# The MAST E-Rapper

Spring 2009 Volume 2, Number 1

## Editor's Note

Welcome to Volume 2 of the MAST E-Rapper! It is with pride and satisfaction that we are able to greet a second year of this renewed publication. It is also presented with great thanks to the many of you who have read, contributed, and commented over the past year. Please, keep it coming! MAST is for you, the science educators of Maryland, and this newsletter is designed to serve your needs.

This issue of the E-Rapper contains a variety of stories for everyone. Make sure to read about the spring **"Evening Speaker Series"** event at McDaniel College on forensic science. Approximately 60 teachers from all across the state convened on Westminster to learn about how to incorporate forensic science techniques in their classrooms. **Rebecca and Mike Ellis** recount the evening where Drs. Marx and Wladkowski presented a variety of ideas that were ready for the classroom immediately.

This edition also presents a comprehensive report on the use of biotechnology in exploring environmental issues. **Linda McGuire, Sarah Savage, and Whitney Mihoulides from Carroll County** report on their development of a classroom activity and kit to teach high school biology students about DNA fingerprinting in the context of American Chestnut Tree restoration efforts. You will also see a great instructional technology article written by **Charlotte Trout of Washington County** that describes the use of mathematical modeling in science classes. Also, be sure to take a look at **Carroll County teacher Dave Cox's** description of his Space Camp experience. This is a wildly popular destination for many teachers in the summer months, and Dave's description clearly shows why.

We are also pleased to present a guest editorial by **Page Keeley, NSTA President** that offers a compelling argument on the importance of Elementary Science programs for all children. This is a reprint, with permission, of an Op-Ed piece she published in May's *NSTA Reports*.

One way that MAST continues to support science educators in Maryland is through the Mini-grant program. It is a pleasure to announce this year's Mini-grant recipient, **Elizabeth Dyson** of St. Mary's County. Also, be sure to take a moment to read **Frederick County teacher Sharon Steger's** report on her 2008 Mini-grant project on the Ray Catcher Solar Vehicle.

In the "Announcements" section, be sure to look at the opportunities presented by Morgan State University and NSTA including the *NSTA New Teachers' Academy*. Applications for this special opportunity are due by *June 30, 2009*.

Make sure to mark your calendar for November 11-13, 2010 when NSTA brings the area conference to Baltimore. MAST has a number of exciting events and promotions leading up to the conference, so keep an eye out for how to get involved.

Finally, the *MAST Outstanding Science Educator Award* deadline is fast approaching. Don't let this slip by. Please, nominate an educator who is deserving of this honor by the **May 15, 2009** deadline. The nomination form is included at the back of the newsletter.

It is bittersweet as I bid you *adieu* as the E-Rapper editor. I have enjoyed serving you in this capacity and look forward to continuing my service as MAST's 2009-2010 President. Please, continue to support the *E-Rapper* with your submissions and readership, and never hesitate to contact me with your concerns, questions, comments, or compliments if you have them.

Warm regards,
*Mary*

Mary Weller, Carroll County
mcwelle@carrollk12.org

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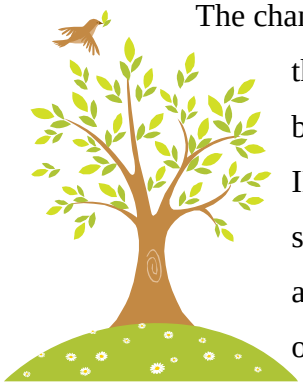
# President's Message



The changing of the seasons always brings feelings of renewal and refreshment. Finally, the April showers are truly bringing us the May flowers- and aren't they beautiful? The school year is coming to a close. MSA and HSA testing, AP and IB testing and county assessments are upon us! Our ability to measure our students' learning is critical. I know, oh so well, that this may also bring additional stress and perhaps even confidence and comfort to what we are doing on a daily basis as well as a long term basis. Allow these items to be measurements that provide us with the data we need so we are continually able to reflect upon our methods and search for ways to improve. Don't be afraid to change; try new tactics and plan ways to share what works with others.

MAST hopes to continue to become a resource for teachers in Maryland as we work in conjunction with the Maryland State Department of Educations Science Office to be better able to provide you, the teachers, with upfront information in regard to assessment and measurements of student success.

Please take the time to recognize your colleagues by nominating them for our ***2009 MAST Award for Excellence in Science Teaching.*** Applications can be downloaded from our website and are due electronically by **May 15th**. If you have any questions or recommendations for how MAST may better serve our membership don't hesitate to contact us at info@emast.org. Enjoy the sunshine, birds and the springtime greening of the Earth.

All my best,

Elizabeth McCook, Frederick County
MAST President

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# MAST NEWS

## Forensic Science Seminar for Teachers

By: Rebecca Ellis, Carroll County and
Mike Ellis, Carroll County

Forensic Science has been widely popularized by TV shows. While in some cases these shows may give students a glamorized view of working in crime scene investigations they also serve to excite today's youth about science investigations. Many high schools and colleges are offering more forensics classes. This is fantastic as students are taking higher leveled science course. At the same time, it also creates a two fold problem: lack of teacher training for these courses and lack of funding for the equipment to run these programs. On April 2, 2009, the Maryland Association of Science Teachers hosted an Evening Speaker Series Event about "Forensics Science" at McDaniel College in Westminster, Maryland. Through a partnership with McDaniel College Dr. Jeff Marx (Associate Professor of Physics and Physics Department Chairman at McDaniel College) and Dr. Brian Wladkowski (Associate Professor of Chemistry) presented several simple and inexpensive labs that can be done in a science classroom. Their experience in working with high school students in forensics comes from three years of conducting forensics science camps. At these camps student get hands on experience in forensics science conducting labs, discussions, and field trips. They presented some basic concepts of forensics as well as ways to use these concepts to teach students about how to use forensic sciences.

Forensic Science incorporates math, physics, biology, and chemistry. The steps to conducting this kind of research involves classification, narrowing the sample to a specific person or sample, moving from a class to individual characteristics, figuring out what the sample is, connecting the sample to a person or crime, testing the suspects for multiple factors in the crime until you keep getting the same results for your tests. This process is summarized in Figure 1.

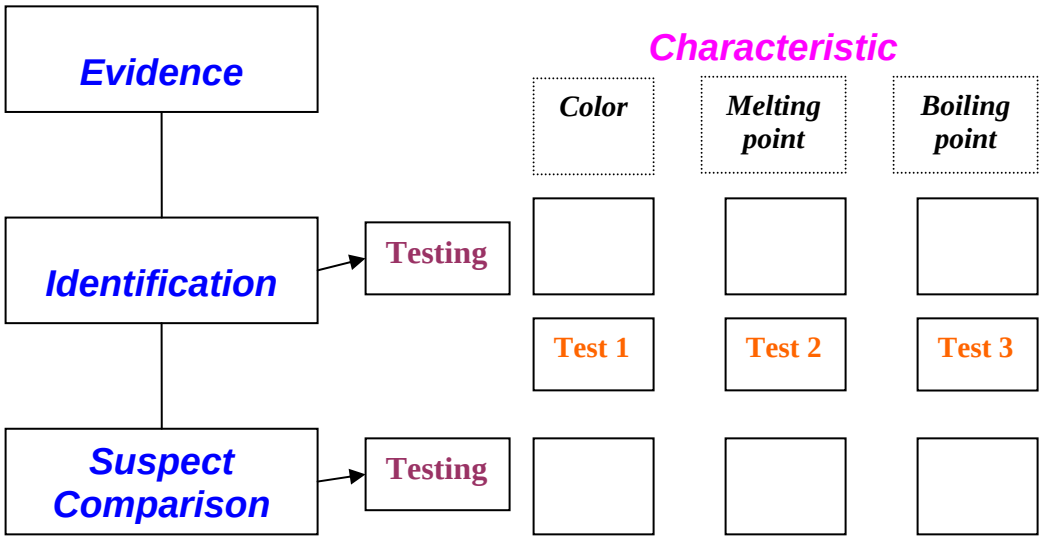


**Figure 1: Forensic comparison chart for comparing samples to suspects**

During the presentation Dr. Marx and Dr. Wladkowski presented several labs that can be done in a high school lab with high school budgets in mind. A very fascinating lab dealt with identifying glass shards. Glass shards were placed into various water/mineral oil mixtures with known refractive indices. When the glass shards matched the mixture's index of refraction, they "appeared to disappear," and the glass type could be narrowed. Doing a simple comparison a student would be able to compare and identify a variety of glass samples.

Another similarly low budget lab had to do with collecting fingerprints using superglue vapor. With this lab, the only part which needs intense supervision (if not done by the teacher) is how to use the glue vapor safely. Dr. Marx and Dr. Wladkowski suggested breaking students up into teams competing to see who can match the mystery fingerprints to each member of the opposing team in the quickest amount of time. To make it more interesting, Dr. Marx and Dr. Wladkowski recommended using different mediums to place the fingerprints on; for example, a soda can, an index card, or a piece of glass. This lab would not only be great at giving students a chance to build laboratory skills, but teamwork skills as well.

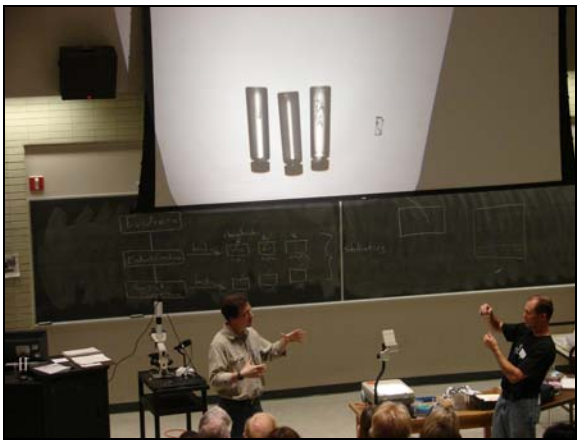

**Figure 2: Dr. Marx and Dr. Wladkowski of McDaniel College identify the index of refraction of glass shards using known indices of refraction of water/mineral oil mixtures.**

Forensics stems from many different areas of science and creates a unique environment for student learning. Pushing students to learn and use critical thinking skills will serve them far into their futures. Dr. Marx and Dr. Wladkowski brought two unique perspectives to the task of preparing scientifically minded students for their future endeavors in science.

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# Upcoming Events

There are several upcoming events being planned for MAST starting in the fall 2009. Details are still being finalized, so you will want to be sure to check back with the MAST website at www.emast.org and watch your email for updates.

First, following the success of the 2008 Fall Conference jointly sponsored by the Maryland Department of Education, the Maryland Science Supervisors Association, and the Maryland Association of Science Teachers, we are currently finalizing details for a second joint conference opportunity. Once again, this will be a terrific opportunity to share your best practices and to network with your colleagues from around the state. Keep watching for more information on presentation proposal submission and attendance registration.

Also in the fall, MAST will continue its "Evening Speaker Series" with an evening at the National Institutes for Standards and Technology (NIST) in Gaithersburg. As with our past evening events, this will be an opportunity to learn about cutting edge science and its applications in the classroom. This will be a late afternoon/early evening event with refreshments and lots of networking opportunities.

Finally, the National Science Teachers Association Area Conference is coming to Baltimore November 11-13, 2010. Though this may sound like it's a long way off, MAST will be integral in helping to shape the program and to prepare to greet thousands of our science education colleagues. Details about submitting a presentation proposal will be forthcoming in the fall, and you are invited to participate! There will also be lots of other special opportunities for MAST members, so don't miss out! Keep an eye on the MAST website and your email for additional information. Or, feel free to contact MAST at info@emast.org if you would like to volunteer!

**NSTA is Coming to Baltimore November 2010**

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# 2009 MAST Mini-Grant Awarded

This year's MAST Mini-Grant is being awarded to Elizabeth Dyson, a Biology teacher at Great Mills High School in St. Mary's County for their Project entitled **"Using Solar Gold to Save Some Green- A Photovoltaic Monitoring Project"**. Ms. Dyson and The Great Mills High School Energy Club are dedicated to creating a more energy efficient learning environment. They plan to install solar panels onto the roof of their school at the beginning of the 2009-10 school year. The MAST mini-grant will enable them to purchase a Datalogger Pro Box, an interface program that will record and monitor their data from the energy produced by these panels. This device will give them real-time data to analyze the efficiency of their photovoltaic system. Allen Skinner, the STEM physics teacher at Great Mills, is also working weekly with the Energy Club to pick out equipment, fundraise, and install the system. Kristen Zelenakas, a Great Mills Environmental Science teacher is also very excited to

incorporate this data and technology into her classroom. MAST is proud to contribute our $500 Mini-Grant funds to this innovative project.

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# 2008 MAST Mini-Grant Update

By: Sharon Steger, Frederick County

I was first able to purchase the "Pitsco Ray Catcher Sprint Deluxe Power Pack" with money Middletown High School received from an Intel and Scholastic "Schools of Distinction" Award. This kit includes materials for 50 students if they work in pairs. The materials include: solar panels, motors, balsa wood sheets, alligator clips, wheels, rubber bands, straws, nylon spacers, axles, gear fonts, and battery holders. The lab also includes a student guide, teacher guide, and a Dr. Zoon vehicle video which takes the students through the steps to build a solar car. Materials needed for the Ray Catcher activity but not included in the kit: soldering iron, utility knife, glue gun, needle nose pliers, drill, batteries, and a ruler. The MAST Mini-Grant allowed me to purchase additional solar panels to be used in an Environmental Science class.

With the Ray Catcher Sprint Deluxe Power Pak, students construct a battery-powered vehicle that can be tested for speed, alignment, and durability. During construction, students attach a solar panel blank onto the vehicle to simulate the position and effects of the actual solar panel. The blank is attached by rubber bands, so replacing it with the solar panel is easy.

After successfully constructing and testing the vehicle on battery power, students substitute the blank with the solar panel and attach it to the motor with alligator clips.

During the energy unit students research nonrenewable and renewable sources of energy. Thanks to MAST, the lesson continues to have a hands-on component. I would like to thank MAST for making it possible for MHS students to design and build their own solar cars.

"Learning science is something students do, not something that is done to them." (National Science Education Standards). As part of the STEM (Science, Technology, Engineering, and Math) initiative, Middletown High School students are being prepared for the 21st century. The solar car project will expose students to technology and will therefore allow them to incorporate our natural resources into a design for the future.

MAST has allowed science students to successfully complete their Ray Catcher solar vehicle!

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# Science Best Practices

## Where Did All the Chestnut Trees Go? Using Science, Technology, Engineering, and Math to Explore Environmental Issues

By: Linda McGuire, Carroll County,
Sarah Savage, Carroll County, and
Whitney Mihoulides, Carroll County

When one thinks of a traditional country Christmas, "chestnuts roasting on an open fire" comes to mind. When was the last time you saw a chestnut tree? Have you ever tasted roasted chestnuts? For thousands of Maryland's youth, the answer to these questions is, "Never!" The once dominant American chestnut tree population began to decline in the early 1900's and was nearly decimated by a fungus. An estimated 4 billion American chestnuts died within 50 years of the beginning of the blight.

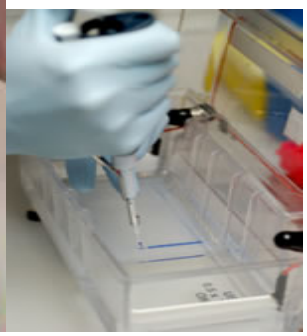
The American Chestnut Foundation (www.acf.org) was founded in 1983 with the goal of restoring chestnuts to the forests of Eastern North America. The ACF conducts research to explore various methods for restoring the chestnut tree populations. Chestnut orchards were started in numerous locations in the Eastern United States including one at Hashawha Nature Center and several schools in Carroll County through the donations of seedlings by ACF.

Carroll County Public Schools incorporates the American Chestnut tree and the environmental challenges of the blight into the secondary science curriculum beginning in grade 6 and continuing through Science Research in grade 12. The concepts and skills associated with ACF research provide students with many opportunities to practice authentic techniques used by scientists in the molecular biology and biotechnology fields.

The CCPS "Chestnut Lab" is aligned with the Maryland High School Science Core Learning Goals (1.2, 1.3, 1.4, 1.6, 1.7, 3.3, 3.4, 3.5, and 3.6) and is completed by all students enrolled in Biology. It uses an inquiry-based approach to introduce students to the complex principles associated with biotechnology applications to study the environmental challenges facing the Chestnut tree. Both the content and the processes of science are emphasized in an effort to make science accessible to *all* learners. Additionally, the materials and procedures were designed to make the "Chestnut Lab" easy to use for all biology teachers.

The Chestnut lab kit supports a variety of activities including DNA fingerprinting/identification procedures. All the biotechnology equipment and supplies necessary for the lab procedures are included. Specially designed pre-lab lessons help students access prior knowledge and increase retention of the material. The pre-lab lessons offer differentiated instruction through a variety of stations incorporating auditory, visual, and hands-on activities. These activities include traditional classification techniques of chestnut varieties, an enzyme cutting simulation, a gel electrophoresis web quest, authentic math applications to calculate materials needed for the lab, practice using biotechnology equipment through a micropipette challenge, and DNA gel loading station.





In the lab, students perform molecular biology techniques such as DNA fingerprinting to identify an "unknown sample" of simulated chestnut tree DNA. Various combinations of gel loading dyes are used to simulate chestnut DNA and were selected for safety, ease of storage and ease of transportation.

The students observe the banding patterns resulting from the gel electrophoresis procedure in order to determine relatedness of their unknown sample to the various known chestnut DNA samples. Students apply their knowledge gained from the Chestnut lab to questions dealing with DNA gel electrophoresis and species relatedness on the Maryland Biology HSA exam. The students' hands-on experience will deepen their understanding of DNA, heredity, and species relatedness.

Most importantly, by participating in the Chestnut lab, students will gain an appreciation of how biotechnology can be applied to environmental issues. They will discuss the positive and negative consequences of technological changes and their effect on the environment. In working closely with the American Chestnut Foundation, students will see how biotechnology can improve the survival of the American chestnut tree. Hopefully, more students will be inspired to continue learning about science, technology, engineering, and mathematics and realize that they can make our world a better place.

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# After the Probeware. Then What?

## Using Computer Models and Simulations in Science Class

By: Charlotte Trout, Washington County

In many science classrooms, students are actively using computers to collect and analyze data. They may even use computers to research a scientific topic, write-up their results and communicate those results to others. However, there is another part of the scientific process that often is overlooked: creating a model from the data or comparing results to a mathematically-based computer model. This step has become increasingly important in the practice of science and our students should be gaining insight into the use of computers in science.

> *Computational science is a fast-growing interdisciplinary field at the intersection of science, math and computer science. There is a critical need for scientists with strong computational science background. Scientific investigation now involves computing as well as theory and experiment. "We can now do as much scientific discovery with computational science as we could before with observational science or theoretical science."* (Washington Post, "Faster Computers Accelerate Pace of Discovery", 12/3/07)

Students should be using computer models and simulations in situations that are analogous to the ways scientists use them. There are simulations of chemical reactions and biological processes that help students understand processes that are too small to observe directly. Computer models allow us to "collapse" time to observe geological events that occur over millennia and to "expand" time to observe physical events that happen in microseconds. Computer models can be used to help students link mathematical expressions to science events and to explore phenomena that cannot be experienced in the classroom (e.g. low gravity environments).

There are plenty of models and simulations available for everyone. In fact, the hard part is sifting through them to find a model that illustrates a concept that students are struggling with or an application that is beyond the classroom. The following sites are a good place to start because they have many models or simulations suitable for middle and high schools, and, in many cases, they also have instructional ideas and materials.

- NetLogo: Many examples available in the Models and Community Libraries – very good for chemistry and physics: http://ccl.northwestern.edu/netlogo
- CAST: Pittsburgh Area High School teachers have developed Excel, VenSim and NetLogo models for use in their classrooms: http://www.psc.edu/eot/k12/cast.php
- MVHS: The Maryland Virtual High School site has the STELLA models and activities developed during that program as well as WebSims and links to many other models. Be sure to check out the CAST CD link: http://mvhs.shodor.org
- PhET: Many Flash and Java physics and chemistry simulations – very rich: http://phet.colorado.edu

When computer models and simulations are used to extend laboratory and classroom experiences, students gain deeper understanding of science concepts and processes. Classroom discussions should include the uses and limitations of models and their importance to the practice of science. Using computer models and simulations allows students to experience how exciting and dynamic science can be. It also allows them to explore questions that are beyond the traditional classroom.

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# The "Space Camp" Opportunity for Teachers

By: Dave Cox, Carroll County

"This is Mission Specialist 2. I copy that, CAPCOM!" As the chair rumbled and my eyes feverishly scanned the massive control panel for the correct combination of switches to flip, I had to remind myself that the experience was only a simulation. If the shuttle mission failed on my account, there would be some immediate ribbing in my headset, and a good laugh when we all climbed down from our stations and reassembled for debriefing.

NASA's outreach programs have traditionally been excellent providers of realistic learning experiences for the public. The U.S. Space Academy for Teachers, held annually at the U.S. Space and Rocket Center in Huntsville, Alabama, is the epitome of that strength. The weeklong event is designed to blend the "space camp" activities so popular among youth visitors with an array of teacher workshops, tours, seminars, and many exciting challenges for educators. Participants leave Huntsville with a new understanding of our country's space program, loads of materials, pictures, and stories to bring back to the classroom, and a fresh outlook on their teaching career.

The cost to attend this program is near $1000, but Honeywell graciously sponsors a large number of science and math teachers from all around the world to attend each year, all expenses paid, including airfare. Teachers interested in applying for a scholarship to attend the 2010 Space Academy should monitor the "Honeywell Hometown Solutions" program online and download the application when available.

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# Guest Editorial

## Elementary Science Education in the K-12 System

By: Page Keeley, NSTA President

"*Any collection of things that have some influence on one another can be thought of as a system. Thinking of a collection of things as a system draws our attention to what needs to be included among the parts to make sense of it, to how its parts interact with one another, and to how the system as a whole relates to other systems*."—American Association for the Advancement of Science (AAAS) 1989, p. 166.

An essential component of higher-level thinking is the ability to think about systems—how parts relate to one another and to the whole. Systems thinking can help us see and understand science education in new ways. This is why one of the goals of my presidency, a goal also shared by President-Elect Pat Shane, is to take a K–12 system approach to supporting the need for high quality elementary science education in every school district.

Elementary science is a critical part of the K–12 science education system. Tragically, the enactment of No Child Left Behind (NCLB) has greatly diminished the time spent on teaching science in many elementary schools. In some schools that have not attained adequate yearly progress (AYP) status, science is not taught at all, and teachers are told point blank not to teach science so they can spend more time on reading and mathematics. The good intentions of NCLB eroded the fundamental foundation for science in our K–12 education system. One of the crucial parts for a fully functioning system is missing or damaged.

Learning in science begins in early childhood. This is a time when young minds are curious about science and ready to engage in the practices and language of science that form a foundation to be built upon and strengthened throughout a student's K–12 education. Young children bring to science views of the natural world and ways of thinking that have a major impact on their learning as they progress from one grade level to the next. Ignoring these ideas and delaying the development of science language and practices until students formally encounter science in middle school certainly violates what we know about systems: If one part is missing, it affects the other parts of the system.

> "*Something may not work as well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected*."—(AAAS 1994, p. 264).

We know science education is not working well for many students in the United States. We also know our system of education is strongly connected to our ability to compete in an increasingly global economy dependent on highly skilled workers in the science, technology, engineering, and mathematics (STEM) fields. One solution in the past few years has been to funnel more funds into Advanced Placement and International Baccalaureate courses in high schools, undergraduate and graduate education, recruiting qualified secondary science teachers, and increasing the rigor of middle level classes. These strategies might work if they match well with the other parts of the system.

However, we can't expect students who have missed six years of science to suddenly be prepared to take on more demanding opportunities to learn science in middle and high school. All the parts of the system that should include the K–6 years of knowledge and skill building are not there to support the cumulative steps that contribute to high levels of learning.

When we look at the progression of learning over time, starting with fundamental ideas and skills developed in preK–2 and built throughout the elementary years, teachers are often surprised to find middle school and high school students have major misconceptions about fundamental ideas developed early on that went unchallenged through school. They are also dismayed to find there are often large gaps in students' conceptual understanding of even basic ideas in science. Is it reasonable for a school district to eliminate science for six years and then expect students to fill in the blanks in middle and high school? Science learning is a cumulative process. It is time to give science a foothold equal to that of reading and mathematics in the K–6 curriculum.

We all have a responsibility to advocate for high quality elementary science programs, increased time spent on teaching elementary science, and opportunities for elementary teachers to get the professional development they need to teach science well. The burden for elementary science advocacy can't be placed solely on the elementary teachers who like to teach science. Middle school and high school teachers, I implore you to speak out to your administrators and help them understand the ripple effect the demise of elementary science has had on student learning in your grades. Your teaching is affected significantly by the loss of elementary science!

You can also push for more elementary science professional development. Bring a team including elementary, middle, and high school teachers from your district to an NSTA conference. Stay tuned for more information about an upcoming NSTA Research Dissemination Conference (RDC) on linking research to practice in elementary science, to be held at the 2010 NSTA National Conference in Philadelphia. Encourage the formation of elementary science professional learning communities to learn how to best restore science to the curriculum and advance K–6 science learning. Encourage a K–6 team to attend NSTA's August 2009 summer institute on Professional Learning Communities in Science.

Public support for early science education is important as well. Parental involvement is key to increasing the public's understanding of why science education must begin in the early grades. The new NSTA Science Matters website is a great a source of material for helping parents understand the importance of elementary science.

Even though not all of us teach elementary science, we have a collective responsibility to ensure every student in every grade has the best possible science education. That is why we as individuals must act as a system. A simple K–2 systems learning goal says, "When parts are put together, they can do things that they couldn't do by themselves" (AAAS 1994, p. 264). Imagine what the output could be at the end of grade 12 if we all band together to strengthen our K–12 science education system to include six years of rigorous, high quality elementary science. After all, each part of the system, including elementary science, contributes to the whole. We can't continue assuming we will increase our schools' output of students who will become our next generation of scientists and engineers without ensuring an input of elementary science learning into the K–12 system.

### References

AAAS. 1989. *Science for all Americans*. New York, NY: Oxford University Press.

AAAS. 1994. *Benchmarks for science literacy*. New York, NY: Oxford University Press.

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# Announcements

- **NSTA Summer Institute Information:** In August, NSTA is offering a summer institute on PLC's. Professional Learning Communities (PLC's) are one type of teacher-led PD that supports collaborative learning among teachers within a school with a focus on student learning needs. Combined with this institute, is a book commissioned for Page Keeley's Presidency through NSTA Press on Professional Learning Communities in Science titled "Professional Learning Communities for Science Teaching- Lessons from Research and Practice". The editors of this book, Susan Mundry and Kathy Stiles, will be the featured presenters at the institute along with some of the chapter authors. The summer institute for school teams (individuals can attend as well) is a new venue for NSTA. Information about the PLC conference can be found on the NSTA web site at:

http://www.nsta.org/conferences/2009/summerinstitute.aspx?lid=tnav

- **NSTA Announces the 2009 New Science Teacher Academy:** In April, NSTA announced that it is accepting applications for the 2009 NSTA New Science Teacher Academy. The NSTA New Science Teacher Academy, co-founded by the Amgen Foundation, is a year-long professional development program established to help reduce the high attrition rate among science teachers new to the teaching profession. Intended for science educators entering their second or third year of teaching, the Academy is designed to help promote quality science teaching, enhance teacher confidence and classroom excellence and improve teacher content knowledge.

  For this academic year, NSTA will select 185 teachers to participate as fellows in the 2009 Academy. NSTA Fellows chosen for the program receive a comprehensive membership package, online mentoring with trained mentors who teach in the same discipline, and the opportunity to participate in a variety of web-based professional development activities, including web seminars. In addition, each NSTA Fellow receives financial support to attend and participate in NSTA's National Conference on Science Education, taking place in Philadelphia, March 17-21, 2010.

  Science teachers located throughout the country, who will be entering their second or third year of teaching and whose schedule is a minimum of 51 percent middle or high school science, are encouraged to apply for the program. Applications must be submitted no later than **June 30, 2009** to be considered.

  The most comprehensive information to date can be found on the Academy Web site, www.nsta.org/academy.

- **Graduate Study Information:** The **Morgan State University School of Education and Urban Studies Graduate Program in Science Education** offers fellowships to provide financial support to members of under-represented groups who have undergraduate degrees in science and meet eligibility criteria. The 63-semester-hour EdD program prepares science educators to assume leadership roles in k-12 school districts and positions as community college and university science faculty.

  Located in Baltimore, Maryland, Morgan State University provides a platform from which to engage in research and practice in urban school settings.

  To request more information or application materials, please contact Dr. Glenda Prime by e-mail (Glenda.Prime@Morgan.edu) or telephone (443-885-3780). Program guidelines may be viewed using the following web address: http://www.morgan.edu/academics/Grad-Studies/programs/GPSME/index.asp

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# MARYLAND ASSOCIATION OF SCIENCE TEACHERS AWARD FOR EXCELLENCE IN SCIENCE EDUCATION 2009

Candidate's Data Form 2009

Candidate's Name_____

Home Address _____

City _____ State _____ Zip _____

School/Institution _____

School Address _____

City _____ State _____ Zip_____

School Phone Number _____ Home Phone _____

Fax _____ e-mail _____

Type of Institution: Public Private

LEA/County _____

Name of Principal _____e-mail _____

Name of Local Newspaper _____

Address _____

City _____ State _____ Zip _____

_____ _____
Signature of Nominee Signature of Nominator

**I. Years of Service**

_____ Teaching

_____ Other (specify)

**Area of Consideration**

_____Elementary
_____Middle/Junior High
_____ Senior High
_____College
_____Administration/Supervision
_____Museum/Outreach

***PLEASE COMPLETE THIS SECTION ON ADDITIONAL SHEETS. This section may be completed by the nominator or nominee.***

I. Chronological Professional History (list most recent first)

Dates Position

II. Professional Memberships (Educational and Scientific)

III. Provide examples of your activities in science teaching/education which demonstrate excellence in science education in the following areas: (may be submitted in outline form)

A. Innovative Approaches
B. Leadership
C. Professional Activities and Growth
D. Other

IV. Attach additional information (letters, articles, etc. ) to this form when you submit the packet.

***Return the nomination packet by May 15th, 2009 to:***
**Letters and nomination packet may be sent electronically.**

Beth McCook, MAST President
C/o Urbana High School
3471 Campus Drive
Ijamsville, MD 21754

240-236-7600 (School phone)
240-236-7601 (School fax)

Elizabeth.McCook@fcps.org

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Maryland Association of Science Teachers

# MEMBERSHIP FORM

Welcome to MAST! Please print, complete, and mail this form to the address below.

Type of Membership – Please check one space in each column.

___ 1 year – $15.00
___ 3 year – $40.00
___ Student – $5.00 (1 year)

___ New
___ Renewal

Member Information – Please fill this out completely!

| | | | |
|---|---|---|---|
| Last Name | First Name | | Level – please check all that apply:<br><br>___ Pre-K<br>___ Elementary<br>___ Student<br>___ Supervisory<br>___ Middle/Jr. High<br>___ High School<br>___ College/University<br>___ Organization (please specify)<br><br>___ Other (please specify) |
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| City | State | Zip | |
| Local School System | School | | |
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