



November 2011

Editor's Note

The Fall Conference was a success. We enjoyed a wonderful keynote talk by Tim Foelke about design issues responsible for the sinking of the Titanic, the opportunity to choose from more than a dozen sessions led by educators, the generosity of our vendors and a great day of fun, food and networking. The pictures on this page capture just a few of the possible hands-on learning opportunities available that day. In addition, we recognized our MAST Excellence Award Winners (see page 9).



Now we look forward to the rest of the year and events focusing on excellent science instruction in the state of Maryland. Check out the President's message for additional opportunities for the coming year.



Your favorite columns are here, of course, as well as a new one. Do you have a favorite app on your smart phone, iPod, iPad or other device? Have you found a use for it in the classroom? Are you using Angry Birds to teach projectile motion in Physics? In this issue, we introduce a new column, "Apps for your Classroom". I hope teachers will find this useful and share their favorite apps – or at least those that have proven useful in the classroom for engaging students and modifying instruction.

May your holidays be safe and relaxing. The next issue of the e-Rapper will come your way in the New Year.

Charlotte

Charlotte Trout, Washington County
troutcha@wcps.k12.md.us



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President's Message

Thank you to all the people who helped support a successful fall conference this year! The presenters were engaging and enthusiastic, the networking and sharing were fun and informative. Don't forget that as the school year continues there will be many other opportunities to join our MAST family at evening events. Also, to continue your professional development during the school year go to the NSTA learning center at www.nsta.org for free professional development activities at your grade level for the subject you teach on your own schedule.

For the first time this year, MAST will also be hosting an online science fair for K-12 students from Maryland. The deadline for entry for students is May 30th to allow for students to participate after their state and advanced placement testing responsibilities conclude. For details see our website at emast.org! Registration will open in mid January.

Alison Hapka
Lead Science Teacher
Elkton High School
President Maryland Association of Science Teachers

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MISSION STATEMENT

The Maryland Association of Science Teachers (MAST), a local affiliate of the National Science Teachers Association, is a professional, non-profit organization dedicated to science education in the state of Maryland. It strives to make science accessible and enjoyable to the citizens of Maryland by promoting and supporting career education in science and technology, instruction for general science literacy, and science outreach programs in all geographic regions of Maryland.

MAST PHILOSOPHY AND GOALS

The Maryland Association of Science Teachers, dedicated to scientific literacy, cares deeply about its mission and members engaged in science education. Its members believe that science is a human endeavor employing careful observation and reasoning necessary for professional and personal problem solving and decision making in our increasingly more technological society. To support this MAST promotes science research, applied science, and science education as professional careers. It also understands that science literacy opens doors for all Marylanders to pursue alternative technology careers, and to understand and enjoy the world they live in.

To these ends, MAST has the following goals:

- 1) provide science educators at all academic levels in the state of Maryland with the opportunities for professional development through the presentation and exchange of knowledge, strategies, and resources;
- 2) acknowledge the accomplishments of exemplary science teachers, students, and administrators;
- 3) encourage and utilize partnerships with business, professional organizations, and science resource centers;
- 4) broaden the base of support in MAST through increased membership throughout the five designated regions;
- 5) provide financial support for outstanding science-related educational programs.

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Each month E-rapper will feature a site for you to bookmark for future use in your instruction. Bookmark it even if you can't explore it right away.

Whether you have a fear of physics or physics is your passion this site is for you. If your students get that glassy eyed look when you say $F=ma$ you need to bookmark this site now!!

Each lesson can be a five-minute addition to enhance your instruction or a great hook at the beginning of your class.

You or your students can pick your scenarios on such subjects as acceleration, speed, friction, gravity, momentum, and inertia. Students explore physics by creating their own Flash animations of accelerating balls, basketball hoops, roller coasters and more.

There are additional visual action lessons on astronomy, sound, light, atoms, Einstein's relativity, and earthquakes.

Bookmark this site today and become the favorite teacher in your school by assigning a homework assignment from this site.

<http://www.fearofphysics.com/index1.html>

Jackie Geer, Montgomery County

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Teacher to Teacher

The New Common Core: What's STEM Got To Do With It?

My school has been hosting several teacher workshops on the proposed Common Core Standards for Mathematics and English. We STEM teachers have a tremendous opportunity to integrate these new standards in to our classrooms. Here are a few thoughts to ponder in the quest to better integrate the new common core:

1. Every science teacher can promote literacy.

Literacy extends far beyond reading comprehension. Students of science must be not only literate, but fluent, in a new language of sorts, the language of scientific thought and articulation. A literate student has been defined as one who is able to communicate ideas, synthesize information, and be a part of his or her society's discussions. Are we doing all we can in our classroom to make students STEM fluent? What graphical analysis discussions do we propose, and how do we allow students to respond? Do our students use writing, technology (and maybe even short videos) to articulate how labs correlate to researched phenomena? If part of literacy is preparedness for larger discussion, are we truly doing our part to prepare students?

2. Every science teacher can foster mathematical thought.

Part of our discussion of the common core for mathematics has been the idea of open-ended problem solving. Much like a real-world mathematics problem can be approached from multiple directions with a variety of valid answers, science can lead to more than one valid, supportable answer in the classroom. Do we allow our students the opportunity to answer open-ended questions, or has our classroom become an EZ-Bake oven of science? Sometimes the way we present a question can take it from a black-and-white answer to an interesting discussion of the grays of the scientific world. While math begins to foster an open-ended discussion that synthesizes prior knowledge with new applications, the science department can be a secondary booster. Let's think about challenging students to synthesize factual information to formulate ideas that can be supported and debated amongst peers.

We would love to hear great ways that you are already promoting the Common Core Standards for Mathematics and English in your own classroom! Email us back so we may share your ideas with other MAST members.

Vikki Bol
Calvert County

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Demonstration of the Month

The Oozing Pumpkin

Even though Halloween is over, we're still in the Fall season. It can be performed in a carved jack-o-lantern, or even in a drinking glass or beaker. Have fun with it and Happy Holidays!!

Materials

- Hydrogen peroxide - 12% (You can find this in the hair care section.)
 - Liquid dish soap
 - Food coloring
 - Package of dry yeast
 - Small cup (make sure it's small enough to fit all the way in your pumpkin)
 - A carved pumpkin
1. It's best to perform this demo in a shallow pan or on a cookie sheet – otherwise, you'll have a soapy mix to clean up afterwards.
 2. Fill a small cup with 30 mL of hydrogen peroxide (12%). (NOTE: Hydrogen peroxide found in the pharmacy section of the food or drug store is only 3% H_2O_2 . You can usually find 12% in the hair care aisle.)
 3. Add a squirt of dish soap to your hydrogen peroxide.
 4. Mix in some food coloring to give your reaction a spooky effect. Red or green food colors look the best.
 5. Open the top of your jack-o-lantern and carefully lower the cup of mixture into the jack-o-lantern. Be careful not to tip it over or you'll have to start over from the beginning.
 6. Now you're going to need to add the catalyst. Mix an entire package of dry yeast with 4 tablespoons of very warm water in a small plastic cup. If the mixture is too thick, like a paste, add a little more warm water to thin it a bit.
 7. Pour the yeast solution into the cup and quickly replace the top of your jack-o-lantern. It will take a few seconds, but once the reaction starts, it's amazing to see.

How does it work?

In this reaction, you've got a catalyst in the form of your yeast solution. This catalyst releases the oxygen molecules that are contained in the hydrogen peroxide. Those molecules are being released as the hydrogen peroxide breaks down into two components, water (H_2O) and oxygen (O_2), from the addition of the yeast catalyst. The foam is the molecules of oxygen being made into tiny bubbles as they pass through the soap that you added. In addition, as the bonds break between the H_2O and O_2 , they release energy in the form of heat. Try performing the experiment without the pumpkin and feel the sides of the cup. They're warm!

Gary Fuhrman, Carroll County

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Apps for your classroom



Using “Pocket Frogs” in the Classroom

Genetics is the foundation for the application, Pocket Frogs. How are genes transferred from parent to offspring? What’s the probability that a child will inherit a specific feature from either parent? There are math concepts of probability and accounting the students must take into account as they play the game and strategize. Pocket Frogs can be utilized to introduce and hook the student, as an extension of learning, or a closing activity for a genetics unit.



The first time I utilized this application in the classroom, I used it as a wrap-up of the unit. The students were given a quick overview of the application, utilizing a print out of screen shots and a live iPod under a document camera. From there the students were released to ‘play’, with the goal of collecting as many frogs in their FroggyDex as possible in a 45 minute period. The students were also provided with a spreadsheet of possible frogs they could gain in the first 3 levels of the game.



Screen Shot of Breeding Possibilities

The students needed to utilize their knowledge of genetics, half genes from each parent, to think before they made the choice to breed a specific pair of frogs. From there they needed to remember, genetics is about luck also! Unfortunately it’s not a 100% help with heterogeneous and homogenous traits, but it works to get their brains moving!

With 2 merit classes, and the inability to wipe the iPods clean at the end of each class, the first class was randomly partnered with someone in the second and it turned into a team effort to fill the FroggyDex, while keeping it an individual competition in the specific classroom.

In the future, Pocket Frogs will be utilized at three points in the unit: beginning, middle, and end. I will use Pocket Frogs to introduce the topic of Genetics and to hook the students into the unit, throughout the unit it will be used to keep the competition alive within and between classes, and in the end the students will turn their collection sheets in with their analysis of genetics.

Elizabeth Rohrer, 7th Grade Teacher, Springfield Middle School, Washington County

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MAST ANNOUNCES 2011 EXCELLENCE IN SCIENCE TEACHING AWARD WINNERS

The Maryland Association of Science Teachers is proud to announce the MAST Excellence Awards for Science Teaching in Maryland. This year's awards were selected from a collection of many outstanding science teachers in our state. MAST is honored to present these award recipients with a one-year membership to MAST along with a monetary gift and plaque.

Our selection for middle school is **Kathleen Damonte** of Julius West Middle School in Montgomery County. Kathleen is an 18 year veteran teacher. Currently she is a Science Resource Teacher, teaching seventh grade science classes to all levels of students. During her teaching career she has presented at local, state, and national science conferences. She has also worked as a curriculum writer and reviewer of the new STEM based middle school curriculum for Montgomery County Public Schools. Kathleen has a passion for science and finding real life application to the content she teaches. She is often scouring through newspapers and magazines to find articles that will be useful in her science classes. On a number of occasions she has found such articles, including one about the incidental rate of bacterial contamination in bagged salad as compared to regular leaf lettuce. This article was used during a biotechnology unit focused around food poisoning epidemics. Kathleen is a hard working, well deserving teacher that always puts the students learning first.

Sharon Steger, a 31 year teaching veteran at Middletown High School in Frederick County, is our selection for this year's High School Excellence Award. Serving science education as a teacher and mentor for years, Sharon has been an excellent participant and contributor to her school, county and our state. This year, she was named a Service Learning Fellow by the Maryland State Department of Education for her project Frederecycle, which instilled habits of recycling in youth for the city of Frederick. In addition, Sharon gets her students motivated through a variety of hands on labs and real life application experiences. One particular simulation is done where students populate "continents" drawn to scale with yarn on the classroom floor and discuss how people and resources are distributed worldwide. Sharon has also served in many leadership roles over the years. She has been department chair for the last 12 years, served as a mentor teacher for student teachers from various colleges and universities around the area. She also serves as the staff development trainer. Her work with students goes far beyond the walls of their high school. Reaching out with Service Learning and providing a variety of opportunities for students to interact with science, nature, and each other is why it is our honor to present Sharon with this excellence in teaching award.

MAST Excellence Awards hope to continue to recognize Excellence in science teaching. Please consider applying for this award or nominating a colleague. Applications for next years' awards, due in May, will be available from our website www.emast.org. Thank you.

Carl Bilotta, Frederick County

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Opportunities for Students (and Teachers)

Dupont Science Essay Contest:

Open to students in grades 7 – 12. The deadline is January 3, 2012.

<http://thechallenge.dupont.com/>

Maryland Science Olympiad:

The website for the Maryland Science Olympiad (<http://www.marylandscienceolympiad.org>) is a good starting point for parents and coaches who are interested in having a MSO team at their school. Initial competitions are regional and have different competition dates so check the website for the competition closest to you. There are two divisions and problems in many different science content areas. There is a registration fee.

USA
BIOlympiad
2012

Accept the Biology Challenge: Become part of the USA Biology Olympiad

The USA Biology Olympiad (USABO) is the premiere US biology competition for high school students. After two rounds of challenging exams, 20 students are invited to a residential training program at Purdue University where they experience labs and lectures with advanced biological concepts and exacting lab skills. The top four students go on to represent the USA at the International Biology Olympiad (IBO) in Singapore July 8 to 15, 2012. Online registration is open from October 24, 2011 to February 3, 2012 at <http://www.usabo-trc.org>.

West Point Bridge Design Contest:

Design a virtual bridge and test it. Try to design a bridge for the minimum cost and maximum load. Get a team together and participate in the national contest, or create a local contest. Information at:

<http://bridgecontest.usma.edu/>

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MEMBERSHIP FORM

Welcome to MAST! Please print, complete, and mail this form to the address below or use the Member Application link at <http://emast.org>

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

- | | |
|--|----------------------------------|
| <input type="checkbox"/> 1 year – \$15.00 | <input type="checkbox"/> New |
| <input type="checkbox"/> 3 year – \$40.00 | <input type="checkbox"/> Renewal |
| <input type="checkbox"/> Student – \$5.00 (1 year) | |

Member Information – Please fill this out completely!

Last Name		First Name		Level – please check all that apply: <input type="checkbox"/> Pre-K <input type="checkbox"/> Elementary <input type="checkbox"/> Student <input type="checkbox"/> Supervisory <input type="checkbox"/> Middle/Jr. High <input type="checkbox"/> High School <input type="checkbox"/> College/University <input type="checkbox"/> Organization (please specify) <input type="checkbox"/> Other (please specify)
Street Address				
City		State	Zip	
Local School System		School		
Home Phone	Work Phone		Cell Phone	
Email Address		Alternate Email Address		

I would like to donate \$ _____ to support:
 the MAST Awards for Excellence in Science Education Program
 the MAST Mini-Grants Program

Please make your check payable to the Maryland Association of Science Teachers (MAST) and send it with this completed application to:
 MAST
 P.O. Box 368
 Finksburg, MD 21048

For Office Use: Date Received _____ Amt Paid _____ Membership to: _____
 Cash _____ Check Number _____ Check date _____ MER 6.11

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**NUCLEAR MELTDOWN IN JAPAN:
THE BASIC PHYSICS OF NUCLEAR POWER**

William Dorland, Department of Physics and Director of the Honors College



On March 11, 2011, Japan was shaken by a magnitude 9.0 earthquake. Dozens of nuclear power plants were rapidly shut down by automatic systems, but the Fukushima One power station rapidly moved into an unprecedented emergency situation. In this seminar, we will first go over the known (and very up-to-date) details of the accident at the Fukushima One power station. We will pay close attention to the basic physics principles involved in nuclear power, and then touch on the engineering and policy implications of these laws of nature as revealed in an accident. We will then compare the Fukushima accident to the Chernobyl accident, with a focus on translating foundational scientific aspects of the reactors to the accident outcomes.

Along the way, we will discuss the physics of nuclear fission, chain reactions, isotopes and decay heat in a way that non-physics majors here at the University of Maryland immediately grasp and subsequently retain. For the last half of the seminar, we will discuss nuclear power in the context of global energy demand, global warming, and international markets in other energy technologies (oil, coal, renewables, and so on).

Participants should expect to complete the seminar with a strengthened understanding of nuclear power plant technology, the nature and scale of accidents that can happen, the interplay among population growth, global energy demand, and global warming, and how technological progress occurs in different economic and political contexts. We will not discuss the health effects of exposure to radiation in detail -that would be the subject of another seminar altogether! The seminar will include a visit to the university's nuclear reactor.

William Dorland is a Professor of Physics at the University of Maryland and the Director of the Honors College. He graduated with a B.S. in physics (special and highest honors) from the University of Texas in 1988, and received his Ph.D. in Astrophysical Sciences from Princeton University in 1993. He also earned a Masters degree in Public Affairs from the Woodrow Wilson School at Princeton University in 1993 after completing a course of study focused on international science policy. Dorland won the 2009 E. O. Lawrence medal for his work on the theory and simulations of turbulence in nuclear fusion reactors. This seminar is based on material from two Honors courses for non-physics majors that Dorland has taught, on the global energy crisis and on international nuclear policy.

Join us on campus on February 29, 2012: Register today at www.sft.umd.edu



NEW!!! FOSS®, Third Edition

The Next Generation of Active Learning in Science

The Lawrence Hall of Science and Delta Education are pleased to announce the release of the new FOSS 3rd Edition during the 2011-2012 school year. The **Full Option Science System** is a premiere inquiry-based science program for elementary and middle school science. FOSS 3rd Edition combines the vision of the Next Generation Framework for Science and cutting edge research in instruction and assessment to prepare students for the 21st Century.

Through Active Learning, students conduct investigations, record data and observations in notebooks, read about science content and the nature of science, and extend learning through technology and by solving problems.

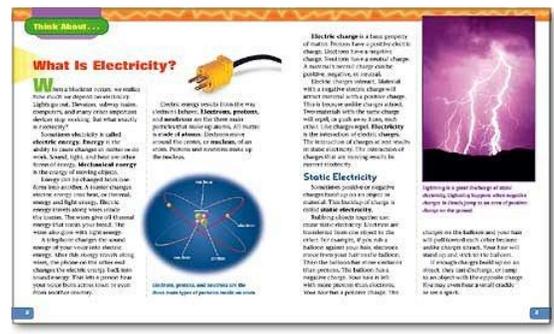
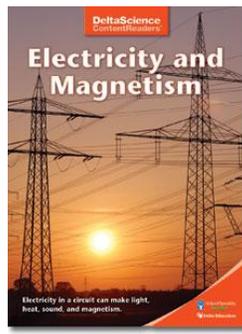
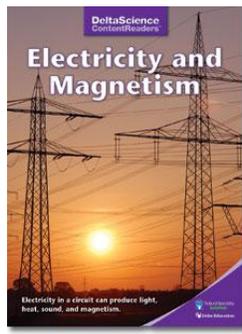
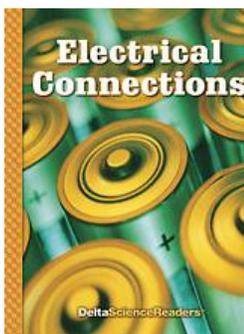
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