## STEM and Career Exploratory Classes

**BY DARRELL CHASE**

Districts face increasing pressure to improve students’ mastery of curriculums in the fields of science, technology, engineering and mathematics (STEM). Yet the number of students entering middle and high school dramatically in middle and high school.

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### Sylvester Middle School

Sylvester and Chinook middle schools’ technology education classrooms have been designed to give students the opportunity to explore many different areas of technology. Business and technology learning stations (modules) have been developed with a self-directed set of instructions for each station. This instructional program provides students with daily, hands-on experiences that enable them to focus on becoming technologically literate, active problem solvers, to pursue their interests.

### Modules students are able to choose from at Sylvester Middle School

**First Quarter Business Education**

- General Computer Knowledge and Windows Operating System
- Beginning “Qwerty” Keyboarding
- Graphic Arts: Drawing Programs/Digital Cameras/Scanners/Computer Animation
- Microsoft Excel: Database/Spreadsheet/Graphs
- Microsoft PowerPoint: Multimedia Presentations/Communication
- Microsoft Word: Written Communication
- Microsoft Publisher: Desktop Publishing/Communication

**Second Quarter Technology Education**

- Research, Design and Safety in Transportation
- Research and Design on Structures and Bridges
- Structural and Design Engineering of Buildings
- Career Exploration Using Career Cruising
- Introduction to Flight/Aviation—Aerospace
- Rockets and the Science Behind Them

We strive to provide instruction that enables students to make informed and meaningful educational and career choices by developing in each the ability to:

- Define business applications and technology.
- Explore business and technology systems.
Having awareness of various career choices (and the postsecondary education required for that career) supports students’ readiness for the future.

- Utilize a problem-solving strategy to solve business- and technology-related problems.
- Use the basics of science and math in solving real-world problems.
- Develop a positive self-image by being successful in hands-on experiences.
- Develop skills in the safe use and operation of computers, basic hand tools, machines, materials, and processes of business and technology.
- Identify talents, abilities and interests in business and technological fields.
- Develop cognitive (mental), physiological, physical (physical), and affective (aesthetic) problem-solving skills by researching and developing, designing, producing, operating, and analyzing business and technology systems.
- Identify various business- and technology-related careers, the opportunities in these fields, and their educational requirements.
- Appreciate the nature of technology and its impact on the individual, society and the environment.

Cascade Middle School Shows off Project Lead The Way

In 1997, Project Lead the Way (PLTW) was created to address the nation’s shortage of STEM professionals. Today, there are 3,000 PLTW schools in 46 states. PLTW has designed a tightly aligned system of curricula, professional development, and assessments. All courses are project- and problem-based learning experiences in which students apply math and science to real-life engineering situations. After taking foundation courses in the eighth, ninth and 10th grades, students move into specialized courses such as civil engineering and architecture in the 11th and 12th grades while completing a full sequence of math and science courses. Each course offers entire curriculum units built upon national math, science and technology standards. Teachers must become certified during a two-week summer workshop at an affiliated university before teaching the program. PLTW also has developed a series of standardized end-of-course examinations that can result in early college credit. Other PLTW programs exist in aerospace engineering programs and college credit. Other PLTW programs exist in the area of design and technology. At Cascade Middle School, we are teaching four modules that are from the PLTW’s Gateway to Technology, which incorporates science, math and engineering as well as leadership components. The modules are: design, modeling, automation and robotics. Design and modeling uses solid modeling—a mathematical technique for representing solid objects—into three-dimensional space. The gateway to technology also includes coursework in architecture and planning, which emphasizes developing solid models for the design process. Utilizing this design approach, students understand how solid modeling has influenced their lives. Students also learn sketching techniques and use descriptive geometry as a component of design, measurement and computer modeling using the Inventor program. Using design briefs or abstracts, students create models and documentation to solve problems.

Suggestions for Starting More Middle School Programs

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In automation and robotics, students trace the history and development of automation and robotics. They learn about structures, energy transfer, machine automation and computer control systems. Students acquire knowledge and skills in engineering problem solving and explore requirements for careers in engineering.

Helping Students Succeed

All mid-level students can be expected to benefit from this approach, especially those students in grade eight who are preparing to transition to the high school and who are beginning to make decisions about the direction their high school and postsecondary education will take. By using this approach we can help ensure that education is helping to engage students in STEM learning so that they may go on to pursue STEM careers and provide the workforce with qualified workers.

References


ACT, “Ready for College and Ready for Work: Same or Different?” (Iowa City, Iowa: ACT, 2006).


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