

A Publication for

ROBERT J. KAISER

MIDDLE
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CLASSROOM



21st Century middle school learning 'New' STEM basics prepare students for a high tech workplace

Today's preteens are a technologically savvy bunch. They are the first generation to grow up with personal cell phones and MP3 players. They use the Internet routinely to learn new things, create personal Web pages, and connect with friends both near and around the globe.

And although this knowledge will surely benefit children as they move toward an ever-changing world and increasingly technological adult workplaces, it is not enough.

To help preteens be truly successful, middle school must offer students plenty of practice with the new basics. These include the STEM subjects of science, educationally relevant technology, engineering and mathematics, which educators and business leaders agree American students need most to successfully navigate today's world and compete for desirable jobs of the future.

Additionally, English language arts (reading, writing, editing) and foreign language studies will play an important role in helping students communicate well in a global marketplace. Social studies expand students' understanding of our vast world, its people and political structures. And finally, the visual, performing and

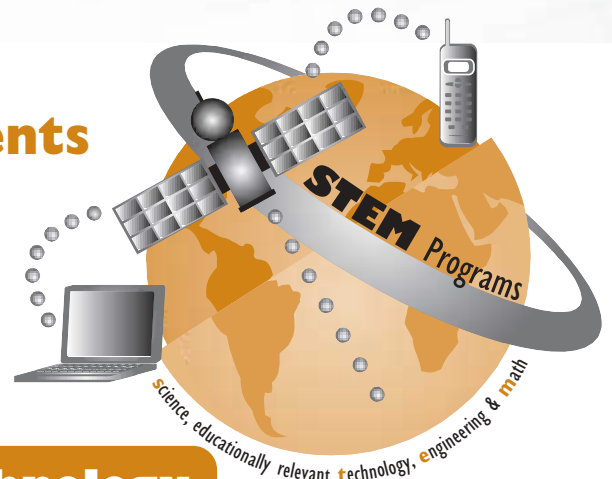
musical arts help them express themselves, understand cultures and appreciate beauty from around the world.

TODAY'S 'BASICS' GO HIGH TECH

Consider these examples of how the "tried and true" are being married with the "here and now" to create meaningful and hands-on middle school learning in the important STEM subjects:

- Sci-fi fans and weight-training teens alike can relate to a lesson on robotics. Using low-tech supplies such as popsicle sticks and rubber bands, students can create models of robotic arms, much like those used in industry to remove hazardous waste or lift heavy objects. Students learn about anatomy and physiology, for example, as they develop an understanding of the human body and how it works. Geometry is used to determine angles. The physical building of the robotic arm provides practice with basic, hands-on engineering. Kids also practice related skills in creative thinking, sequencing (following steps), and problem solving.

- Using photo-editing software, students learn first-hand that what they see on-line and in magazines isn't always what it seems—an important consumer lesson in itself. In addition, while students create and edit electronic images, they are honing their computer skills while weaving in math practice using fractions, percentage and scale, and delving into the science of color theory.



Technology in the jobs of today... and tomorrow

The National Science Foundation estimates that in 2010, the year that many of today's middle schoolers will begin graduating from high school, as many as one-fourth of all jobs will be based on math, science and technology. Additionally, the number of new U.S. jobs requiring math and science—from retail sales to high-tech computer software design and programming—continues to grow. By 2012, science and engineering jobs are projected to grow by 26 percent, a dramatic increase considering that jobs in other fields are projected to grow by only 15 percent.

Science, math and technology are woven into many of today's jobs, in both obvious and surprising ways. For example:

- ▶ **Auto mechanics** routinely rely on computer skills to use hand-held diagnostic devices to pinpoint problems and when referring to service manuals stored in electronic databases. Algebra, trigonometry (with an emphasis on angles) and business math are also used in the course of their day-to-day tasks. According to the U.S. Department of Labor's Occupational Outlook Handbook, there will be a 9-17 percent increase in auto mechanic/technician jobs by 2012.

- ▶ **Registered nurses** draw heavily on science, including anatomy, physiology, microbiology, chemistry, nutrition and psychology. Math — such as weight and measurement, fractions and percentage — is essential for dispensing medication. Growth in the nursing field is faster than average, with 27.3 percent more jobs projected by 2012.

- ▶ **Multimedia artists and animators** combine visual art creativity with computer skills to create programs and applications for the Internet, Web sites and video games. They also create programs for information kiosks, such as those in museums and shopping malls. These multimedia products combine graphics, sound, text, animation, still images and digital video into one package. By 2012, jobs in this field will have increased by about 15 percent.

The 2003 Trends in International Math and Science Study has shown that American students lag behind students in other countries, particularly China and Japan, in their understanding of science and math. Without adequate skills and early training in these areas, today's students may be less qualified than their peers overseas for desirable jobs. Already, many major U.S. manufacturers have moved significant production—particularly in areas of high-tech—overseas, citing a lack of skilled U.S. workers.



SMART Boards are exciting students to learn

SMART Board use in our nation's schools is growing rapidly and there's a good reason why. These interactive "white" boards, that have essentially taken the place of the traditional chalk board, have brought learning to an all new level.

In Monticello, SMART Board technology has been used for the last three years and began with a handful of boards that were placed on rolling carts and shared by teachers in each building. During the past two years, schools began affixing the boards in individual classrooms, after Technology Director Shelley Rossitto procured federal grant monies for the purchase of more boards. Presently, every school in the district has at least some classes that utilize them. And most teachers, who don't have one, want one.

For RJK Middle School 6th grade English Language Arts teacher Susan Bertorelli, who was one of the first teachers in the district to introduce her students to SMART Board learning, she can't imagine her classroom without it!

"I use my (SMART) Board everyday," explained Bertorelli. "I do my lessons in class and then I put them out on my web page so students can use them for review or to catch-up if they were absent." Bertorelli, who has been teaching for the past six years, learned about this technology while in graduate school. She embraced its versatility because of her teaching style. "I have high expectations for my students and I try to stay away from some of the standardized teaching techniques of the past that tend to disregard a child's uniqueness and individuality."

For Teri Galazin, an RJK 7th grade math teacher, she feels the same way. "It's amazing the added level of comprehension and retention my students have displayed since I've been presenting their math lessons in a visual way," stated Galazin,



When they know that they get to use the SMART Board, Susan Bertorelli's 6th grade ELA students get very excited about answering their grammar questions!

whose students love to use the built-in protractor for measuring angles (a standard feature that comes with the SMART Board software.) "It's so interactive; the kids really get actively involved with each lesson. I feel really blessed to have access to such great technology in my classroom; people need to realize how lucky we are."

In our society, many children are brought up watching a large amount of television and movies, and playing video games for hours on end. When it comes to school work, they lack the discipline and many times the attention span, to stay focused during traditional teaching techniques and lectures. The SMART Board is a technology that caters to the 21st Century mindset of today's students and satisfies their need and desire for visual stimulation.

HOW IT WORKS:

Take a regular desktop computer and connect it, through its video output to a ceiling mounted data projector. That projector then shines the image on a "white" board or SMART Board, which is secured to the wall in the front of the classroom. The Board is connected to the computer's tower through a USB port which makes it interactive. That means you can open and close programs and files, navigate to other locations or stream video clips from the internet by using your finger in the same way you would a mouse. It allows you to do all the things you can do on a regular computer, but in a large format (usually sized with a 77" screen) and it doesn't require the teacher to go to his/her desk and leave the front of the classroom. This helps keep students focused and learning, for any teacher knows it can be a challenge to engage students once you've lost their attention.

As an added bonus, it actually helps all types of learners stay motivated, interested and even excited about their school work.

Some students actually look forward to coming to school because they know they will be working on the SMART Board in class. With things like Internet exploration, word processing skills, video streaming and an unlimited access to educational resources literally at a teacher's fingertip, the SMART Board has become a smart idea in helping to supplement the required curriculum of any grade level.

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