Anchorage School District STEM Programs

STEM: Science • Technology • Engineering • Math

During the inaugural year, the STEM curriculum department at ASD took on several objectives. The goal of these objectives is to coax more students into taking more mathematics and science during their years in school, to assist students to understand the connections between mathematics, science and engineering design, and to help the students to feel more confident in their abilities to understand and do mathematics, science and project design. This is a part of national goals to increase the number of graduates in STEM career areas. Additionally, a STEM website has been created. We believe we have adhered to the firm commitment made last year when this initiative was formalized by the school board, to not drastically change or eliminate any math or science initiatives that were in place.

STEM in an acronym for Science, Technology, Engineering and Mathematics. The term is somewhat new, but the foundation of knowledge in the area is older.

The STEM curriculum encompasses the desired learning that students will need to prepare them for their lives in a future that perhaps they don't quite understand themselves. In this district, that we are moving to combining these areas into one realm does not mean that the instruction will immediately change. The Anchorage School District has been doing very well at educating students and there is no reason to change that. We can improve, however, and we are making steps to prepare the students a bit better for the rapidly changing technological world they enter.

A primary objective of the STEM curriculum is to integrate the teaching of the four composite areas so that the students better understand the connections among the areas. Most students already understand this concept, but all students must understand it.

ELEMENTARY SCHOOL

Three main areas have been identified and work begun with pilot programs at the STEM cohort schools.

Science Kits

We are using the science kits as a framework on which to build the STEM curriculum. The Ed Tech department, along with STEM mathematics and science specialists, is aligning technology standards into the guides for the kits. In essence, we are trying to allow the teachers in the classrooms to complete a

MIDDLE SCHOOL

A couple of STEM projects that are being used at some schools are being introduced to other school sites.

STEM Conference

During the second semester, a conference is typically held for middle school girls. Although it has traditionally focused on math, this year it is the Middle School Girls STEM conference. It will be held the same day as the Sally Ride Academy.

HIGH SCHOOL

Efforts are primarily directed to the fields of science and mathematics in different ways this year. The math department has new texts for Pre-algebra, Algebra 1, Geometry and Algebra II. Trainings to use the new texts will incorporate more uses of technology. Science is the focus at the 9th grade level.

IS9 brainstorm

For the IS9 classes, a meeting of minds will be held in February 2010 to put together projects that use STEM curriculum well. These projects will be posted on the ASD

science lesson while at the same time having the students learn technology, mathematics, reading and writing strands.

NASA pre-engineering lesson

Additionally, we have rolled out a new NASA pre-engineering lesson. It is termed "**NASA's BEST students**." It uses an online curriculum to allow students at a variety of age levels to understand the process of re-examining a design and re-doing a build. It has been taught to several teachers by a NASA trainer, has been taught in an abbreviated form at the new teacher institute, and has been taught as an intensive at a couple of schools.

Sally Ride Academy

The third initiative for elementary schools this year is the **Sally Ride Academy**. This national curriculum has been taught in several cities in the United States for several years. Some ASD teachers have attended the trainings in summer and have taught the course here in our schools. The same training is being taught for grades 3 – 6 in late January. The Sally Ride curriculum includes career pathways to use at the late elementary

FIRST Lego League competitions

Several middle schools will participate in the **FIRST LEGO League®** competition with schools from around the state.

Sea Perch Program

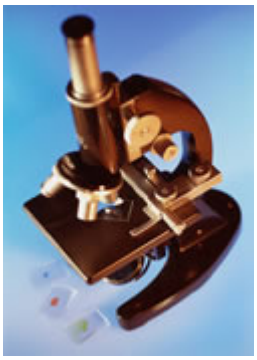
The **Sea Perch Program** ROV underwater robots program has been used at one middle school for several years. It is a project developed at MIT and incorporates many STEM curricular objectives. This fall, the STEM curriculum department set up a training for this project with representatives from the Juneau Economic Development Council and the US Navy. Teachers from other areas of the state also participated in the day long training. As a continuation, two additional ASD schools are building the underwater robots and are seeing the results of a project that uses mathematical and scientific knowledge in combination to produce a winning design. Hopefully, this will allow a city-wide competition in the spring.

STEM integration

The staff at four middle schools have offered to assist with STEM integration. The STEM curriculum department is helping to guide alignment of mathematics and science in the projects that these four schools are using.

Moodle site for all ASD high school science teachers to see, to use, and to modify to their best use.

Biology review



For biology, the other 9th grade science class, a review committee is being established at this point. The objectives of the curriculum review committee include determining if the current text and curriculum meet the needs of upper level biology classes, if the text and curriculum are in alignment with current understanding of the cellular unit, and if the current curriculum is preparing our students properly for their careers beyond high school. There is also an ongoing effort to look at STEM supplementary materials and projects that are aligned to our present standards (such as the one initiative observed at Lumen Christi).

AP Environmental Science

Additionally, we want to investigate another possibility that has been used successfully at some schools in the lower 48. For the advanced freshmen, offering an AP course in science would allow those students to get more science credit in a nationally recognized course. The course chosen for this alteration is AP Environmental Science. A committee will meet in February 2010 to investigate the

and middle school levels to align student interests with their coursework as they progress through the K-12 years.

ramifications of introducing this option either next year or the year after. The objective is to allow more students to take more science in high school, while not negatively impacting their GPA.

Robotics competitions

Since 1999, the Anchorage School District has been involved in robotics competitions to involve students in STEM activities. The number of schools involved in this exciting team sport has increased dramatically. We hope that more schools will try some level of the competitions, and that more students participate. The FIRST competitions, in particular, are friendly while also being competitive. The goal is not to trash another team's robot, but instead to work with it to achieve a goal. Bartlett High School's robotics team competed in the World Robotics Festival in April 2011.

Dimond High School Engineering Academy

The DHS Engineering Academy is designed to prepare students for a two-year or a four-year engineering degree program. Five engineering courses follow the Project Lead the Way (PLTW) curriculum that may qualify for articulated agreements with universities in Alaska and across the U.S. Engineering Academy courses are project-based. Students are connected with engineering professors at UAA and with engineers in businesses that serve on the Engineering Academy Advisory Council.

Students may enter the Engineering Academy as freshmen and continue the four-year sequence or they may take individual courses when space is available.

Service High, Biomedical Career Academy (BCA)

The Biomedical Career Academy at Service aims to prepare students for a successful career in the health care industry. Classes within the BCA focus heavily on rigorous academics within a traditional curriculum, integrating health care and medically based activities within the classroom and community. Students have the option of preparing themselves for a position directly after high school within a health care setting and/or to focus on preparation for a traditional college degree.

All students are required to be members of HOSA (Health Occupation Students of America- a nationally recognized student health care organization) and will also be obtaining current first-aid/CPR certification. Seniors, upon the successful completion of prerequisites, will take a capstone class which focuses on individual research and hands-on learning.

The BCA students will be interacting with our business partners in the community thus will be held to high standards of professional conduct and communication.