Math
And How You Can Help
Survey Results from 13 Rural Counties in Arizona
A MIND ONCE STRETCHED BY A NEW IDEA NEVER REGAINS ITS ORIGINAL DIMENSIONS.

ANONYMOUS
Dear Fellow Citizens,

Since 2007, Science Foundation Arizona (SFAz) has invested over $40M to improve the education pipeline and over $60M in research. Most of those funds have gone to enterprises in major cities such as Phoenix, Tucson, Flagstaff, Prescott, Yuma, etc. And, SFAz will continue to invest in those areas. This report addresses a different segment of Arizona – that of the 13 rural and remote counties of Arizona – and was initiated because a donor was interested in validating what we know about the education needs in smaller Arizona communities.

Margaret Mullen, SFAz’s Chief Operating Officer, designed and oversaw the survey, along with Kristina Chapple, Director of Analytics, Evaluation and Compliance. Thanks to assistance from SFAz Vice Chairman, Craig Barrett, and the Arizona Department of Education, the survey was distributed to every public school superintendent, principal and teacher in the 13 rural and remote counties. A remarkable response rate of 31% was received, and we are pleased by the significant response from all 13 counties.

This report tells the story of dedicated professionals who are desperate for the tools necessary to improve their skills, increase student learning at all levels and implement the increased rigor of Arizona’s Common Core Standards and Next Generation Science Standards. As citizens, we have a moral and ethical responsibility to address these needs and ensure an improved economic future for generations to come. As Science Foundation Arizona leadership, we are committed to continuing our efforts, and ask that you join us.

Sincerely,

William C. Harris
President and CEO

Donald V. Budinger
Chairman of the Board
ABOUT THE SURVEY

This survey was conducted to obtain firsthand input from the K-12 public school superintendents, principals and teachers in the 13 rural and remote counties of Arizona. We wanted to hear from those responsible for educating our children what they needed to fully implement Arizona’s Common Core Standards and Next Generation Science Standards.

The survey was launched by the Arizona Department of Education in April 2013, and concluded early May. It was distributed to 11,326, and 9,890 of those surveys actually got to the recipient.

WHO RESPONDED

We received 3,032 completed surveys for an overall response rate of 31%.

- Navajo and Apache Counties had the largest teacher response rate of 38% and 36% respectively. Santa Cruz and Coconino Counties were the lowest at 19%.
- 30% of principals and 24% of superintendents responded.
- Responses were received from 86% of all schools.
- 80% of respondents were female.
- More than 50% of teacher respondents and 75% of administrator respondents have been teaching 10 or more years.
- 16% or 444 respondents reported teaching Special Education (SPED).

STUDENT FAMILY DEMOGRAPHICS

We asked educators to tell us about student family and community income levels.

- Nearly half of educators reported student family income of less than $30K per year.
- One-quarter of the educators reported community income of less than $30K per year.

PERCENT OF RESPONDENTS REPORTING STUDENT FAMILY INCOME LESS THAN $30K

<table>
<thead>
<tr>
<th>County</th>
<th>Percent Reporting</th>
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<tbody>
<tr>
<td>Apache</td>
<td>62%</td>
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<tr>
<td>Coconino</td>
<td>38%</td>
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<td>Cochise</td>
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<td>Gila</td>
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<td>Graham</td>
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<td>Greenlee</td>
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<td>La Paz</td>
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<td>Mohave</td>
<td>49%</td>
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<tr>
<td>Navajo</td>
<td>58%</td>
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<tr>
<td>Santa Cruz</td>
<td>60%</td>
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<tr>
<td>Pinal</td>
<td>42%</td>
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<tr>
<td>Yavapai</td>
<td>40%</td>
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<tr>
<td>Yuma</td>
<td>47%</td>
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PUTTING THE COUNTIES IN CONTEXT

The state of Arizona is comprised of 15 counties. The following map provides some context, including size and population, number of schools and teachers and median income of the 13 counties included in this survey. For comparison, the same data are shown for the metropolitan counties of Maricopa and Pima, although they were not included in the survey.

Our thanks to the Arizona Department of Education and the Arizona Association of Counties for their assistance with this information.
CHALLENGES FACING STUDENTS, THEIR FAMILIES AND EDUCATORS

To determine the most effective ways to help, we asked a series of questions about the challenges facing students at school and in their community. Results include:

- 99% have internet access at school, and 96% in the classroom, while only 56% of students have wireless access at school.
- 50% reported that fewer than half of students have internet access at home.
- 24% reported that half of their students do not speak English as a first language.
- 13% report that over half of their students ride a school bus more than 40 minutes to school.
- Nearly half reported that 75% or more of their students qualify for free breakfast and/or lunch.
- Just over one-third of the educators reported that fewer than 10% of their students had an involved parent.

“No one could make a greater mistake than he who did nothing because he could do so little.”

Edmund Burke
TEACHER EDUCATION

We asked respondents about their educational background. Forty-four percent reported a bachelor’s degree as their highest degree. Fifty-two percent reported to hold a graduate degree, of which 6% is a Master of Science (MS).

SCIENCE AND MATH TEACHERS

Overall, more than half of respondents teach Science or Math, but are not necessarily qualified to do so.

The federal No Child Left Behind Act (NCLB), reauthorized in 2001, requires that all teachers be “Highly Qualified” in the core academic content area(s) they teach. We asked Science and Math teachers to indicate if they meet Highly Qualified standards. The chart below shows the respondents who say they are NOT Highly Qualified in these fields:

PERCENT OF RESPONDENTS WHO REPORT TEACHING SCIENCE OR MATH

The federal No Child Left Behind Act (NCLB), reauthorized in 2001, requires that all teachers be “Highly Qualified” in the core academic content area(s) they teach. We asked Science and Math teachers to indicate if they meet Highly Qualified standards. The chart below shows the respondents who say they are NOT Highly Qualified in these fields:

PERCENT OF RESPONDENTS TEACHING SCIENCE OR MATH WHO REPORTED THEY ARE NOT HIGHLY QUALIFIED, PER STATE STANDARDS
SCIENCE AND MATH TEACHER NEEDS

Understanding that basic Science and Math skills are essential to have students career- or college-ready at graduation, we asked teachers to tell us which of the following three items would help them the most. The cumulative top priorities were:

1. Funds for supplies
2. Funds for equipment
3. Professional development during the school year
4. Common planning time
5. After school programs in Science, Math or Robotics

RESPONDENTS’ NEEDS FOR TEACHING SCIENCE OR MATH IN ELEMENTARY ( ■ N=1,277) OR HIGH SCHOOL ( □ N=355)
TEACHER PROFESSIONAL DEVELOPMENT IN SCIENCE AND MATH

Understanding the increased rigor needed for a twenty-first century education, professional development is essential for teachers to maintain and expand skills. 33% of the Science teachers reported they had no professional development in the last three years, and 11% of the Math teachers said they had received none.

PRIORITY OF TEACHER NEEDS

The survey closed with two open-ended, optional questions.

The first question was “What one item would help you teach Science and Math?” 78% of the survey responded replied, and following are the results:

Teacher pay ranks last among issues identified as what would help provide greater student learning. This may be because teachers realize this is not something SFAz can fix, or because it is a well-known concern.
SURVEY FINAL COMMENTS

The last question was “Is there anything else you want us to know before beginning the initiative?” Twenty-seven percent or 827 responded to this question. What follows is a small sample of those responses.

Note: While major spelling errors were corrected, text remains in respondents’ own words.

- The biggest thing that teachers lack is time. We do not need more paperwork to fill out, we need resources that are ready to use and time to collaborate with willing colleagues who will do their share in providing for a group.

- There are not enough resources in district to implement the common core. We can not even access the internet on student computers.

- There are so many things I want to do but I don’t have the time to plan alone or with my colleagues.

- Many students in our district can’t even afford scientific calculators. Since all students must take Algebra II we are going to need some way of providing them with calculators. I know a high school we visited had their bookstore check out graphing calculators to students in certain classes and they were responsible for keeping batteries in them and turning them in like a book at the end of the year.

- Please take into consideration that many of our students do not know how to dream bigger. They only see what is next to them and even though we have so many opportunities, theirs may be very restricted due to economics, rural areas or their parents perspectives of life.

- Those of us who have taught out in the rural areas don’t have the tax base nor funding to give our students the experiences they deserve.

- We haven’t done any curriculum changes or textbook adoptions in 11 years (HS Science). If we are to teach different/new things (or if we are to use different methods), we need to revisit our curriculum to be sure we are on the right track. Also, we don’t know if the state plans to adopt the Next Generation Science Standards. If AZ adopts these standards we will need to make some changes.

- It took me many years just to get a small graphing board…this school is inadequately funded compared to the “schools in town” with regards to technology, training priorities, basic communication…

- It is very difficult teaching science the way it should be taught without money. I have probably spent about $1,000 of my own personal money this one year alone. I refuse to just give the kids worksheets when they should be getting hands-on experience.

- It would help teachers if the public understood why this (Arizona’s Common Core Standards) is so important as well as why it will be more painful to implement in a state like Arizona where the current standards are far from where they will be with the Common Core standards.

- Thank you for caring enough to ask what we need, not just assume.

- Technology is the heart of the future in education — Payson needs to catch up. Money has always been a factor!

- For math and science the only hands on thing that my classroom came with was 4 science tool kits.

- I would like science activities that are great vocabulary builders for Language learners. In addition I am seeking more materials (aside from worksheets) to enhance science lessons.

- The area of Health, Nutrition, Physical Education, Social and Emotional Development needs to be at the forefront of education and recognized as a critical component to learning. This evidence has been received at the national level but needs funding and exposure at each district level. This IS science!
I do believe we are in much need of high-quality professional development, however this needs to come from outside our county. The training received from the school personnel is nonexistent and relatively poor quality at the county level (depending on who is doing the training).

I am fortunate to have been employed in the electric and nuclear utility industry for 34 years before returning to the classroom so I have first hand experience on the “real world of work” but many educators only have their classroom experiences as their frame of reference so many do not see the big need for Common Core and STEM.

The school where I work has no science lab equipment with which to provide concrete activities for the concepts taught out of the textbooks.

It’s difficult for me to leave this one-room school and go to another location for professional development. Takes 2 hours to nearest large town, and hard to find a sub.

It is difficult to teach science in the classroom w/o sinks, and with just 4 electrical outlets.

Collaboration among all subject matters…the whole future is based on a well-rounded student, not just science and math.

Thank you for reaching out to more rural areas. It would be great to see opportunities for professional development in math and science.

I am eager to learn, open to new ideas, and always looking to expand my repertoire of instructional strategies.

I’d like to have more training in depth of knowledge and ways to help develop critical thinkers in the classroom.

Over 90% of my students qualify for the free lunch program at my school, and a school garden would also be an excellent source of nutrition and energy for the students as well as an invaluable, ongoing educational center.

The teachers within our district test the kids to death and the students are good at bubbling in answers from a multiple choice. However, I would love to see more hands on and actual “real” teaching encouraged.

Teachers and administrators need to be held accountable for high standards in teaching.

Due to state standards we have to teach for testing. I feel that science is being drastically left behind by most teachers, and only taught “when there is time” which for some teachers is not everyday. Students who are pulled out for reading intervention are also missing out on science education (at least at the elementary level). I think our district could really use some professional development/help in the area of science at the elementary level.

Please do not use the money for hours of teachers sitting in meetings being talked to, and given too much paper work with too many ideas that we never have time to try. That is not helpful. We need to have time to actually learn about with models, and time to create quality-learning activities for students to get engaged in.

I believe that elementary teachers should be more educated in Science. As a middle school teacher I get students who know very little about Science because their elementary teacher just skipped it!

It has been very hard to integrate science into curriculum, there is not enough time to teach so much in one day, and therefore any recommendations/trainings would be very appreciated.

The more students can see how their mathematics and science knowledge can be used in the real world, the better the students are able to make achievable goals.

Students in low-income schools need more hands-on activities, which are hard to do when there is a need for manipulatives and materials.

iPads or other tablets for classroom use (multiple responses).
I would like the experts that are training us to come in and actually teach a lesson to my class so that I can see their methods in actions and how they address the problems I face in my classroom. I have tried for 2 years to have my students work together in groups and I have had little success with it, for many reasons. Some classes do better than others.

I consider Technology should be implemented in school with prepared teachers because it’s not the future for our kids, it is here right now.

Watching other teachers in action and connecting us to teachers that are highly qualified and motivating so we can have a network to learn from and get information from.

It would really be nice if you would consider our school or the funds as we have a high population of students that are in the poverty level and don’t have much exposure to opportunities to learn science and math outside of the educational setting.

We also need to ensure that lower grades are teaching students. At my school, students are coming to 4th grade not knowing basics, like: causes of night & day, states of matter...

Lab Equipment for experiments, computer programs for calculators (multiple responses).

It has been very hard to integrate science into curriculum, there is not enough time to teach so much in one day, therefore I think our students can become better learner through understanding the basic of math and science and how we use it everyday of our lives.

The tight budgets make teaching Science more difficult than if there more hands-on resources available. I have spent over a thousand dollars of my own money this year to buy lab materials.

Yes, we need information/materials for our students that are written at an easier reading level in science. Usually the concept along with the specific vocabulary we are trying to teach is difficult enough without the whammy of readings that are difficult. I want my students to walk away understanding the concepts without being frustrated with how cumbersome the delivery material is to comprehend. Help them to want to read the information!

A Smartboard (multiple responses).

I would love it if we could have professionals from these fields visit our kids and do hands on activities with them. They know why learning to read and why learning English is important, but they need more emphasis on math and science.

There are very limited resources (if any) for science and mathematics. I also think better training to help new teachers teach students writing is needed.

Our school only has 1 computer lab for about 600 students. Classes are scheduled to use the computer lab once a week for 30 minutes. We have no student computers in our classrooms.

Teacher needs post graduate scholarships on paid study leave. It is not easy especially in Math to do teaching and going to grad school at the same time.
NEXT STEPS AND HOW YOU CAN HELP

SFAz will commit $15M to a three-year Rural and Remote Initiative to provide teachers the tools they need to improve academic achievement and develop the skills to implement Arizona’s Common Core Standards and Next Generation Science Standards. We will begin with a focus on Navajo and Apache Counties as areas of greatest need, but will include programs available to all 13 counties.

Initial stopgap, short-term actions include:

1. SFAz will hire a full-time field staff person to assist teachers in teaching Science and Math in Apache and Navajo counties. (SFAz already has STEM field staff working in other areas.)

2. SFAz will give every full-time K-12 teacher in Navajo and Apache counties a gift card for supplies PROVIDED the school superintendent and principal agree to set aside weekly common planning time to focus on Science and Math and the implementation of Arizona’s Common Core Standards.

3. SFAz will issue a very simple Request for Proposal (RFP) to schools in the 13 counties for up to $10K each for equipment that would improve academic achievement in Science and Math. While Navajo and Apache Counties will be given priority, all responses will be considered with the requirement noted above for common planning time.

4. SFAz will issue RFP’s to fund both teacher professional development and create after-school Science, Math and Robotics clubs. Funding will be available to all counties. Staff development and planning sessions will be recorded and evaluated.

It is important to note that SFAz is not making a statement on the funding needed per student. We are simply taking short-term stopgap measures to address today’s needs as identified by the teachers responding to our survey. We hope the appropriate bodies review the distribution of education funding that goes to administration, versus the amount that gets to the classroom, and recommends any necessary adjustments to ensure teachers have the tools necessary to educate Arizona’s children.

THE CALL TO ACTION

Please join us by selecting one of the above-noted areas to support, allowing us to address educator needs more quickly. This report is a summary of the data collected. We can run cross-tabulated data any way that would be helpful to a potential donor or advisor.

Resources need to be dedicated to these 13 counties quickly, in addition to continuing support for the urban counties. We cannot rely on government to provide the funding needed, so individual philanthropists, trusts, foundations, and corporations must invest to ensure an educated workforce that maintains America’s competitiveness.

Simple things matter as much as the big investments. Every citizen in Arizona who pays taxes and can afford to should use the Education Tax Credit to dedicate funds to a school. If they are not connected to a specific school, we suggest giving to a rural or high-needs school. They have the hardest time raising funds from their population since donors need to pay taxes in order to take advantage of the Tax Credit. But, our students, our future need more! Invest with Science Foundation Arizona and we will expand these programs across the state, track the results and report the successful outcomes.

GO TO WWW.SFAZ.ORG/DONATE OR CONTACT US AT 602-682-2800.
AN INVESTMENT IN KNOWLEDGE PAYS THE BEST INTEREST.

BENJAMIN FRANKLIN
WHY SCIENCE FOUNDATION ARIZONA?

Science Foundation Arizona has a proven track record of success. Our process includes external peer review of all proposals before they go to the Board for full consideration. Our professional staff has decades of experience in the research, education and non-profit fields.

Once awarded, our staff oversees all grants, meeting at least quarterly with recipients to ensure the work stays on track and funds are expended as expected. Budgets are reviewed quarterly along with milestones. If projects falter and cannot achieve their objective, the Board will terminate the grant.

An independent, external Audit Committee annually selects grants for compliance testing and reports to the Board of Directors, which is fully committed to transparency, oversight of donor funds and tracking results.

SFAz will use its process and track record to ensure accurate results and success.

“SMALL DEEDS DONE ARE BETTER THAN GREAT DEEDS PLANNED.”

Peter Marshall