

Preparing Students for Success in the 21st Century

Critical and independent thinking, problem solving, collaboration and communication are skills children need to develop into wise, productive adults. Having these skills is essential for meeting the social, cultural and economic challenges of the 21st century, and Cincinnati Public Schools has launched an innovative program to make sure that students are prepared.

The Science, Technology, Engineering and Mathematics (STEM) program offers a seamless pathway from kindergarten to senior year for students interested in the innovation-based careers that are driving today's global economy. The program breaks down traditional barriers between academic courses by integrating core concepts across all disciplines — using technology every step of the way.

The first STEM school opened at the start of the academic year at William Howard Taft Elementary. Once among the lowest-performing schools in the district, Taft Elementary was redesigned with an all-new staff and stocked with an array of technology to engage students in a new way of learning — including laptop computers, iPods, camcorders, digital classrooms and a wide variety of software.

“STEM is giving students an opportunity to learn in a way that's non-traditional,” says Danielle Pankey, third-grade lead teacher at Taft Elementary. “Our flexibility comes in the access to technology. We use technology to enhance our teaching.”

The movement away from rows of students watching a teacher lecture with notes on a blackboard has been a tremendous success. Attendance has improved, and students are excited about learning — things that can't be

measured on a test but set the groundwork for achieving higher scores.

“Our students want to come to school,” Pankey says. “The parents have seen such a shift in attitude about how the kids feel about school that they're buying in because their kids are happy. They're encouraged.”



Lead teacher Danielle Pankey engages students with new SmartBoards installed throughout William H. Taft Elementary.

STEM impacts the entire curriculum through project-based learning activities. Pankey uses a Valentine's Day project as one example. The entire school designed and made cards for one of its business partners, Christ Hospital. Students created a design that used a specific size of paper, used only three lines of text and incorporated a pop-up image so the entire piece communicated its message in an attractive way. Students worked on their designs at home, drew plans and then used the resources at school to create the finished products.

“We teach through project-based learning in which students explore academic concepts within the context of everyday living,” says Taft Elementary Principal Donna Fields.

“Our students also will be engaged in project-based learning on a regular basis, so that academic concepts are understood within the context of real-world situations.”

- Jamie Beirne, teacher, Hughes STEM High School

“For instance, our students may have to sell goods from an imaginary store or something else with which they are familiar. The students then come up with a math problem or a writing project based on the real-world situation or concept. This helps them become so much more engaged.”

STEM education is a priority across Ohio, as more employers are struggling to find a talent base to support new business opportunities. As state officials work to lure more businesses to set up shop throughout Ohio, STEM programs are seen as economic growth tools. So far, Ohio has dedicated more than \$200 million for STEM-related education initiatives, with CPS’ programs being among them.

CPS developed its STEM programs in partnership with the University of Cincinnati (U.C.), Cincinnati State Technical and Community College, Strive and other businesses and organizations. The initiative is strongly supported by the Cincinnati Federation of Teachers (CFT), and several business partners have signed on to help bring STEM concepts to life through internships and job

shadowing opportunities that allow their facilities to double as learning laboratories. Key partners include Procter & Gamble, Duke Energy, GE Aviation and the Cincinnati Zoo and Botanical Garden.

STEM doesn’t mean extra math and science classes, but rather, applying the strengths found in those fields to all areas of study.

“Teachers can work with each other in a collaborative fashion in the classroom to break down discipline boundaries,” says Tim Kraus, president of CFT. “This way, you can have history and English being taught together ... using technology and project-based learning to bridge the gaps.”

In fall 2009, the Hughes STEM High School will be launched with incoming freshmen — adding new grades to the program each year thereafter. One of the lead teachers designing the high school STEM curriculum is Jamie Beirne.

“At the freshman level, students are going to take a science and history class combined,” he says. “At their sophomore level, they’re going to take a biology/English course. We’re trying to break down barriers between what students learn in the classroom and how it connects to the real world.

“Mathematics is not a subject you take in school; it’s a tool to help you understand the world,” Beirne says. “When kids see the relevance of the subject areas and how they apply to the real world, it starts to make more sense. Our students also will be engaged in project-based learning on a regular basis, so that academic concepts are understood within the context of real-world situations.”

The STEM curriculum will help students identify their individual strengths and areas of academic interest so they can choose a focus for their studies during their junior and senior years. Students will be able to earn college credits and get early exposure to college life, thanks to the partnerships with U.C. and Cincinnati State.

“We see ourselves as a grade 9-16 school because of our relationship with our college partners,” Beirne says. “We’re able to offer students a seamless educational experience that extends both through high school and college. And, when you add on the elementary program at Taft Elementary, students in the future can take advantage of this program throughout their entire education.”

Hughes will offer five STEM career pathways: Bioscience; Sustainable Urban Environment; Aerospace Science and Engineering; STEM Education; and the Zoo Academy.

“We looked to businesses to tell us the kind of jobs that are going to be needed in the future,” Beirne says. “We structured our program to meet those needs.”

The measurement of success isn’t going to be the number of engineering students enrolled in a particular college. Instead, the measure will be the number of future leaders who are prepared to make their mark on the world because they’ve mastered STEM concepts.

“We want all of our students to make natural gains,” Pankey says. “Wherever you started in August, at the end of the year we want to look back and say, ‘You’ve really grown as a student.’ We want to see that every student made personal gains, over time, as a result of having this different way of learning.” ★

