

# QCMP Math & Science Program

**Purpose, goal or objective:** A large body of research enumerates the barriers that limit participation and success of women and minority student in science, technology, engineering and math (STEM) courses and careers. These include the following: 1. Negative attitudes of faculty and staff regarding the ability of women and minority students to achieve at high levels in math and science; 2. Lower performance and lower rates of preparation in math and science courses and on standardized test; 3. Limited exposure to co-curricular activities in STEM; 4. Lack of information, limited role models, varied influence of adult or authority figures; 5. Lack of interest in STEM fields and careers; 6. Competitive versus cooperative learning environments; 7. More limited, often inferior, resources to support effective learning and development at pre-college levels; 8. Teaching and learning environments that fail to support different learning and interaction styles; 9. Lack of mentors; 10. Lack of role models; 11. Stereotypes that STEM isn't for girls and minorities; 12. Lack of self confidence/self doubt; 13. Limited quality science and math education ( Armstrong, AACC, 2011).

The mission of the QCMP Math and Science Program is to provide an opportunity for 11<sup>th</sup> grade students to discover, explore and experience the realm of science and mathematics in a nurturing environment with the goal of preparing students to enter Science, Technology, Engineering, and Mathematics (S.T.E.M.) careers. This program is a collaborative effort with: Black Hawk College, Western Illinois University, Scott Community College, Augustana University, St. Ambrose University, University of Iowa, Palmer College of Chiropractic Medicine, Moline High School, United Township High School, Rock Island, High School, West High School, North High School, and Central High School. The network also includes, mentors from John Deere, Alcoa, Midwest America, Rock Valley Physical Therapy, Trinity Medical Center, and Genesis Health System.

**Date of Implementation:** Planning for this program started in the summer, 2010. Black Hawk College was awarded a KNOW2GOILLINOIS Network grant in August 2010 to initiate this program. The first component of the program took place on March 3, 2011.

## **Description of program elements or strategies that make the program successful:**

Learning Outcomes: Through participation in the QCMP Math and Science Program students will enhance skills in Computer Science, Engineering, Health Sciences, and Mathematics while developing teamwork, resource management and leadership with the assistance of instructors, support staff and business partners who will also serve as mentors.

Program Design: The QCMP Math and Science Program focuses on the areas of Computer Science, Engineering, Science (Health), and Mathematics. (Computer Science – March, 2011; Engineering (Alternative Energy) – summer 2011; Health Sciences – fall 2011; Mathematics; (Statistics and Actuarial Science)– spring 2012. All students will be exposed to all core STEM areas listed above.

The following are requirements for student participation in the QCMP Math and Science Program: 1. African American and Hispanic students ( in the junior year of high school) with a 3.0 average or above. 2. A strong interest or commitment to the areas of Science, Technology, Engineering, and Mathematics; 3. Resource Management skills; 4. Demonstrated Leadership; 5. Self motivator; 6. Works well in a team setting.

Thirty ( 30) students were anticipated from each of the following high schools: Moline, Rock Island, UTHS, Central, North, & West. Students were selected by the guidance counselors at each school. Each student was required to complete an application which included an essay, letters of recommendations and parental permission. Only twenty ( 20) students completed the application process and were selected to start the program.

To date, ten ( 10) minority and female mentors from local businesses and industry have been identified. The mentors have been through an orientation which outlined the goals and expectations of the program. Also, parent sessions have been conducted to inform and involve the parents in the success of their student in the program.

**Evidence of Success - Evaluations:** The program held the Computer Science Component on March 3, 2011. Students were taught how to program and how to take apart and reassemble a computer. A competition was held after the one day instruction and students worked in teams to build and program computers. The fastest team was awarded a trophy. (Teams were intentionally groups to encourage members from various high schools to work with students from other schools.) During the evaluation period, students informed the network partners that they enjoyed the “hands on” components of the program the most. They liked working with people they did not know. People interested in the health science areas were excited to learn that they were capable of building a computer. They said that they “ could not wait to return to their respective schools to tell their friends about the program”. Parents also sent emails to the network partners to confirm the student’s perceptions and comments about the program.

The Engineering component took place on June 3, 2011. The Associate Dean of Sustainability Energy Careers Programs and key faculty from Black Hawk College and Western Illinois University provided hands on instruction and theoretical application of “theft sensor” devices, RFID, PLC, Pro Model ,Forklift Simulation, Electricity and Metallurgic Engineering Application. Mentors from ALCOA and Mid American Energy were also in attendance. One student replied “why don’t they teach us about physics, chemistry and math like this”? The Engineers from ALCOA were so impressed with the student engagement and the Engineering Component that the company has volunteered to host the Math Component in the fall 2011.

This program is successful because: 1. it is a collaborative effort with colleges and universities, K-12 systems, and business and industry partners. 2. All partners in the network are working together to address the need to increase the number of minority and women prepared to enter STEM disciplines and careers. 3. Most importantly, the students want to continue with the program; they are eager to tell others; 4. And the professional mentors are willing to volunteer their time and expertise simply because there was no one there to provide the support and opportunity to them.