



Afterschool and Summer Programs: Committed Partners in STEM Education

With generous support from the Noyce Foundation, three of the nation's leading afterschool and summer learning organizations are joining forces in a collaborative effort to promote Science, Technology, Engineering, and Math (STEM) learning during the out-of-school hours. By leveraging our joint efforts and expertise, the Afterschool Alliance, National AfterSchool Association (NAA), and National Summer Learning Association (NSLA) are committed to working together to advance effective, meaningful STEM learning in the afterschool and summer learning space and to making 2010-2011 the *Year of Science in Afterschool*.

The Afterschool Alliance, National AfterSchool Association, and National Summer Learning Association have joined forces in a pledge to expand the national dialogue on STEM education and to serve as strong partners in educating the next generation of scientists, mathematicians, and engineers. Together, we commit to leveraging our organizational resources and our tens of thousands of program partners to expand the role of afterschool and summer learning programs in support of STEM education.

Background

STEM literacy and skills are vital to the professional success of our children and the economic health of our nation. Studies estimate that nearly 80% of future careers will require awareness of and facility with STEM. But without a stimulating STEM education, our children and youth will not develop the basic analytical, problem-solving, and critical thinking skills so central to academic achievement and workforce readiness in the 21st century.

Afterschool and summer learning programs play a major role in engaging children and youth in STEM topics and careers. Defined broadly as those programs serving students before school, after school, and during the summer, these expanded learning opportunities currently benefit millions of children and youth nationwide. For example, according to a recent Afterschool Alliance report, 8.4 million children are enrolled in afterschool programs, and the parents of another 18.5 million children would sign up if a program were available. An estimated 14.3 million American schoolchildren currently participate in summer learning programs, while parent interest indicates 24 million more would enroll if programs were available.

When combined with the traditional school day, afterschool and summer programs constitute an ideal space for getting children and youth excited about STEM learning and careers. This environment by nature offers the kind of project-based and hands-on learning time and venue that sparks their interest and passions - a logical platform to engage them in STEM education. The principles of experimentation and exploration inherent in the scientific process are also found in afterschool and summer programs, where children and youth confront problems, develop solutions and work collaboratively.



Woodcraft Rangers' Nvision Afterschool Program in Los Angeles, reaches young people who would otherwise have little or no access to STEM activities. It receives federal funding from the 21st Century Community Learning Centers Program and from California's After School Education and Safety Program. In Woodcraft's Energy Technology Club, middle school students explore alternative energy technology, including solar, wind and biofuels. After learning various math, physics and engineering concepts, students then create newer, green energy sources by building their own devices. Using everyday items, students built wind turbines, semiconductors, and photovoltaic solar panels. Eventually, students generate and harness enough solar and wind energy to power their iPods and computers, helping to reduce their environmental footprint. Evaluations find that participants show improvement in school attendance, academic achievement and behavior.

Photo Credit: Marquita Takai



Operated primarily as partnerships between schools and community-based organizations, these programs present innovative ways to engage students who may be detached and disinterested during the traditional school day. Children can explore STEM topics of their choosing and undertake longer-term projects without fear of academic failure, and can gain an appreciation for the relevance of STEM topics in their daily lives. This is especially important in light of the number of studies which demonstrate that STEM learning during the school day is necessary – but not sufficient – to support lifelong STEM literacy.

Making use of the hours before and after school and during the summer for STEM activities gives children and youth time to develop an interest in science, which is key to getting them into STEM careers. Research has shown that an interest in science in 8th grade is a better predictor of students choosing a STEM career than academically high-performing students of the same age who show no interest in science. Unique and effective community partnerships are another feature of STEM programming that falls outside regular school hours. These programs often collaborate with external organizations and individuals, particularly with museums, universities, professors, private businesses, and more. Through partnerships with community organizations and collaboration with local STEM institutions and professionals, they are exposing children and youth to instructors and mentors with rigorous STEM backgrounds. By meeting individuals who have exciting and successful careers in STEM fields, they not only gain knowledge but can start to envision themselves in those careers.



TechREACH in Lynnwood, WA captures middle school student interest in STEM education by teaching hands-on, collaborative STEM curriculum in afterschool clubs and summer programs. Funded in part by the National Science Foundation, the program focuses on engaging underrepresented minority and low-income students, and continually updates its curriculum to appeal to current student interests and emerging technologies. Students have built LEGO Mindstorms robots, including a simulated Mars Rover and robots that use sensors to imitate animal behavior. All students independently create and program their robots to complete specific tasks, and complete the unit with a 'Robot Olympics.' Through robotics, students learn various technical skills and become excited about the real-world relevance of STEM learning. When entering high school, TechREACH club members have shown an increased interest in technology and plan to take more STEM courses.

Photo Courtesy of TechReach



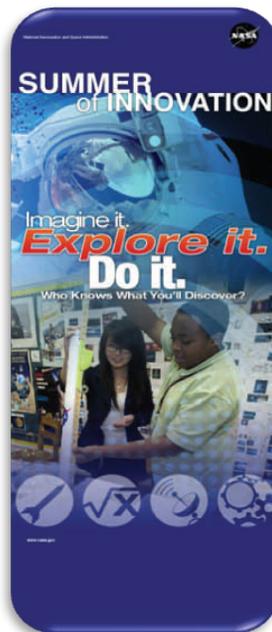
Action Steps to Make 2010-2011 the *Year of Science in Afterschool*

STEM learning is already engaging millions of children in meaningful activities after the school day ends. But there is enormous potential to do even more. The Afterschool Alliance, National AfterSchool Association, and National Summer Learning Association are poised to continue and expand the national dialogue on STEM education and to serve as strong partners in educating the next generation of scientists, mathematicians, and engineers. We ask federal agencies and policy makers to recognize this unprecedented effort and to include us explicitly in policies and initiatives to increase STEM learning in afterschool and summer programs.

Together, we pledge to leverage our organizational resources and our tens of thousands of program partners to:

- Highlight the urgency of providing our children with a strong background in STEM;
- Showcase how afterschool and summer learning programs can help engage and excite children and youth about STEM topics and careers;
- Increase awareness within the afterschool and summer learning communities about opportunities for quality STEM learning in these spaces;
- Educate afterschool and summer practitioners and provide pathways to professional development to help deliver high-quality STEM programming;
- Increase national, state and local media coverage of STEM learning outside the traditional school day;
- Educate national, state and local policy makers about best practices in STEM learning outside the school day;
- Build support for partnerships between schools and community-based organizations to bring more STEM opportunities to students in afterschool and summer learning programs;
- Advocate for greater public and private investment in STEM; and
- Use our conferences, newsletters, and public speaking opportunities to advance this critical agenda.

Our work is already underway. In October 2010, the Afterschool Alliance showcased its work on behalf of this initiative at the USA Science and Engineering Festival on the National Mall in Washington, D.C. Several afterschool providers and numerous youth were on hand to draw attention to the vital role afterschool programs play in STEM learning. Each of the partners is currently planning a strong focus on STEM learning at our national conferences, including NSLA's Summer Changes Everything™ conference in November 2010, which features a STEM-focused general session with NASA representatives and six STEM-specific workshop sessions. NAA recently announced that Bill Nye the Sci-



NASA's Summer of Innovation Project is a major federal initiative to infuse STEM content into summer programming. It is designed to improve STEM teaching and learning in partnership with federal agencies, academic and informal organizations, nonprofits, and industry. This far-reaching effort to provide an intensive and interactive middle school education experience aims to accelerate underrepresented, underserved and underperforming student learning and improve student STEM skills and knowledge. Piloted in Summer 2010, it engaged many states across the country. For example, the Wyoming Space Grant Consortium ran a project titled "Powering STEM Education in Wyoming with Wind Energy," which tied aeronautics and climate change together with wind turbines.

ence Guy will headline their 2011 Annual Convention and the Afterschool Alliance will similarly feature STEM in afterschool as a big part of the 2011 *Afterschool for All Challenge*.

Through plenary talks and professional development workshops, each of these events will energize and equip the afterschool and summer learning communities to engage students in STEM learning and to advocate for additional resources for STEM in afterschool.

We don't have a second to waste. The very future of our children and our economy is at stake. Our students will need a solid understanding of STEM – and the problem-solving and creative-thinking skills it involves – to have success in science and in business. Across the country, there are incredible examples of innovative STEM learning taking place in afterschool and summer learning programs. We need to seize the opportunity to bring these programs to all our students sooner rather than later. Together, our three organizations can and will play an important role in advancing this agenda and in creating more opportunities to bring the excitement of STEM learning to an increasing number of our students.



Cosmic Chemistry is a two-week, summer science program for 9th and 10th graders, designed to encourage high school students to enroll in high school chemistry. The pilot program launched in Tulsa, OK in summer 2010 and uses the real-world context of space science to set high expectations, build background knowledge, and motivate students, with the ultimate goal of increasing their science achievement. These students are working with a curriculum based on real world science from the NASA Genesis Mission, the fifth in a series of un-manned NASA Discovery Program space missions focused on the solar system, which utilizes on line content, including live webinars with astronauts. The program was developed by McREL and has funding support from the United States Department of Education's Institute for Education Science.

Photos courtesy of McREL

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- **Afterschool Alliance** – <http://www.afterschoolalliance.org>
 - **National AfterSchool Association** - <http://www.naaweb.org/>
 - **National Summer Learning Association** - <http://www.summerlearning.org/>
 - **America After 3pm** - <http://www.afterschoolalliance.org/AA3PM.cfm>
 - **America After 3pm Special Report on Summer** - http://www.afterschoolalliance.org/AA3PM_Summer.cfm
 - **Planning Early for Careers in Science** - Tai et al., Science (2006), v.312, pp.1143-1144
 - **The 95 Percent Solution** – Falk, J.H. and Dierking, L. D., American Scientist (2010), v. 98, pp. 486-493

