

regional science resource center

News of the UMass Medical School Regional Science Resource Center

Science for everyone

A Message from the Director

The Regional Science Resource Center (RSRC) has been helping make science education accessible to more than a hundred school districts and thousands of students since 1994. Established at the Worcester Foundation for Biomedical Research, the RSRC became a vital component of the UMMS Office of Science Education in 1997, upon the merger of the WFBR with UMMS. It provides professional development and curriculum resources to K-12 science and mathematics teachers in school districts in Central, Southeast and Western Massachusetts. The objective of all these endeavors is to support and encourage excellence in science and mathematics education and to promote learning by doing.

If one word could be used to describe the cornerstone of the RSRC, it would be “partnerships.” Partnerships are integral to every initiative of the RSRC: collaborations with administrators, teachers and schools to identify local and regional needs; strategies to meet those needs; and planning and implementation. The RSRC joins forces with higher education institutions, businesses, non-profits and other networks to

enhance K-12 math and science education in a coordinated way.

Through these numerous partnerships and collaborations, RSRC creates professional development opportunities for teachers and administrators; builds networks that link educators; offers laboratory experiences for middle and high school students; provides a mathematics and science curriculum resource library; and coordinates events that

engage educational shareholders.

The RSRC currently serves 138 districts across the Commonwealth and its resources are organized into five categories—professional networks, professional development, math and science curriculum library, student laboratory and *Science-To-Go!*, the science-in-a-box and lending resource.

The RSRC benefits many people—from the sixth grade science student who visits the Shrewsbury lab and discovers that science can be fun to the dedicated math teacher searching for a better way to make math relevant. Because of the RSRC’s programs, every year thousands of learners have an opportunity to discover the wonders of science and math. ■



Sandy Mayrand, MBA
RSRC Director

Science and Engineering Fair

An experience that lasts a lifetime

The Massachusetts Middle School Science and Engineering Fair is frequently won by students from the Central Massachusetts districts served by the Regional Science Resource Center (RSRC), a fact not lost on RSRC Director Sandy Mayrand, MBA, who chairs the fair. Forty percent of this year’s top Massachusetts Middle School Science and Engineering Fair winners came from such schools. “There is a broad coalition of organizations in Central Massachusetts, including UMMS, WPI, Intel and the Worcester Regional Science and Engineering Fair Board, who have collaborated to develop and support a course, ‘Blueprints for Science,’ for middle and high school teachers to learn how to incorporate the inquiry process into their existing curricula,” said Mayrand. In its three years, 84 teachers have successfully completed the training. This course has had a direct impact in the quality of student science and engineering projects in Central Massachusetts.

Billed as “an experience that lasts a lifetime,” the fair annually attracts more than 250 students from 62 schools and 44 school districts. Along the way, participants build skills in research, statistical analysis and public speaking. “Even though my project was based on one area of science, I was able to observe and communicate science with other participants. The fact that I was able to speak to the judges gave me confidence in sharing my views of science with others,” reports Westborough High ninth-grader Sneha Patel, who participated when she was a seventh-grader at Gibbons Middle School in Westborough.

The fair is more than just a lively competition among Massachusetts science students. Research shows that middle school is a critical time when students determine potential career paths. While

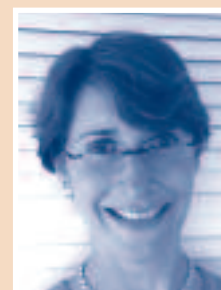
science professionals know that creatively thinking about science and conducting experiments is the fun part, often students in the middle grades haven’t had the opportunity to do so. Performing a small science experiment independently in an area of personal interest and presenting it to peers and the scientific community mimics the real world and is often enough to spark the interest of a budding scientist or engineer to continue.

In turn, the working scientists and engineers are often inspired by the opportunity to talk science with middle school students. “Not only is it a real delight to meet the kids and listen to them, but it’s rewarding to feel that you’re encouraging them simply by discussing their work and showing them that other people find it interesting



Michael Bourie (left) and Corey Provencal from St. Michael's School in North Andover won second prize for their project, "How Much Force Does It Take Ortiz to Hit the Ball to Pesky Pole?"

too,” said John Goodchild, PhD, of the Department of Chemistry at Worcester State College. “This works the other way around too—some projects are so good, I come away with a rejuvenated enthusiasm for my own science.” ■



From participant to supporter

Diane M. Casey, PhD, who graduated from the Graduate School of Biomedical Sciences in 2003, has become a supporter of the RSRC. Here she explains why.

I have seen firsthand the value of exposing middle and high school students to the scientific process. The inquiry-based activities students perform in the RSRC laboratory give them a realistic idea of what it means to do science. Students become engaged, ask questions and think about how to answer those questions by designing more experiments. This is exactly what we as scientists do every day.

The annual Women in Science Conference is another fantastic example of how the RSRC exposes

students, this time middle school girls, to the wide array of careers in science, technology, engineering and math. The conference provides a forum for these girls to meet local women using science in their careers. The conference participants have substantial time to learn about presenters’ work and the pathways they took to their careers and benefit from one-on-one discussions about career possibilities in science. In the many years that I participated, I always found the girls to be enthusiastic, interested and full of questions. I loved it!

Maximizing resources through partnerships

In a multitude of partnerships throughout the Commonwealth, the Regional Science Resource Center works with school districts, colleges and universities, non-profits and businesses to improve K–12 math and science education together.

Two current partnerships exemplify the value of maximizing resources statewide to make improvements. UMass Medical School is the fiscal agent and lead organization for the Central Massachusetts STEM (Science, Technology, Engineering and Mathematics) Pipeline Network. This network, established in 2004 through the Economic Stimulus Act and administered through the Massachusetts Board of Higher Education, includes six businesses; the Central Massachusetts Regional Employment Board; the regional higher education institutions represented through either the Colleges of the Worcester Consortium or individually; six science, math or educational networks; four non-profit STEM organizations and 17 school districts.

The network's goals are to increase the number of students who partici-

pate in programs that support careers in fields related to mathematics, science, technology and engineering; increase the number of qualified teachers of these subjects in Massachusetts; and improve these subject offerings in public and private schools.

The network and its advisory board have a two-pronged approach to achieving these goals. One is to develop a regional coordinated plan, leverage existing resources and discover new ones. The other is programmatic; the network has combined resources to address a region-wide need in teacher professional development: improvement of the physical science experience in grades 3–8. The network has just completed the first summer of a course for teachers, "Assessing and Addressing Misconceptions in Physical Science." This fall, teachers are applying what



Science teachers Kevin DeNolf, of Shrewsbury's Oak Middle School (left), and Chad Adams, of Lunenburg's Turkey Hill Middle School, use a sock and a balloon to generate static electricity and then explore its many properties as part of the STEM Pipeline Network course, "Assessing and Addressing Misconceptions in Physical Science."

they learned in the course in classrooms across the region.

In another partnership with the Massachusetts Department of Education, Intel and WestEd, the RSRC is developing materials for 40 hours of a school-based Mathematics Learning Community (MLC) to accompany Massachusetts Intel Mathematics Initiative (MIMI), an 80-hour mathematics course for K–8 teachers.

The MLC materials and facilitation guide allow lead teachers to work with colleagues to apply the content and teaching explored in the MIMI course to their own classroom practice.

Through these and other partnerships, the RSRC does what it does best: makes the most of resources to improve math and science education statewide and expose students to careers in these fields. ■

Hands-on science

The Regional Science Resource Center (RSRC) not only supports science in schools throughout Massachusetts, it also serves as a place students can visit to practice science themselves. The RSRC houses a fully equipped student laboratory that allows teachers and their middle and high school students to "do science" in an applied way; in some cases, this will be their only opportunity for hands-on science because of the limited resources at their own schools. Lab experiments at the RSRC cover a range of topics—some of the most popular with students include isolating DNA in an onion, solving a crime using DNA fingerprinting and using gel electrophoresis to discover whether a subject is carrying the gene for cystic fibrosis.

The lab also offers Advanced Placement molecular biology laboratories. For students and teachers alike, science comes to life as they develop basic biotechnology skills and become familiar with the research process.

"The Science Resource Center has allowed my students to do some molecular genetics labs that otherwise can't be completed because of lack of funding for equipment and chemicals," says Tahanto Regional High School teacher Alice Apostolou.

In addition, the laboratory has become the setting for motivated high school students whose teachers have recommended them for independent research—work that may advance them to local, regional and state high school science fairs.

Middle and high schoolers aren't the only ones to benefit from the RSRC's hands-on science resources. Through the center's *Science To Go!* program, elementary teachers and their students receive science units

that include materials for experimentation. *Science To Go!* also replenishes consumable materials that elementary teachers use in their classroom to explore basic scientific concepts with younger students. ■

The following are comments from thank-you notes written by Shrewsbury Oak Middle School seventh grade science students who visited the RSRC as part of their genetics unit. They participated in a lab in which they used gel electrophoresis to identify normal DNA or DNA with deletions.

"I loved that field trip and it was great to be part of. It made our class feel important that you took your time for us. The things I learned greatly helped my science grade."

"Learning isn't usually fun, but when you have hands-on experiments, it's a lot easier."

"It was really cool. I felt like an actual scientist."

"I can't believe how much I learned with such a short time at the lab. I think it was an important part in learning more about science and how real scientists in their jobs work to diagnose the problems in humans."

Women in Science starts with middle school girls

This year marks the 12th anniversary of the Women in Science Conference, sponsored by the Regional Science Resource Center (RSRC) and the Worcester EcoTarium. The goal of the annual conference is to expose Worcester middle school girls to careers in science and to engage them in conversations with local women who use science in their professions.

Held on a Saturday in March, the

program begins at the Ecotarium with interactive workshops led by women in medical, scientific and engineering careers who in many cases are UMass Medical School students, faculty and staff. Professions represented at the conference include health care, marine biology, criminology, chemistry, education and environmental sciences, among others. Presenters explain different paths to their careers, provide tips on courses of

study and discuss ways to prepare and train for their professions.

The 150 girls who annually attend the science conference also have the opportunity to talk one-on-one with the presenters at lunch, and are often joined by current UMMS students. The conference concludes with a motivational address to the students by a successful woman in a science or technology profession and an interactive group activity. "Since my involve-

ment in 2000, I'm continually impressed by the unique opportunity this event provides," said Debra Heitmann, MD, assistant professor of emergency medicine. "It allows young women to meet female professionals, ask questions about their career choices and actively engage in hands-on experiences. It sends the message that with hard work and determination, they can certainly become one of the future's leaders in science." ■

Focus on the Regional Science Resource Center

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