



Madison City Schools Congressional Field Hearing

STEM Education in Madison City Schools

April 30, 2012

Greetings, Chairman Brooks and Ranking Member Lipinski, my name is Camille Wright, Director of Instruction for Madison City Schools. Welcome to Bob Jones High School. Thank you for inviting me to participate in this important hearing to discuss STEM education programs and partnerships in Madison City and its importance to the future workforce in Alabama and the US economy.

STEM education is critical to the future of our nation's economy. The mastery of STEM subjects is a vital component in being able to successfully navigate the 21st century global environment. This goes far beyond being a scientist, physician, architect or engineer. Understanding the world in which we live and how to make critical decisions relies on a base in science, engineering and math. Certainly in our technology-driven society, students need to be comfortable interacting with and utilizing technology, and their ability to secure high-wage, high-demand jobs and maintain those jobs depend on this.

Madison City School system places a strong emphasis on STEM education. We are sitting in the Mecca of STEM careers. Although we have a very transient population, the greater Huntsville area has the largest population of master's degrees in the nation and the second largest population of individuals with doctorate degrees. Eighty-eight percent of Madison City Schools' graduates enroll in post secondary. They are more likely to go into a STEM field than any other occupation except education. It is important that we use all the available resources in our area to keep our STEM education relevant and rigorous.

Madison City Schools offers a vast array of courses, clubs, and after school activities in the STEM fields. We offer nine Advanced Placement courses in Science, Technology and Mathematics. About 35% of our students take an Advance Placement course. We have over 90% of our students graduate with a Career and Technical Education course. Our state recognized Career and Technical programs in the STEM fields include Engineering, Biomedical Sciences, Health Science, and Computer Science. In most of these Career and Technical Education programs, the terminating course includes some type of internship in the field. In Level 3 Engineering this year we have had approximately 60 students interning in business such as Boeing, Adtran, AEGIS, AMTEC, SAIC, Raytheon, Hudson Alpha, NASA, and many other companies. In the STEM areas, we have a 100% placement rate at the post secondary level. Additionally, our Engineering teacher has received the national Milken Award for educational excellence.

At every elementary and middle level, every school is an Alabama Math, Science, and Technology Initiative school. We use an integrated philosophy to teaching STEM courses. Research shows that students learn better when they think, plan, reason, compute and evaluate as a means to solve problems in order to master the content. We use iPads for part of our tutoring program that is funded

through a state Department of Defense grant. Our district technology coach works closely with our teachers to help them effectively integrate technology skills.

One of the greatest limitations to high student achievement in the STEM courses is the level of knowledge of the classroom teacher. Whether it is due to lack of content knowledge, lack of understanding of real-world application, or lack of knowledge of resources, the classroom teacher is the key to improving student achievement in STEM fields. In fact, author and educator Anne Jolly, in her article, "What Does the Research Say?", states that "the most important determinant in student achievement is teacher knowledge and expertise". If we want to improve K-12th grade math and science education, we have to invest in our educators.

Alabama has largely adopted the National Common Core Standards. We need new resources for our teachers to align to the College and Career Ready Standards. However, this year the state legislature will likely fund textbooks at only \$31 dollars per child even though an average textbook cost about \$75 dollars. Teacher professional development money has been cut as well. This is money we have used in the past to help our teachers become knowledgeable of best practice, current research, and industry standards.

One of the components that Madison City has found most effective is instructional coaches. Our Board of Education has funded instructional coaches for each of the secondary school. All of our elementary schools have reading coaches that are funded through the Alabama Reading Initiative. These teachers' primary responsibility is helping their peers develop effective instructional practices and increase student achievement. They are a point of resource for their colleagues. The other critical factor that has helped Madison City Schools has been our partnerships with business, industry, and non-profit organizations.

In order to maintain student interest in math and science, we have to show the linkages between the concepts taught in school and its application to life. For too long students have viewed science as a set of historical facts that does not apply to their daily routines. Connecting to health, food, and their environment is critical to answering their question, "Why do we have to know this?" In a Southern Regional Educational Board report, *New Vision for the Middle Grades*, they stated, "Recent evidence makes clear that each middle grader's personal individual engagement in school is essential to his or her success. Studies repeatedly show that students who lose interest in school in the middle grades are likely to flounder in ninth grade and later drop-out. Yet developmental and brain research confirms that by middle grades, students are capable of making connections between their academic work, their personal interests and career aptitudes. Middle grades professionals can use these connections to help students prepare for success in high school and postsecondary studies." (p. 1)

If we can connect what the students are learning in math and science and use their natural affinity and love of technology to make learning relevant to their world, we can keep students love of STEM alive throughout their educational career. Additionally, they need participation in programs such as rocketry and robotics competitions, Destination Imagination programs, science fairs that truly focus on scientific investigation, and have real world hand-on learning opportunities in the community.

The biggest challenges we face in improving student achievement in math and science education is keeping teachers knowledgeable and relevant in their field and having the needed technology to be

current. We need to show students how STEM is used in everyday life and why it is important to tomorrow's careers. This goes beyond simply saying "science and math are important - study hard". We need to show students where these skills get used and how STEM proficiency helps them land a better paying job. A recent STEM study showed that students who were STEM proficient had higher pay than that of non-STEM students - even when the STEM proficient students were working outside STEM career fields. The industries surveyed noted that students with strong STEM skills were better able to think critically and evaluate the evidence when making key decisions. Students need to hear repeatedly from industry that "We hire employees who have skill sets that are in line with STEM."

Madison City could not maintain excellence without all of our partnerships with post-secondary, business and industry, and non-profit organizations. We partner with local colleges and universities in a multitude of ways. In addition to dual enrollment and articulated credit, post-secondary institutions in our area host competitions, provide transitional outreach, and have summer camps for STEM areas. Our partnerships with business and industry are extensive. The business community funds a wide variety of programs in our schools. They provide guest speakers, job shadowing opportunities, and internships. We have an advisory committee from business and industry that helps guide the direction of programs in Madison City to keep us relevant and in touch with industry standards and needs. Organizations such as Hudson Alpha offer free professional development to our teachers and educational experiences for our students.

We partner with numerous non-profit organizations that provide a variety of services from counseling to professional development. One of the most notable is the Alabama Best Practice Center. This organization has provided hundreds of hours of training for our teachers, administrators, and central office staff and has help with the vertical alignment of educator training. This year, we participated in the initial year of the Instructional Partner Pilot Program; a joint effort between Alabama Best Practices Center, the State Dept of Education, Alabama Reading Initiative, and Alabama Math, Science, and Technology Initiative along with 5 select school systems in our State. This program has provided in depth support for our principals and instructional coaches by implementing research-based best practices in adult learning and peer coaching. This approach develops teacher leaders that transform the way in which instruction is delivered in the classroom. The Instructional Partner Pilot is an impetus in the development of professional learning communities in our schools. As director of Instruction a large part of my job is to develop and coordinate the outreach to these entities.

In our global, rapidly changing world the most important gift we can give our students is the understanding of the need to remain a lifelong learner. Our education doesn't stop once we have a diploma in our hand. In today's fast-paced world, so many of the jobs our students will hold don't currently even exist. This means that our students need to exit high school with the ability to think, collaborate, make decisions and innovate. The basic skills (the three R's) are still important, but our students need to be able to use those skills as a foundation, not as the end point. It is important to develop a culture that embraces the concept "community of learning" from the schools, to the family, to industry and throughout the community. This is an area of great strength for Huntsville/Madison/Madison County. We place a premium on education and lifelong learning.