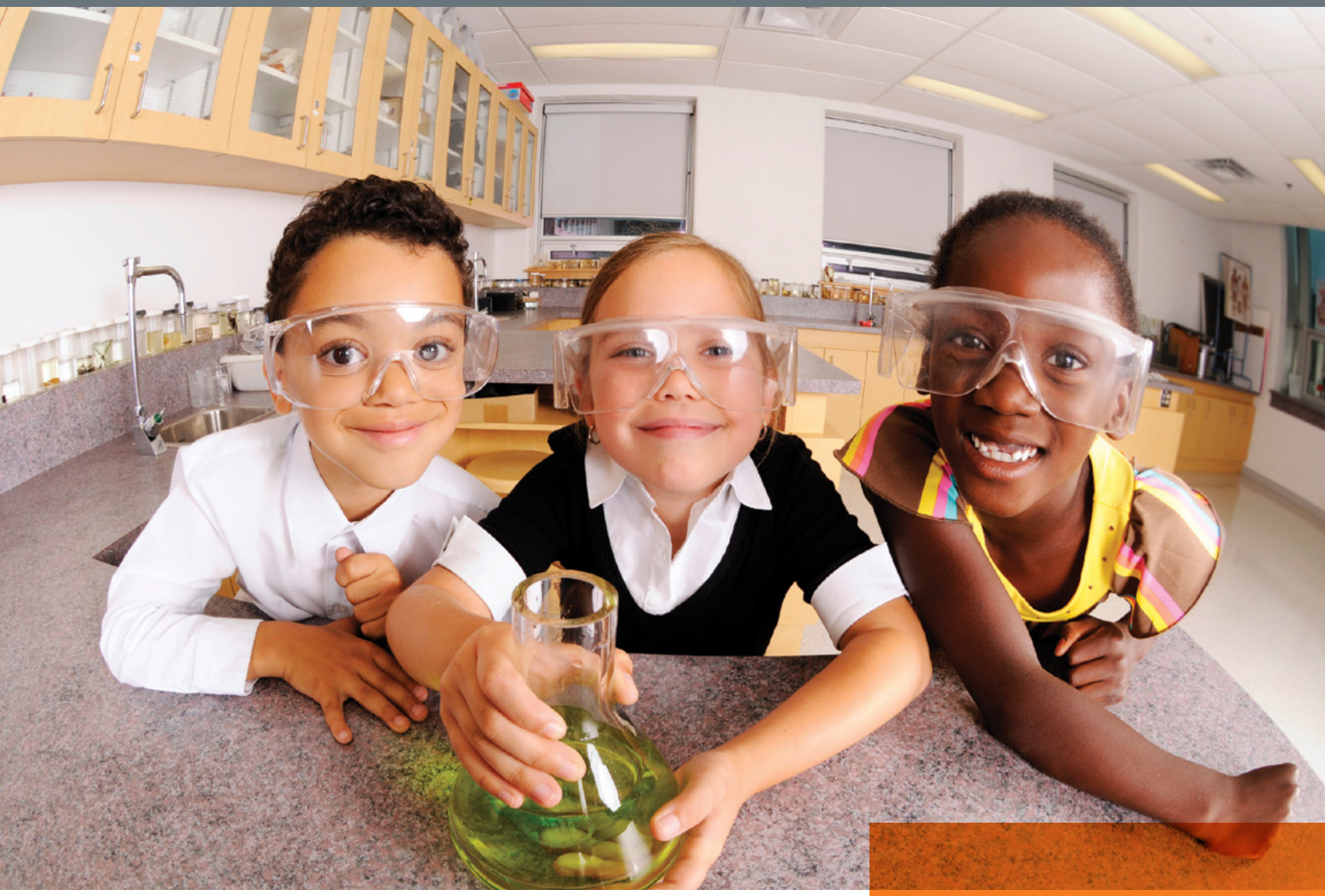
CREATING A CULTURE OF ACHIEVEMENT



ARIZONA STEM NETWORK
LED BY SCIENCE FOUNDATION ARIZONA

A Five-Year Plan for STEM Education

Let's Begin

Recognizing that Arizona must put in place a globally competitive education system, in September 2010 Governor Jan Brewer asked Science Foundation Arizona (SFAz) to develop a community based statewide plan for STEM education and establish the Arizona STEM Network. In addition to the commitment from the Governor, Freeport McMoRan Copper & Gold Foundation and Helios Education Foundation provided major funding for the plan development and were joined by Intel, JPMorgan Chase and Research Corporation for Science Advancement.

With representatives from the Governor's Office of Education Innovation and the Department of Education, input was sought from more than 1,500 participants in education, business and government—concerned individuals from across Arizona's 15 counties and the Navajo Nation over a 14-month period. This effort recognizes that implementing a globally competitive education system demands a combination of grass roots participation, statewide coordination and strategic commitment from key players in education, government, business and philanthropy.

The wide outreach around Arizona revealed dire information and resource needs, particularly in rural and remote areas. And, it exposed a deep desire to pursue STEM-based learning in schools, identify and implement STEM tools and practices to improve student outcomes and readiness, and build stronger partnerships with local businesses.

The plan outlines the role of the Arizona STEM Network to help build a common agenda for STEM education and strategically reach more students and teachers at an accelerated rate. This urgent endeavor is nothing less than a commitment to transform Arizona education with concrete ideas, practical solutions and a reframed culture of achievement. This plan's driving force is to help Arizona children be successful in school, careers and life. That requires making first-rate education a top priority, and it demands a laser-like focus on performance, high expectations and high standards. The goal is to make the leap from incremental improvements in educational performance to transformational change.

Such an undertaking poses a major challenge to a system not yet equipped to provide students with skills and knowledge they need to succeed. We are determined to move forward, together, and do so with clarity and urgency.

Expecting Relevance, Cultivating Engagement, Demanding Achievement

STEM represents **disciplines of knowledge** by which we understand, measure, and design our world – science, technology, engineering and mathematics. STEM education is also an **integrated, interdisciplinary** approach to learning that provides project-based and relevant experiences for students. STEM seeks a method of teaching and learning that **goes beyond mere transfer of knowledge**—it aims for a deep understanding of subject matter and its implications in answering questions and solving problems of local and global importance.

It challenges students not to just "know," but also to "do." In the broader context of education reform, STEM is a means for improving education outcomes not only in math and science but also in language, social studies and art – providing students with the greatest spectrum of options for success in college and in careers.

The Purpose of the Arizona STEM Network

The Arizona STEM Network will drive access to effective STEM education for all Arizona students. The Network creates a unique unifying force for linking and leveraging existing STEM assets in the state, building on best practices, and fostering new and innovative STEM approaches in communities, districts and schools throughout the state.

The Arizona STEM Network aims for nothing less than large-scale social change and a genuine common agenda. Fully funded, the Network will provide the critical connective tissue to enhance collaboration, capture and retain knowledge about what works, and avoid wasted duplication and ineffective approaches. The Network goals are:

- Support successful implementation of the state-adopted, internationally benchmarked mathematics and science standards and assessments
- Increase mathematics and science achievement for all Arizona students
- Establish STEM as a priority in communities, districts and schools throughout Arizona
- Improve coordination and information management to accelerate the replication and scale of best practices
- Increase the number of individuals graduating with STEM degrees and credentials

SFAz serves as the operational management "hub" to provide ongoing focus, commitment and structure to realize these goals—taking advantage of SFAz's brand recognition, experienced Board of Directors and expertise in designing, executing, measuring and managing successful initiatives. Additionally, the Network will benefit from the counsel and leadership of a newly formed STEM Network Oversight Council of experienced leaders from across the state.

The Plan

The plan gathers together four strategic concentrations that will guide the work of the Arizona STEM Network for the next five years. Each is action-oriented, results driven and focused on preparing students to succeed. In essence, the plan will: 1) integrate STEM learning into schools and districts; 2) develop and deploy a predictive analytics system to measure impacts; 3) strengthen teacher effectiveness; and 4) create opportunities for business to meaningfully engage.

The overall success of the Network depends on an integrated approach that recognizes the importance of each of the parts. SFAz STEM staff will lead and coordinate this Network, building a structured system of information management tools, processes and technical assistance. The purpose is to identify and encourage effective STEM practices, precise measurement of student outcomes, community collaboration, and structured, individualized implementation strategies that can lead to shared purpose and sustained commitment to educational improvements.

1. Integrate STEM into Schools and Districts

The full integration of STEM is much more than introducing a program—it can transform the direction of a school or district. This requires establishing local plans to significantly improve student performance, and enlisting the active engagement at all levels of education and the community. Its success depends on prioritizing STEM and putting in place effective models that best meet student needs.

To integrate STEM and build sustainable and measurable progress, the Network will:

- **Work with the Governor's office, the Department of Education and County Superintendents to extend STEM expertise** through Regional Education Service Centers throughout the state and develop Network staff in rural communities.
- **Create a "how to" guide for integrating STEM into schools and districts.** This will provide detailed steps for incorporating project-based, interdisciplinary STEM instruction, leadership development and community support. Principals, superintendents and teachers will be led through a mapping process to assess their current readiness and identify and implement effective models that best advance their students.
- **Implement web-based tools and a resource bank for identifying quality programs** based on research and evidence that can be matched with the specific needs of schools and districts.

2. Predictive Analysis and Measurement of Outcomes

Collecting and analyzing information is increasingly critical to know what works, know what needs to be changed and replicate what can make a difference. Effective use of metrics and measures will increase the return on investment of public and private dollars and strategically accelerate the Network's efforts.

To accomplish this, the Network will:

- **Develop and deploy performance-based analytics and a technology infrastructure to collect, analyze and disseminate program metrics throughout the Network.** The work includes engaging key stakeholders and technology specialists to identify key performance indicators and necessary data to track improvements in STEM education and Network efforts.
- Make possible **effective assessments aimed at continuous improvement** in real time - crucial to producing meaningful and accurate outcomes.

3. Strengthen Teacher Effectiveness

Arizona needs to fill critical gaps in STEM teaching. This includes finding quality teachers to meet current demands, supporting and improving capabilities of existing teachers and modernizing the way teachers are educated.

To help ensure a pool of effective, STEM-ready teachers, the Network will:

- **Capture and deploy STEM teaching tools to help meet internationally benchmarked common standards and assessments.** SFAz STEM staff will work to identify content rich, project-based STEM teaching models aligned to the new standards and have the potential for scale, taking advantage of both existing infrastructures and new partners.
- **Engage teachers and students in STEM career exploration and professional development.** This includes bringing STEM undergraduate and graduate students into K-12 classrooms to share their experiences, assist hands-on experiments and provide context for lessons.
- Support research and teaching faculty at Arizona higher education institutions to **develop innovative, content-focused STEM education courses for new teachers** that are geared toward project-based and interdisciplinary STEM learning and assist in translating them into training opportunities for existing teachers.

4. Create Meaningful Business Engagement Opportunities

Every business in Arizona has a vested interest in education and a skilled pipeline of workers. To create productive partnerships between schools and businesses throughout the Network, SFAz will develop an action-oriented "STEM Advocates" program to build ongoing relationships with schools and share practical knowledge for STEM success. The Network Partners will:

- **Design activities for STEM Advocates.** A commitment may include employee volunteer time, hosting field trips, mentoring STEM activities, working with teachers, speaking at school functions, contributing to curriculum development, and publicly advocating for high standards and STEM for all students.
- **Inform and engage about STEM and important education advances** by preparing and distributing STEM articles to employees regularly.
- **Showcase the efforts of STEM Advocates** publicly through media and other information channels.

What Makes This Plan Unique

Too many programs have suffered from a lack of scalability and sustainability. Too many efforts have suffered from generalized support and a resulting inability to assess failure or success. The Arizona STEM Network is determined to change that.

The Network's targeted approach will focus on impact, not simply reporting activities. A combination of technical assistance, relevant and critical information, tools and resources will be directed to schools and districts willing and able to prepare their students for success. Rather than random involvement of teachers and administrators, a whole school and district approach with both a centralized infrastructure and regional centers will create the needed framework to measure performance, support progress and achieve collective impact. This is an opportunity for STEM education to move beyond the typical grant cycle, "add-on" approach to lasting and sustainable results.

Achieving success requires integrating the value of STEM learning into the fabric of our schools and districts. It means moving Arizona beyond ad-hoc, incremental programs that too often leave students at the mercy of short-term grant funds.

This plan, built to change our state's course, cannot wait. The time to begin is now.

Contact Science Foundation Arizona at 602-682-2800 or **info@sfaz.org**
visit our website **www.sfaz.org** to read the full plan and find out more
about the Arizona STEM Network.

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