MSTA Newsletter

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In this Issue

From the Desk of MSTA's Executive Director

By Robby Cramer, MSTA Executive Director

We are just a week or so away from your opportunity to gather new science techniques, insight, and knowledge from people who know what they are talking about! They teach in schools just like yours. They have the same pressures you have. And right now they are asking themselves why on earth did I sign up to do this presentation???

I know the answer to our speakers' angst! Our presenters have something of value to share with you!

The best part is of our state conference is that you have the opportunity to choose what sessions you attend. You can tailor your own professional development to meet your needs right now. There will be over 253 sessions at every level, in every aspect of the science disciplines. You are in control of your own professional development!

We asked when you wanted to have conference sessions. We have responded with preconference sessions and a conference schedule designed to address your preferences. We have a diverse array of sessions and field trips. The theme of our state conference, to be held

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From the President's Desk: Innovation in the Classroom

By Mike Klein, MSTA President

As we approach the 2011 MSTA Annual Conference, I have been in conversation with many teachers and administrators about the value of attending. The reasons are copious and include networking with colleagues, exposure to new science education programs and ideas, opportunities to see new technology and equipment to support science teaching, and the opportunity to share your passion for teaching with other like minded individuals. All are wonderful reasons to attend and will certainly make the time away from the classroom and home worthwhile.

However, I would like to focus on one aspect of the conference in particular, teacher led sessions; and even more specifically on project based learning or the sharing of project based models in the science classroom. My reasons for being drawn to these particular sessions are numerous, but in an odd way coalesce around an article out of Wired Magazine. This author, Janet Raloff, was taking a look at President Obama's proposed budget for 2012 and noted a decided emphasis on science research and STEM education.

Many R&D programs would see expanded or new funding to meet a number of administration goals, said presidential science adviser John Holdren, including:

- *doubling the budgets for the National Science Foundation, the Energy Department's Office of Science and the National Institute of Standards and Technology*
- *spurring development of clean energy technologies and providing national high-speed Internet access*
- *improving science, technology, engineering and math education*
- *and promoting private R&D investment by expanding the R&D tax credit and making it permanent.*

This proposed budget has a long way to go before being adopted and it will certainly undergo significant change, but I was encouraged to see the president continue to push forward with his national objective "to out-innovate, out-educate and out-build the rest of the world."

Where I think that science education in general, and the MSTA conference in specific, join hands with the President's objective is that science

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From the Desk of the Executive Director - continued from front page

in Grand Rapids on February 25-26 is **Science Matters: It's a Brain Thing.**

Leading experts will share brain based learning strategies for science instruction. We have master classroom and college teachers sharing expertise on how these strategies help their students learn science and classroom practitioners will offer suggestions that you can implement in your classrooms! Be part of the dialogue to explore how you can reach the learners in your classes.

Thursday and Friday mornings will offer opportunities to check the Van Andel Education Institute. Explore how these educators are using inquiry with students. Try the inquiry process yourself using model organisms to learn about how to observe like scientists do in their research. Learn about models you can use with your students in your classrooms. Then go up on the hill to the Van Andel Research Institute and speak with a scientist about their work with similar model organisms as they are researching cure for cancer, and other diseases. Have an opportunity to see a working Laboratory.

Friday and Saturday conference sessions will offer opportunities to learn more about the latest brain and learning theories and how to translate this important research to enable your students to remember and retrieve new scientific knowledge.

Teaching Science is both an art and a science. Your state science conference is your opportunity to add to your skills set and to your own personal knowledge. See you at the conference in Grand Rapids!

Presidents' Letter - continued from front page

teachers provide the first real opportunity to teach about innovation, research and the development of ideas into reality. Yes, we want students to be grounded in science knowledge, but even more importantly we need them to be able to innovate, to create and to carry a passion for exploration into the world around them. It is what we got into this profession to do and it is why the Michigan Science Teachers Association continues to gather professionals from around the state and region to share experiences and ideas.

As you explore this year's conference, I hope that you look for opportunities to share and learn about innovative projects and curriculum. I know that you will find them and that you will leave renewed and excited about the possibilities for bringing real and authentic curriculum and learning into your classroom.

MICHIGAN DEPARTMENT OF EDUCATION UPDATE

The Science Conceptual Framework and the Next Generation Science Standards

By Kevin J. Richard, Science Education Consultant Michigan Department of Education

By now most science teachers have heard of the new "Common Core State Standards" in mathematics and English. Many are wondering, "Is science next?"

Science is also building a similar common set of expectations that states may elect to adopt. Unlike the mathematics and English documents, this initiative is being developed in a slightly different manner.

The project is being funded by the Carnegie Foundation and will be completed in two steps. The first step is the development of a Science Conceptual Framework that will identify the important scientific concepts that all students should know and be able to do. This part of the project started last year and is being conducted by the National Academy of Sciences (NAS). The National Academies were started in 1863 by President Abraham Lincoln as a non-political group that addresses science from an unbiased point of view. Because of this philosophy, the organization usually works without external input or comments. Last year was the first time in its history that the National Academy solicited public comment when they sent out a draft copy of the Conceptual Framework. The group received many comments and took them into consideration as they prepare the final publication, scheduled to be released in April, 2011 in a hard copy book.

Once completed, the second phase will start with the development of the Next Generation Science Standards (NGSS). This group, coordinated by Achieve, will build the expectations for the concepts identified by the NAS. In preparation for the development, a team of 30 writers whom are mostly teachers has been recruited and selected. The document's structure may take on similarities to the NAEP 2009 Science Framework and the College Board's science standards. The group also looked at ten internationally recognized countries with English science versions to determine what parts of their standards can be used. These countries were Canada (Ontario), China-Taipei, England, Finland, Hong Kong, Hungary, Ireland, Japan, Singapore, and South Korea. Many good ideas came from them and there were some areas of need. The NGSS will have the opportunity to add some elements not found in those countries. Some elements are:

- Incorporation of mathematics
- Evidence-based inquiry
- Model-building
- Use of engineering design
- Foundations for concepts in modern biology
- Interdisciplinary connections

Yet to be determined are some decisions that were also difficult in developing Michigan's new standards. They are

- Organization of the standards
  - o Grade Level vs. Grade Span
  - o High School standards vs. Course/credit standards
  - o Middle School Content
  - o Inquiry and Design
- Grain Size
- Examples inclusion
- Connections to the Common Core State Standards
- Vocabulary
- Learning Progressions
- Exemplary features as identified in the Internationally Benchmarked countries

EDITOR'S NOTE: Shortly before the publication of the newsletter, Kevin forwarded me a copy of the PowerPoint presentation by Joseph Martineau, Ph.D. (Director of Educational Assessment and Accountability) presented to the Michigan State Board of Education for discussion that led to a recent decision to raise the "cut scores" for MEAP testing. In summary, the data presented indicate that the current scores are inadequate to support higher level of college readiness. New studies indicate that an increasing number of American students are not academically ready for the rigor of college work. In Michigan, only 30-38 percent of public school 11th graders meet College Readiness Benchmarks for mathematics and reading and a majority of students require remediation in order to perform successfully in college coursework. The did make the decision to raise the cut scores in accordance with Dr. Martineau's proposal. I am unable to link the presentation to a website, but am willing to email a copy to any members that would like one. If you are interested, my email is cherylhach@hotmail.com.

The process is anticipated to take approximately 12 to 18 months, bringing the final release sometime in mid to late 2012. During this development, it is currently planned to have two open public reviews and two or three internal state reviews. I will be recruiting a small group to assist me in these internal state reviews.

While nothing has yet been released and planning is still occurring, it is certain that the country will have a new set of standards shortly that states may or may not adopt. It is an exciting time and a great opportunity for you to stay informed and get involved with this national movement.

Check out these top picks from Michigan Online Teacher of the Year, Andrew Vanden Heuvel!

Hands-On(line) Science Activities

As science educators, we strive to provide our students with meaningful and engaging opportunities to directly interact with scientific concepts. We call this "hands-on" learning. The growing field of online education is challenging our traditional understanding of hands-on activities by providing students with powerful tools to authentically interact with real (or at least, realistic) scientific data online.

Zooniverse

(http://www.zooniverse.org)

With this easy-to-use web tool, students are invited to contribute to large-scale scientific research projects. Students interact with real data to hunt for new planets, recover historical climate data, or monitor Solar outbursts. This innovative education project is the ultimate demonstration of the power of crowd-sourcing.

Google

(http://www.google.com)

You've probably heard of Google Earth, maybe even used it in your classroom, but check out these other interactive tools for astronomy, geology, or biology.
http://sky.google.com
http://moon.google.com
http://mars.google.com
http://bodybrowser.googlelabs.com

PhET

(http://phet.colorado.edu/)

With nearly 100 advanced math and science simulations, PhET can be used for classroom demonstrations, inquiry activities, or even rigorous labs. Teacher-created hand-outs, worksheets, and lesson plans support this freely available library of simulations.

Tracker

(http://www.cabrillo.edu/~dbrown/tracker/)

Video analysis can be a tremendously valuable method for data collection in the physics laboratory. With this free, web-based (or downloadable) program, students can analyze their own home-made videos. Imagine the possibilities!

Gizmos

http://www.explorelearning.com/)

These math and science simulations cover a broad range of topics from 3rd to 12th grade. Each simulation is available for a free 5-minute trial, which is usually enough for a demonstration or quick inquiry activity. If you pay to upgrade, you are met with a wealth of teacher support materials including handouts and online assessments.

Ann Arbor HANDS-ON Museum

220 EAST ANN STREET • ANN ARBOR MI 48104 • 734.995.5439 • WWW.AAHOM.ORG

WHAT'S THE IMPACT OF CARBON ON OUR ENVIRONMENT?

HOW ARE FUELS PRODUCED?

WHAT ARE THE POTENTIAL APPLICATIONS OF DIFFERENT FUEL TYPES?

Students will learn the answer to these questions and more through special programming through the Ann Arbor Hands-On Museum!

The Ann Arbor Hands-On Museum, with support by BESC, is now offering biofuels workshops, *Farming for Fuel*, to students in Michigan.

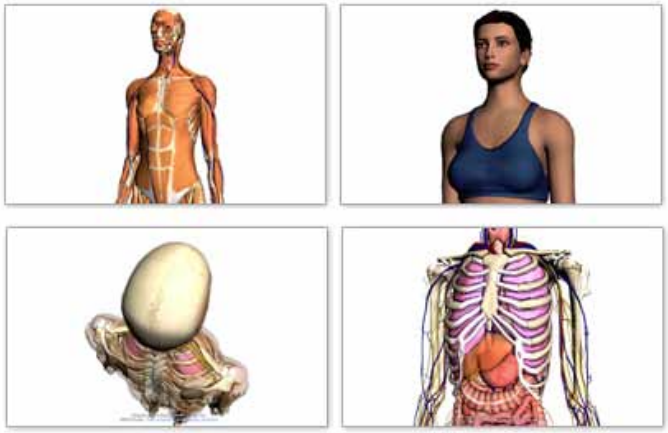
TEACHERS CAN TAKE ADVANTAGE OF THE BIOFUELS PROGRAMMING IN TWO WAYS:

- **OUTREACH DAYTIME WORKSHOPS AND EVENING EVENTS AT YOUR SCHOOL.**
- **SCIENCEWORKS LABS AT THE ANN ARBOR HANDS-ON MUSEUM.**

For more information, call Ann Hernandez at 734.995.5439 or email education@aahom.org.

Google Body Browser

By John R. Sowash, Southfield Christian School, jsowash@southfieldchristian.org, Blog: electriceducator.blogspot.com, Twitter: @jrsowash



Google Body Browser is a recent addition to Google Labs (experimental products) that will excite anyone who teaches topics related to human anatomy. Body Browser provides three dimensional views of the human body and allows for the isolation of specific organs and tissues layers. The instant search feature allows students and teachers to quickly search for and find specific organs.

Navigating and using Google Body Browser is very simple as it uses the same controls and interface as Google Maps and Google Earth. Before you begin, make sure you have a web browser that includes WebGL (an HTML element that enables 3D graphics without using Flash or other 3rd party plugins). Browsers that will work include Google Chrome 9, FireFox 4.0/b1. Mac users running OS X 10.6 or later can run Body Browser in Safari after enabling WebGL.

If you don't have the correct browser version, you will see the banner image posted above. If your browser is compatible, you'll jump right into exploring the human body!

As an anatomy and biology teacher I'm excited about using Body Browser in the classroom. It will certainly make learning human anatomy more interesting and interactive. Here are some ideas for using Body Browser in your classroom:

- Teach muscle attachments (a difficult concept) with the muscular and skeletal layers turned on.
- Teach the importance of anatomical naming conventions by exploring related structures (a good example is the clavical, subclavian muscle, subclavian vein and subclavian artery)
- If you have an interactive whiteboard, play "pig" or "horse" as a class, asking each student to name a structure and then challenge the next student to name a different structure.
- Compare and contrast the mapping of veins and arteries.

I also have a few suggestions (which I have submitted to Google) to improve Body Browser:

- Add layer support similar to that used in Google Earth. Users content can further enhance and extend the visual exploration of the body by providing textual or multimedia information related to specific body features. This would be a great opportunity for companies like WebMD or A.D.A.M. to leverage their existing content.
- Include X-ray and CT scan views of the body.
- Enable the exploration of the inner brain, not just the external hemispheres.
- Enable exploration of the inner heart, not just the external features.

Making the School Yard an Extension of the Classroom

By Maria M. Ferreira, Ph.D., Associate Professor, Wayne State University

Today's children spend less and less time in the outdoors, leading Richard Louv in 2008 to coin the term "nature deficit disorder." Louv pointed out that experiences with nature are essential to a child's physical and emotional development and that the lack of these types of experiences has led to the increase in child obesity, attention disorders, and depression.

Although many children, particularly those in urban areas, might not have access to large natural areas, the schoolyard can be a source of wonderful learning experiences. Below are some ideas of activities that can easily be done outside. When your students get restless, consider taking them outside to do some of these activities.

Plant a Garden

Consider planting a garden in an area of the schoolyard that gets little traffic, so that it is less likely to be vandalized. Packets of seeds are inexpensive and readily available in stores such as Lowe's and Home Depot. A garden planted with a mixture of seeds from wild plants requires little up keeping and is a continuous source of beautiful flowers that in turn attract insects and birds.

Ecological relationships

Have students keep track of the animals they see in the schoolyard before they build the garden (insect types, birds, small mammals) and then compare with the number and variety of animals that visit the garden. Questions to investigate: Do the number and variety of animals increase after the garden is planted and as the garden develops? What animals visit the garden? Which animals live in the garden? How does each animal use the garden? Discuss the concept of biodiversity.

Mathematics

Math is everywhere. Young students can identify shapes outside and count objects, while higher grades can measure distances, measure the circumference of cylindrical objects such as trees, identify and measure angles and determine the surface area of various areas of the schoolyard.

Involve the students in the designing of the garden so that they become familiar with the concept of scale – translating their drawing into a real-life area dimensions.

Weather

Have students make daily observations of the weather including air temperature, cloud cover, presence or absence of wind, etc. Ask students to predict the weather for the rest of the day based on their observations. Have them compare their predictions with those of the local media. This simple activity can lead to a discussion of how weather is predicted, the various variables that are taken into consideration when predicting weather, and what it means when the forecast indicates a 30, 50, or 100% chance of rain or snow. As an extension invite a local meteorologist to give a presentation in your class.

Involve the students in measuring and graphing rain fall over time using rain gauges that they can make using the activity in this website http://www.eduplace.com/rdg/gen_act/weather/rain.html

In the winter give students magnifying glasses to look at snowflakes. Bring snow inside and have them measure and graph change in temperature as the snow melts and becomes liquid. Connect the activity to "changes of matter" and the role that temperature plays in these changes (liquid, solid, gas).

Things to Keep in Mind

If your students are not used to experiencing the schoolyard as a source of learning experiences, you will need to structure the activities well and provide clear guidelines and expectations so that the time spent outside is productive and leads to meaningful learning. Organize students into small groups, give each member of the group specific roles and responsibilities and time the activities to keep students on task. Eventually, your students will begin to see the schoolyard as an extension of the classroom.

Utilizing Children's Literature in the Outdoor Classroom

By Dianne O'Connor, Lower School Science Teacher, Roeper School, Bloomfield Hills, MI

There are many choices of wonderful children's books that can draw children into the outdoors and inspire their closer observations and connections to nature. One book I have used with my 2nd and 3rd grade students is Discovering Nature's Alphabet by Krystina Castella and Brian Boyl. This book contains beautiful photographs of natural objects, each representing a letter of the alphabet. This book has inspired my students to conduct their own searches for natural forms of letters.

In constructing this activity, I first shared the book with my students and then prepared them for a letter scavenger hunt in our woods. Each child took a pencil and a clipboard with a sheet that contained 26 boxes, each labeled with an alphabet letter. I asked them to find a special place to sit in the woods, with the understanding that they were to sit quietly for a period of five minutes. From this vantage point, they were to find as many alphabet shapes as they could and draw them in each of the boxes. A digital camera was available for them to photograph forms that especially appealed to them. After five minutes, they switched spots and continued looking for another five minutes. The hunt could continue for several more intervals, and, of course, the amount of time in any one spot could vary, depending on the students.

This is a very simple and effective activity that gets children outdoors and really looking closely at nature. Spending quiet intervals and really looking in depth strengthens children's connections with the natural world.

Castella, Krystina and Boyl, Brian Discovering Nature's Alphabet. Berkley, California: Heydey Books, 2005

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*Also offered online

> MASTER OF SCIENCE EDUCATION

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- Complete two courses by attending classes just one night per week, with a second meeting online.
- Developed by Lawrence Tech in partnership with the Detroit Zoological Institute, Cranbrook Institute of Science, Aquinas College, and the University of Detroit Mercy.
- Courses aligned with the Michigan Curriculum Frameworks and Benchmarks for Science and the DI (Integrated Science Endorsement).

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The Fledgeling

The Fledgeling is flying again. Inquiry based, hands on activities will stimulate your students to get involved. The activities address science content and process skills It is hoped our teachers will find the Fledgeling helpful

THINK GROWNING!

Spring brings rebirth! Seed projects are popular with all age groups. The following activities provide a "growing" experience.

SCIENCE GRADE LEVEL CONTENT EXPECTATIONS

Process Skills: INQUIRY

Inquiry involves generating questions, conducting investigations and developing solutions to problems through reasoning and observation.

- Make accurate measurements with appropriate (non-standard) units for measurement tool.
- Construct simple charts from data and observations.
- Generate questions based on observations.
- Plan and conduct simple and fair investigations.

Content: LIFE SCIENCE

Life Requirements – Organisms have basic needs. Animals and plants need air, water and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building materials for growth and repair.

Check the Michigan Department of Education Website, for additional content and process skills which may be appropriate for your grade level.

SUGGESTIONS:

Make a vocabulary list of new science words.
Develop a plant reading list.

TEACHER REFERENCE:

- Bosak, Susan V, Science Is.A source book of fascinating facts, projects and activities. Scholastic Canada LTD. The Communication Project. Scholastic: ISBN:0-595-74040-9
- Headlam, Catherine: The Kingfisher Science Encyclopedia, Kingfisher Booksm New York: ISBN 1-65697-842-7
- National Science Education Standards, National Research Council, National Academy Press, Washington, DC: ISBN 0-309-05326-9

Materials List for Activities One and Two:

- Egg Cartons (paper or plastic)
- Newspaper (fine print section – no color print)
- Seed starter soil or potting soil mix. Do not use soil that forms hard clumps!
- Flower of herb seeds (dwarf varieties)
- Clean 6oz yogurt cups
- Pencils
- Scissors
- Teaspoon
- Tablespoon (kitchen type)
- Ruler- Measuring stick
- Flat toothpicks
- Hand lens (optional)
- Water (room temperature/rain water is best)
- Water container: 42 ounce juice bottles with grip handles work well.
- Plastic bags saved from dry cleaning
- Masking tape
- Black permanent marker
- Box for supplies (copy paper box with lid)

NOTE: Use as many recycles materials as possible. WE ARE THE EARTH'S CARETAKERS! This is a great time to address waste and the growing problem of land fills. DOES YOUR SCHOOL RECYCLE???

Mr Chem Says:

Always wash your hands when you finish working with soil. Soil contains many small organisms which can you harmful to humans.

WE WOULD LIKE TO HEAR FROM YOU. Please give us your comments. Do you have material for The Fledgeling? What would you like to see in The Fledgeling? Send to:
Sally DeRoo, Email: sue@ucia2.com, Fledgeling
Editor, c/o MSTA, 1390 Eisenhower Place
Ann Arbor, MI 48108

Start your notebook of Fledgelings now! Questions? Contact us!

ACTIVITY ONE:
PLANTING SEEDS

1. Gather egg cartons and all materials. Cutting along the fold (teacher job) carefully remove the carton lid.
2. Gently poke a hole in the bottom of each cell. Use a pencil, poke from the inside to prevent crushing the cell.
3. Place the carton lid under the cell portion.
4. Cut 4"X 4" squares from the newspaper (Good measuring practice)
5. Place your thumb in the middle of the square and fold the sides to make a cone. Fold the sides down and place the cone in each cell. Paper makes is easy to transplant the seedlings without injuring roots.
6. Wet the cone to help secure it to the cell.
7. Select a "Growing Area" with bright light and cover the surface with plastic bags and newspaper. Secure the edges of the plastic with masking tape to prevent wrinkles and curling plastic.
8. Spread newspaper on the work area to prepare for planting.
9. Prepare the soil by mixing and adding water to moisten it just enough so it sticks together. It should not crumble when squeezed in a closed fist. If the soil looks like "mud", it is too "heavy" for growing seeds. Mix in some sand if possible.
10. Using the tablespoon, fill each cell with soil.
11. Direct the students to select seeds. Two students per carton is good. Be sure to mark each student section with the permanent marker.
12. Using a ruler, students should measure and mark a "1/2" inch on a tooth pick.
13. Fill a bottle cape or two with water for each group of students.
14. Place the seeds, kind , well marked, on a piece of wax paper or in another bottle cap.
15. Instruct the students to make a small "tunnel" in the center of each cell with a tooth pick. Check the seed packet to determine the proper depth for planting. The hole should not be more than an ½ inch deep.
16. Carefully wet the flat end of the toothpick, gently touch the selected seed. It should stick to the tooth pick. Transfer the seed to the soil tunnel
17. Using the toothpick carefully cover the seed and smooth the top of the cell. Push the toothpick down next to the seed to mark where the seedling should appear. Check the package for germination time
18. Water the seed by slowly adding one or two teaspoons of water to each cell.
19. Place the Gardens in the Growing area. Over the weekend, a plastic sheet placed over the Gardens will help prevent evaporation. Place a couple of high back chairs at each end of the table to hold the plastic high enough over the growing plants to prevent them from being crushed. Tape the edges of the plastic in place. You have made a Greenhouse to hold in moisture.
20. Record the planting time and expected seedling appearance in student journals. Students record what they did: record, draw, label, list, write Record observations daily. Record the date and time, as seedlings might emerge in the afternoon. If hand lens are available, students can examine the growth cell to observe the tiny plant as it appears.
21. Students may measure the height of the seedlings and develop a graph. The teacher may choose to construct a Class Graph to compare the growth rates of the Gardens. Bar graphs in color work well.
22. When the seedlings are about 2" tall, it is time to transplant them to a larger space.

ACTIVITY TWO:
TRANSPLANTING SEEDLINGS

1. Wash and dry the yogurt cups. One plant per cup, if large plants are expected. Check the package.
2. Poke a hole in the bottom of each cup (teacher task)
3. Trace the cup bottom on newsprint and cut out the circles of paper.
4. Place the paper circles in the bottom of each cup. (Prevent soil from falling through)
5. Measure a half-way point and mark each cup.
6. Fill each cup half full of soil.
7. Use the tablespoon to gently lift the paper cone and growing seedling from the carton cell. (Good idea to practice) The cone should hold together.
8. Place the cone and growing seedling in the center of the cup on top of the soil.
9. Fill the cup with soil to cover the cone "plug" Add enough soil to just meet the surface of the cone. There are surface roots close to the surface of the seedling that depend on moisture for growth. Covering young roots may injure the plant. DO NOT cover the plant stem, it may rot!
10. Water the seedling to settle the new soil and force out trapped air. Students may observe "bubbles" of escaping air as they water the seedling. The water settles the soil and removes air trapped air trapped between the soil particles. Trapped air dries out the seedling's fragile root hairs .DO NOT pack the soil down around the seeding. You may break roots.
11. Return the seedlings to the growing area. Be sure the plants receive the proper light and water. Keep the young plants out of drafts and direct sunlight until they are well established.
12. Record the planting process in student journals.
13. When the new plants are well established, they can be transplanted to outdoor gardens or larger pots. Herbs are wonderful for windowsill gardens.

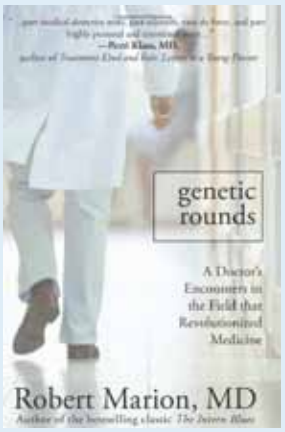
GROWING ACTIVITIES ARE ENDLESS!

Book Reviews

Genetic Rounds: A Doctor's Encounters in the Field That Revolutionized Medicine

By Robert Marion, MD

Reviewed by Cheryl Hach, MSTA Executive Editor



I recently read the book Genetic Rounds: A Doctor's Encounters in the Field that Revolutionized Medicine, by Robert Marion, MD on the recommendation of a friend. What a good choice! The book is a compilation of case histories from a pediatric geneticist that explores the complexity and frustration that arise from treating conditions that can never be healed. While the genetic abnormalities are explained in sufficient detail for the reader to understand the clinical implications of the disorder, it is the compassion of Dr. Marion that makes the book so thought-provoking. He relates the anguish he felt at having to tell a college friend that his child was affected with a genetic abnormality that would ultimately prove fatal. It spelled the end of a long friendship. He describes the moral dilemma he faces when he sees an afflicted individual in a public setting. Does he take the parent aside and suggest they consult a physician or just let the moment pass?

It is clear that Dr. Marion sees himself not only as a caregiver to the young patient he is seeing in consultation, but more importantly, as ongoing, long-term support for the entire family. As a physician, he can monitor and perhaps alleviate the pain of his young charge, but his real calling is to provide the compassion and advice that makes it possible for families to heal and go forward.

Part medical detective story, part ethics dissertation, the book is a genuinely insightful look at a little known specialty practice and one that will prove interesting to students and teachers alike. In fact, I liked it so much that I ordered another title by the same author that examines the genetic profiles of figures in world history. Stay tuned!

Darwin's Dogs: How Darwin's Pets Helped Form a World-Changing Theory of Evolution

By Emma Townshend

Reviewed by Sara Helmer, Kalamazoo Area Mathematics and Science Center

Within the past few years, numerous books regarding Charles Darwin and his distinguished theory of evolution have been published. Unfortunately for readers, the subject matter has been rather redundant. Mainly concerning his life and research, a large number of books were released in 2009, in celebration of the Darwin anniversary year. At this time, Emma Townshend, however, chose a unique way of enlightening Darwin fans on several aspects of his life. Entitled, *Darwin's Dogs*, this quick-read relates the renowned scientist's strong love for animals, dogs, in particular, to his development of the theory of evolution.

For anyone who has ever pondered the thought process of a dog and the possible connections between humans and animals, *Darwin's Dogs* is an appropriate book. Less than 150 pages in length, it is a succinct story of Darwin's life, beginning with his earliest years as a young boy. Townshend gives detailed descriptions of relevant snippets of his life, including his strong bond with his family's pets. Covering everything from young Darwin's initial fear of dogs to the death of his beloved terrier, Spark, very few details are left unwritten. Intertwined within the text are various quotes, letters, pictures, and diagrams from his life, giving the reader an insider's view into his intricate thought process. Townshend discusses Darwin's voyage on the Beagle, as he sailed to various locations around the world, ultimately beginning his scientific journey. The reader learns of his relationships with fellow scientists and how their work had a major effect on Darwin's own research. Also explained were his many struggles with acceptance of the argument that all animals, including humans, descended from one common ancestor. Throughout the duration of *Darwin's Dogs*, the reader will grow to appreciate the profound intellectual's lifelong examination of animals and their descendants.

Townshend does a magnificent job of allowing the reader into Darwin's life through his various personal triumphs and struggles. The journey begins with his initial attraction to evolution and continues to follow his admirable research throughout adulthood. Unlike any predecessors, *Darwin's Dogs* presents a refreshing perspective on Darwin's insightful life. For Darwin fans and skeptics alike, this book is a worth-while read.

OPPORTUNITIES FOR TEACHERS!

Accepting applications now for 2011; new courses in Australia and Guyana

OXFORD, Ohio - Applications are being accepted for 2011 summer/fall graduate field courses and a master's program that offers international conservation studies in 12 countries throughout Africa, Asia, Australia and the Americas. New in 2011 are courses in Australia and Guyana.

Created in 2004 by Miami University's Project Dragonfly and the Cincinnati Zoo & Botanical Garden, Earth Expeditions graduate courses and now the Global Field Program (GFP) master's degree bring together graduate students, scientists, educators and community leaders at critical conservation field sites worldwide. In addition to Australia and Guyana, sites for 2011 include the Amazon, Baja, Belize, Borneo, Costa Rica, Kenya, Mongolia, Namibia, Thailand and Trinidad.

Tuition for seven graduate credits and all basic in-country expenses are covered in the $1,250 course costs. Accepted students are responsible for airfare.

Earth Expeditions and the GFP, which can be completed part-time from anywhere in the United States or abroad, are open to educators and other professionals from all disciplines and settings, regardless of grade level or academic focus. For information and to apply, please visit:

- Earth Expeditions: http://www.EarthExpeditions.org
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