



WOW! Ed

The Center for Educational Improvement
2010 STEM and Education

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Current Events

CEI recently received a contract to work with the Cleveland Metropolitan School District in Ohio. During our time there, we will be helping with school improvement plans in the categories of World Cultures and International Studies, as well as Career Academies. Thank you to all of those who helped make this award possible, and we look forward to working with you in the upcoming months!

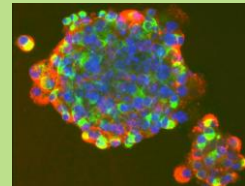
CEI is currently leading the Center for Improving Ohio Schools as an Ohio approved SIG vendor. We now have a team of 40 professionals available to meet your needs. Please visit our [website](#) for more information.

Dear Christine,

In 2009, the Obama Administration infused \$260 million for a Science, Technology, Engineering, and Mathematics (STEM) initiative. The initiative is designed to improve the ability of students to think critically about these topics and to expand STEM to reach students in underrepresented groups, including women and minorities. [According to the White House "five major public-private partnerships are harnessing the power of media, interactive games, hands-on learning, and community volunteers to reach millions of students over the next four years, inspiring them to be the next generation of inventors and innovators."](#)

- To provide one example of one of the recent partnerships: In November, NASA announced that it will provide \$20 million over the next five years to focus on stimulating student interest and knowledge of robotic technology.

This newsletter provides a birds-eye view of some of current efforts to get U.S. schools and students back on track with a focus on how to solve practical everyday problems and also apply technologies to design products and systems for the future.



America's Need for Science, Technology, Engineering, and Mathematics (STEM)

A large majority of secondary school students fail to reach proficiency in math and science, and many are taught by teachers lacking adequate subject matter knowledge. There is a growing concern that the United States is not preparing a sufficient number of students and teachers in the areas of science, technology, engineering, and mathematics (STEM)



Dr. Mason training teachers at Crittenton Community School in Ohio

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Services Provided

School Improvement Plans

We can help you develop and monitor School Improvement activities to meet state and federal requirements. We are certified as school improvement officers in Ohio and trained in school improvement reviews in Washington DC. Dr. Audrey Kremer who just joined our team specializes in 21st Century Knowledge and Technology Skills.

Workshops and Seminars

CEI implements our unique "WOW! Factor" presentation style for interesting and vibrant workshops.

We also provide over 30 different training modules that can be formatted to fit your school's needs. Among these are workshops on: co-teaching, closing achievement gaps, global education, and the Response to Intervention model. We provide both live, in-person and web-based workshops.

When compared to other nations, the math and science achievement of U.S. pupils and the rate of STEM degree attainment appear inconsistent with a nation considered the world leader in scientific innovation. In a 2007 international assessment of 15-year-old students, the U.S. ranked 28th in math literacy and 24th in science literacy (Kuenzi, 2008). Moreover, the U.S. ranks 20th among all nations in the proportion of 24-year-olds who earn degrees in natural science or engineering (Kuenzi, 2008).

So what are other countries doing to prepare their students in the field of STEM that the U.S. is failing to do? What is the U.S. doing to increase STEM education and teacher quality in our schools? While further study of how STEM is approached internationally is needed, with recent STEM initiatives, the U.S. is on the road to improving STEM instruction.

The initial force behind STEM education initiatives was the potential to develop future engineers and scientists through the implementation of specialty or magnet high schools focusing on science, technology, engineering, and mathematics (SEDTA, 2008). Over 100 schools specialize in mathematics, science, and technology serving 37,000 students nationwide. Other schools are implementing STEM initiatives with funding from the U.S. Department of Education and agreements with practicing engineers. However, in most school districts, science, technology, engineering, and mathematics are included as part of the entire curriculum - not as a specific focus. And for many schools, engineering is not addressed.

Many schools also lack highly qualified teachers to teach their science, technology, engineering, and math programs. According to research compiled by the Science Education Technology Directors Association (SETDA), it is difficult to find and retain STEM-qualified teachers because:

- Very few graduates are majoring in STEM-related fields choose a teaching career
- It is difficult for STEM-trained professionals to transfer to teaching because of certification requirements
- Teachers with a STEM background often leave teaching to pursue graduate school
- STEM-trained professionals often don't pursue teaching because of low compensation.

Data Driven Instruction

CEI can assist teachers and administrators in training and implementing DDI programs into their schools.

Praxis Tutoring

We offer Praxis tutoring for teachers working on completing their Praxis I or II tests, as well as the speciality exams.

More information

Please visit our website for information or to arrange for a presentation regarding [services](#). Contact us now to learn about our plan for a 10% discount for packaged services.

Contact Information

Contact our Executive Director, Dr. Christine Mason.

Email:
cmason@edimprovement.org

Phone:
(571) 213-3192

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info@edimprovement.org

Another dilemma that the U.S. STEM initiative hasn't yet addressed is the inequity that exists for some students. If students in secondary school do not experience high quality STEM programs, they will be less likely to pursue those types of degrees or careers during their post-secondary education, and therefore be less likely to enter a teaching career as a highly qualified STEM teacher. In addition, many students do not see the relevance of STEM fields to their every day life because they are not given ample opportunity to experience the different fields to their full potential (SETDA, 2008).

References:

Kuenzi, J., (2008). CRS Report to Congress: Science, Technology, Engineering, and Mathematics (STEM) Education: Background, Federal Policy, and Legislative Action

State Education Technology Directors Association, (2008). Science, Technology, Engineering, and Math.



Current Initiatives in STEM Education

Click on the name of the initiative to visit its corresponding website.

For Teacher Training

The U.S. Department of Energy, Office of Science: The Office of Workforce Development for Teachers and Scientists

The U.S. Department of Energy offers a pre-service summer internship program for students who have decided on a teaching career in mathematics or science. Students are placed in paid internships in science, math, and technology. Students work with scientists or engineers and are mentored by a Master Teacher who currently works in K-12 education and is familiar with the research environment of a specific National Laboratory.

Cincinnati Initiative for Teacher Education (CITE)

CITE is a five-year pre-serviceteacher education program designed to graduate fully qualified teachers. Teachers are required to obtain two degrees - a bachelor's degree in education, as well as a degree in their specific discipline. Additionally, teachers participate in a one-year internship that combines teaching and professional development. During the internship they work with experienced teachers, faculty, and other interns as professional teams.

George Washington University, Washington, DC Teacher Preparation Program- QUEST

The QUEST program is designed for recent college graduates and professionals transitioning from other fields who want to become middle and high school teachers. The QUEST Program provides the coursework for initial teacher licensure leading to a Master's in Secondary Education (M.Ed.) and licensure eligibility for those who are interested in teaching secondary Art, English, English as a second language, foreign language, mathematics, computer science, science (biology, chemistry, physics), and social studies.

For Students

The National Consortium for Specialized Secondary Schools of Mathematics, Science and Technology (NCSSMSST)

NCSSMSST supports specialized schools whose primary purpose is to prepare students for leadership in mathematics, science, and technology. Specialized Math and Science High Schools (MSHS) focus on STEM courses where teachers encourage student learning and the development of critical thinking skills. MSHS form partnerships with colleges, businesses, and community organizations to support research and internships.

Project Lead the Way (PLTW)

PLTW is a national, nonprofit educational program that promotes science and engineering for middle and high school students. PLTW partners with public schools, higher education institutions and the private sector and currently serves over 175,000 students. PLTW utilizes a project-based learning philosophy where students engage in hands-on, real-world projects and students discover how the skills they are learning in the classroom are applied in everyday life. PLTW's primary goals are to increase the number of students who pursue degrees in engineering and engineering technology programs, and who graduate with these degrees. PLTW is also committed to providing leadership for the continuous improvement and innovation in STEM programs.

Incorporating STEM into Schools

Although teacher training programs and student-directed STEM initiatives are a great pursuit for all school districts and states, many teachers and administrators would like to know what they can do *today* to incorporate STEM into their teaching and their schools. Please click on the title to view the document or website associated with the information

Teaching Math Problem Solving Using a Web-Based Tutoring

System, Learning Games, and Student Writing

This article describes the use of 4MALITY, a web-based mathematics tutoring system, with 125 Massachusetts fourth graders and their teachers in three rural school districts during the 2007-2008 school year. Throughout the research, Maloy, Edwards, and Anderson (2010) found that in using 4MALITY students were able to form broader set of strategies for teaching math problem solving using a combination of computer-based activities, learning games, and students' creative writing of math problems. 4MALITY and the combined work with teachers and tutors proved successful, with 70% of students improving their performance from pre-test to post-test.

National Association of Workforce Development Professionals (NAWDP)- Youth Summit, Chicago

During the 2010 Youth Summit in Chicago, the NAWDP presented a seminar on beginning a Youth Apprenticeship (YA) program in schools. With this program, students are able to have an internship with a local business in order to gain valuable experience in the workplace. The NAWDP stressed that providing workforce experiences in the STEM area of education will help to increase careers in these fields because students will become more exposed to what they have to offer. Click on the link above to view the NAWDP's PowerPoint presentation.

Click [here](#) to view a Wisconsin school district's plan to begin a YA program.

Click [here](#) to view a sample of a curriculum that can be used in a YA program.

Coalition for Science After School (CSAS)

Individuals and organizations involved in [STEM education](#), youth development, and out-of-school time programs have formed an alliance to promote science as an after school initiative. It is based at Berkley University and involves 150 member organizations. *CSAS envisions the day "when young people from all backgrounds have access to high-quality science, technology, engineering and mathematics (STEM) learning beyond the classroom."*

[One CSAS program, AfterSchool KidzScience](#), provides field-tested science kits focused on a general science area (physical science, environmental science, forensics, etc.) The materials have been tested in after school settings and are designed to assure that they are easily presented by program staff with little or no science or



education background.

Sample Unit Plan: Nuclear Revision

This sample unit plan gives teachers and administrators an excellent example of how content areas can be integrated to expand the relevance to students' lives. This unit, developed by Rebecca Gerik and Kimberley Garner in Anchorage Alaska, combines science and English to help students gain a better understanding of nuclear power and how it effects us today and in the future.

The STEM initiatives are vital to the future of education. Science inherently provides students with direct, hands-on activities to problem solve and engage in critical thinking activities with their peers. There are many web resources available to further assist teachers and schools. Adequately equipped science labs and an inquiry-based approach are needed for students to gain experiences to delve into topics and become better prepared for the science and technology that will shape their futures. Whether you teach science, history, English, or any other subject, there are myriad ways to build on STEM and improve learning outcomes. Climb on board this band-wagon!

Sincerely,

Christine Mason
Center for Educational Improvement
www.edimprovement.org

This newsletter has been provided to you by the Center for Educational Improvement as per our mailing list. Please contact Lauren Lomdale with corrections or comments at llomdale@edimprovement.org.

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