MSTA Newsletter

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In this Issue

From the President's Desk:

A Reflection on a Modeling Unit in the Biology Classroom

By Michael Sampson, MSTA President

As the Next Generation Science Standards (NGSS) have been released, I am continuing to focus on using models and having my students develop models in biology classes. For this article I will also focus on the Using Models in Biology workshop that has been the focus of my article in the past few newsletters.

Since the last newsletter, I have completed the Gecko Breeding Challenge with both my AP and advanced ninth grade biology classes. Both classes enjoyed the inquiry-based activity and also had similar struggles with not always having the "correct" answer spoonfed to them. The process of finding the "correct" answer through discovery activities and frequent small group and whole class dialogue was the biggest challenge.

Developing mathematical models for predicting inheritance was the focus of the unit. Models were developed for both one gene and multiple gene traits. The one gene mathematical model was constructed based on observations of inheritance patterns of geckos and a set of inheritance rules

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Mission Statement

The MSTA mission is to stimulate, support, and provide leadership for the improvement of science education throughout Michigan.

Thoughts From Your Executive Director

By Robby Cramer, MSTA Executive Director

On April 9, 2013 the Next Generation Standards were released. At the April State Board of Education meeting your MSTA Leadership spoke in support of the NGSS. We shared the MSTA Position on the Framework for K12 Science Education. We talked about how MSTA supported both the external reviews and the internal reviews of the NGSS in order to ensure that Michigan perspectives were represented in the final documents.

Support for the external reviews including email messages, website posting and newsletter articles to our membership. Furthermore, internal review committee support included finding meeting spaces and rooms at MSTA board meetings and state conferences for the team members to meet face to face and wrestle with the documents. We also provided conference call funding for conversations within small groups of the teams. All of this support for the reviews enabled the State of Michigan to provide the greatest number of responses of any state. Indeed, the NGSS National Writing Team has been impressed with the depth of our collective comments. We know that science educators and scientists across Michigan have influenced the science education standards for our students.

In the past week I have spoken to several internal committee members. Our Michigan reviewers have found several places where their thoughts are reflected in the final version.

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Thoughts from your Executive Director - *continued from front page*

I hope you have taken time to express yourself in the survey MDE has available on- line until May 8. Continue to let us know how we can support your transition to the NGSS. At the MSTA Board Retreat during the end of April we will begin organizing the next state conference. Watch the Newsletter, Journal, and Website for additional resources.

MSTA Position on A Framework for K-12 Science Education

In July 2011 the National Research Council, National Science Teacher Association, American Association for the Advancement of Science and Achieve, called for the creation of new national standards for science education. As a result, Michigan became one of 26 states invited to participate in the development of what is to become the Next Generation Science Standards (NGSS). In keeping with the Michigan Science Teachers Association's mission statement, to stimulate, support and provide leadership, we have taken on a key role in the writing and review process for this initiative.

While the final version of the standards has not yet been adopted, we enthusiastically embrace the vision provided in A Framework for K-12 Science Education from which they were developed. We heartily endorse the key dimensions, which include the Science and Engineering Practices, Crosscutting Concepts and Disciplinary Core Ideas around which the Next Generation Science Standards are being finalized. Our goal is to promote the effective, systemic and sustained implementation of the new NGSS once they are approved.

From the President - *continued from front page*

established by group consensus. Groups tested the one gene model to see if it applied to all situations and then the class moved on to development of a model that could be used on a multiple genes. Surprisingly, testing and verifying the correct mathematical model for multiple gene inheritance appeared easier for the ninth grade students.

Assessment of the unit consisted of a poster session and a post-test. The poster session allowed the students to present their proposal to a zoo on why the zoo should select their "rare" gecko. The poster had to use the mathematical model to support the breeding program they used to produce their "rare" gecko as well as why they thought their gecko was considered rare. The post-test asked the students to apply the genetics and math concepts learned about to gecko inheritance to other organisms and new situations. This application of concepts to new situations is where the ninth grade students struggled when compared to the AP students. There were many complaints from the ninth graders that "we never learned this stuff" and "we only learned about geckos."

I will use this feedback from the students to put more emphasis on application of these concepts to other situations in the future.

The modeling is not over yet...in a few weeks I will be using another modeling unit to teach evolution by natural selection.

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to Teach in the 21st-Century Classroom?

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Adventures in Antarctica

By Susan Tate, Region 4 Director

Antarctica, often described as the coldest, windiest, driest place on Earth, is a land of majestic mountains and endless plains of ice. Along its continental margins and islands, graceful sea birds and mammals frolic amongst the gently floating sea ice and the cathedral-like spires and towering walls of the glaciers. The stunningly vast panorama of the land itself illustrates the reflective, spiritual quality of nature. But even in Earth's last pristine wilderness—where there is no native population, there have been no wars, and the land is owned by no one—there is growing evidence that our actions here in the United States, and around the world, are having an impact on its fragile ecosystem. I had an amazing opportunity in March to travel with the group 2041 to the Antarctic Peninsula and learn more about the continent's plight, and what we can do to advocate for and protect Antarctica.

The organization 2041 was founded by polar explorer and environmental leader Sir Robert Swan to raise awareness of the fact that in the year 2041, the Protocol on Environmental Protection to the Antarctic Treaty is up for review. Swan has made it his mission to preserve Antarctica by advocating for recycling, renewable energy, and other sustainability initiatives around the world. Each year, for the last ten years, he selects people from all over the world—college students, educators, business leaders and non-profit leaders—who are all interested in learning more about sustainability to be a part of his International Antarctic Expeditions. Tipped off by my principal, I checked out the 2041 website and applied to be a part of this year's expedition. After being selected, I had to do my own fundraising to make the trip possible, and fortunately the dream became a reality with generous help from family, friends, and the Whitehall community.

My adventure began in Ushuaia, Argentina, which is referred to by locals as "El Fin del Mundo" (The End of the World), because quite literally it is the southernmost city in the world. There I met up with 2041 team leaders and the other 79 program participants from 28 nations that would be a part of the group's International Antarctic Expedition 2013. After spending almost three days in Ushuaia learning team skills and even hiking up the Martial Mountains (part of the Andes) to the Martial Glacier, we boarded the Quark Expedition ship "Sea Spirit" for a 10-day cruise to the Antarctic Peninsula via the infamous Drake Passage. The Drake took it fairly easy on us—although several people never left their cabins during the crossing—and after two days at sea, we were all very excited to spot our first icebergs, and then finally Smith Island. During the trip we made daily shore landings in Zodiac rubber boats, and we became quite adept at the process of putting on our gear (three to four layers of clothing, muck boots, hat and gloves, lifejacket, sunglasses or visor), swiping out with our cabin card (so they could track who was on or off the ship), decontaminating our boots, and then boarding the Zodiacs. This somewhat laborious process (which was reversed upon arriving back to the ship) was all worth it for

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Adventures in Antarctica *continued*

the opportunity to go ashore for several hours at a time to hike up glaciers, wander through Gentoo and Chinstrap penguin colonies, and even one night…camp on the ice under the stars! In addition to the curious penguins, we had encounters with a variety of seals (leopard, fur and Weddell) and whales (orcas, minkes and humpbacks). I was slightly disappointed to only see two Adelie penguins (my favorite) on the entire trip, and it was explained to us that, due to changes in sea ice and ocean temperature, they are becoming rare along the peninsula. Much like the Arctic, the peninsula area of Antarctica has warmed several degrees in the last 50 years—another reason why it is important to make sustainable choices about energy and our natural resources.

With so many wonderful memories from my trip it is difficult to pick a favorite. Would it be camping under the most spectacular star-filled sky I've ever seen? Would it be having the courage to do a polar plunge into the freezing cold (and leopard seal filled) ocean? Would it be getting checked out by inquisitive young penguins? Would it be seeing spectacular geological formations and icebergs in person? Would it be getting the chance to spend two weeks with an incredibly diverse group of amazingly passionate and talented individuals who share a common goal of improving the world through sustainability? I'll let you know when I decide.

Note: *Susan is an 8th grade Earth Science teacher at Whitehall Middle School. She can be contacted for more information about her trip, or for suggestions for using polar resources in the classroom at susantate@whitehallschools.net. For more information about the mission of 2041, or to check out the IAE 2013 blog, please visit www.2041.com*

Wood-To-Wheels: Kids Think Engineering

From Lloyd Hilger, Science Department Chair, Hanover-Horton Schools, Horton Michigan

Last Summer (2012), I participated in the Wood-To-Wheels Program at Michigan Technological University. This is a program of study for Secondary Science Teachers where they learn about alternative fuels & engines from an engineering perspective, where they develop relevant learning units for their students, and where they return to their classrooms during the academic year, and they then implement their learning units, involving students in actual engineering experiences.

I wrote an article in the summer of 2012 for the MSTA Newsletter about this tremendous experience. It is called "Wood-To-Wheels, or How I Spent My Summer Vacation". It is found online at:

http://www.msta-mich.org/images/pdfs/newsletter/msta_summer_newsletterweb2.pdf

Currently in my seventh-grade Science classes, the students are actively invoved in bioengineering doing a ligno-cellulosic conversion of bio-mass. Specifically, the students are taking wood that has been pre-treated with sulfuric acid, and applying an engineering process to the wood that culminates in producing high-quality ethanol, a biofuel.

This process involves the use of enzymes, which aid in the breaking down of the wood, to yield glucose. The glucose is then fermented, yielding a mixture of ethanol and water. This mixture is then distilled until the result is fairly-pure ethanol.

After several samples of distilled ethanol are produced, the students then test each sample's purity. The purity levels can be determined by finding the density of the samples.

Follow-up activities include burning the ethanol samples in watch-glasses to see how much water remains, and then having the students use the ethanol samples to run the motor of a powered fuel-cell fan.

Some teachers who attended last summer's Wood-To-Wheels Program have, during this academic year, engaged their students in the same or similar activities that I have done with my Science classes, activities that focus on the bioengineering of a high-quality alternative fuel. Other teachers from the Wood-To-Wheels Program are having their students focus their learning on other topic areas, such as engines and genetic engineering.

Now that I am engaging my seventh-grade students in the actual bioengineering of alternative fuels, I am also observing how this segment of the Wood-To-Wheels Program has impacted these students.

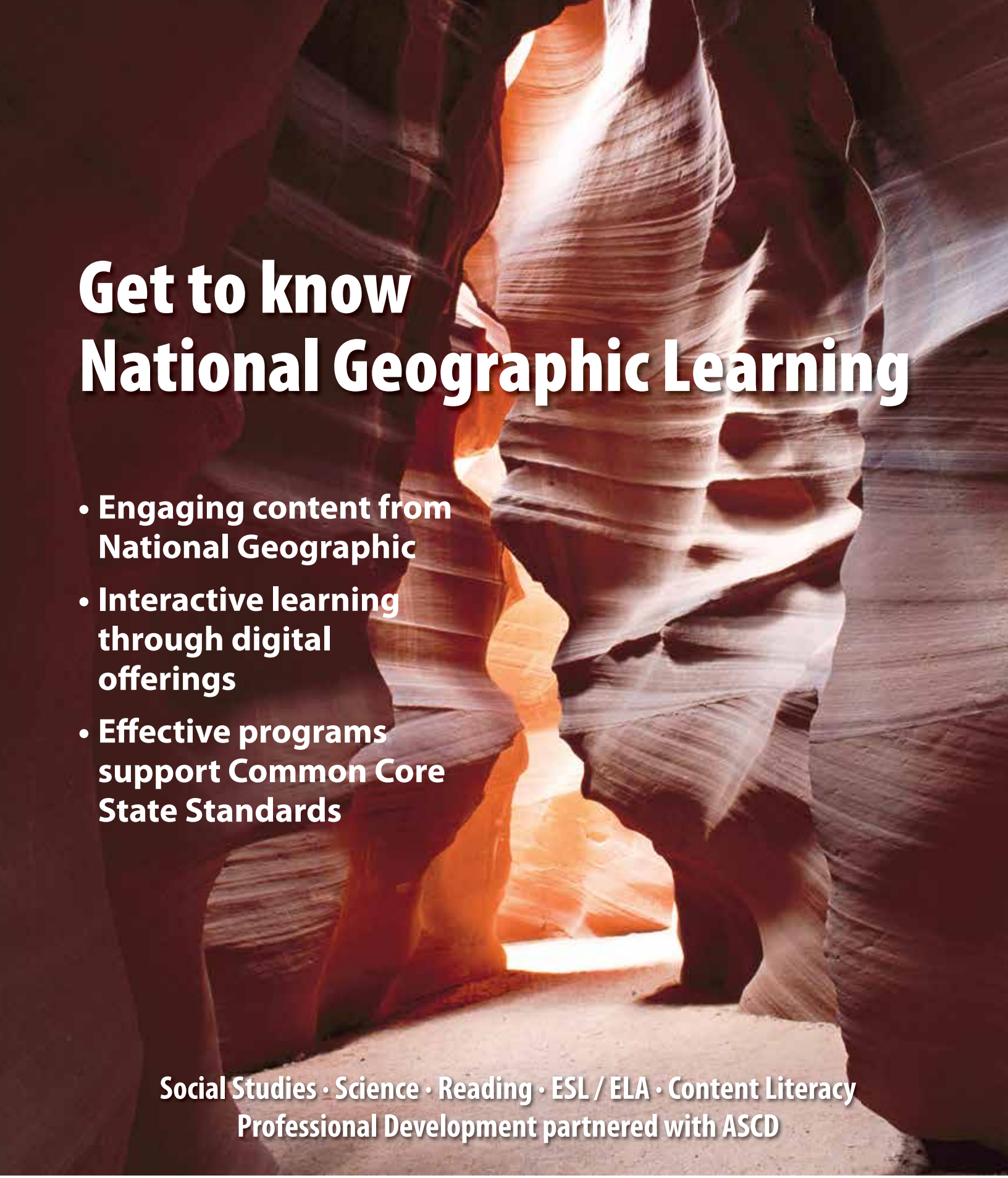
One result of the students' involvement in the bioengineering of alternative fuels has been that they have become much more interested in future careers in the field of Engineering, and have wanted to explore them.

Since some of my Science students are also enrolled in my Computers class, I encouraged them to do online research about various Engineering careers. Each student explored their top three Engineering career choices. They made use of a Website called Discover Engineering. It is found at:

http://www.discoverengineering.org/

After their research was complete, each student then produced their own Power-Point Slide Show about their # 1 choice among Engineering careers, and shared their Presentation with their class.

When students in seventh grade are introduced to the field of Engineering as a possible future career area for themselves, both through hands-on Engineering experiences in the Science classroom, and also through online information-gathering & computer-presentation-making about Engineering careers, they are getting a good, early exposure to what Engineering is about, and they are also getting an opportunity to consider the importance, the fun, and the positive and desirable aspects of a career in Engineering.



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Congratulations to the 2013 MSTA Award Winners!

The Michigan Science Teachers Association celebrated the winners of the 2013 Science Educators of the Year Awards during a banquet at the MSTA Conference March 8, 2013 in Ypsilanti, MI.

Robbie Cramer was recognized by the MSTA board with the Distinguished Service Award. She was chosen for this special honor for her extraordinary contributions to the advancement of science education through her work in MSTA.

The winning Elementary, Middle School, High School, and College Science Teachers of the Year were chosen for using or modeling best practices, inspiring their students, demonstrating innovative teaching strategies, being excellent role models for students and other teachers, demonstrating leadership, and exhibiting a passion for science and for teaching.

The winning Informal Science Educator was chosen for his unique and extraordinary accomplishments, active leadership, scholarly contributions, and direct and substantial contributions to the improvement of non-school based science education over a period of time.

Congratulations to this year's winners:

Category	Winner	School District
Distinguished Service Award	Robby Cramer, Van Andel Education Institute	Grand Rapids, MI
College Science Teacher of the Year	James McDonald, Central Michigan University	Mt. Pleasant, MI
High School Science Teacher of the Year	Erika Fatura, Pentwater Public School	Pentwater, MI
Middle School Science Teacher of the Year	Monica Harvey, Hart Middle School	Rochester, MI
Elementary Science Teacher of the Year	Diane Krzyaniak, Marshall Upper Elementary School	Wayne Westland Community Schools, MI
Informal Science Educator of the Year	Jerry Pahl, Kalamazoo Aviation History Museum	Kalamazoo, MI

Contact: Marlenn Maicki
MSTA Awards Chair
Phone: 248-647-2522
Email: mmaicki@dcds.edu

MICHIGAN SCIENCE TEACHERS ASSOCIATION

Call for 2014 MSTA Awards Nominations

Look around you! Are you working with someone whom you consider an excellent science educator? Does this person do an outstanding job in the classroom and/or in your school district? Does this person contribute to the profession by taking leadership roles within the educational community and show a willingness to share ideas with colleagues by presenting seminars and workshops, and by publishing science related articles in professional journals?

If you know someone who exhibits these attributes, then please NOMINATE HIM/HER for one of the following categories

- **Elementary Teacher of the Year**
- **Middle School Teacher of the Year**
- **High School Teacher of the Year**
- **College Teacher of the Year**
- **Teacher of Promise**
- **Administrator of the Year**
- **Informal Science Educator of the Year**

Nomination deadline: July 1, 2013

Awards are issued based on the following criteria:

The winning Elementary, Middle School, High School, and College Science Teachers of the Year will be chosen for using or modeling best practices, inspiring their students, demonstrating innovative teaching strategies, being excellent role models for students and other teachers, demonstrating leadership, and exhibiting a passion for science and teaching. There has been some confusion about fifth grade teachers. If the teacher works in an elementary school, nominate him/her for the Elementary Award. If the teacher works in a middle school or junior high school, nominate him/her for the Middle School award.

The winning Science Teacher of Promise will be chosen for inspiring students, demonstrating innovative teaching strategies, demonstrating the potential for science leadership, and exhibiting a passion for science and teaching. Eligible nominees must have taught fewer than five years.

The winning Administrator of the Year will be elected based on dedication to and support of science education in the district and community, and for being a strong advocate of science teaching and curriculum. Eligible nominees include all levels of district administrators, curriculum directors, ISD/RESA chairs, Math/Science Center people, and higher education administrators.

The winning Informal Science Educator will be chosen for unique and extraordinary accomplishments, active leadership, scholarly contributions, and direct and substantial contributions to the improvement of non-school based science education over a period of time.

- Please be advised that no member of the current MSTA Board of Directors is eligible to receive one of these awards while serving on the Board.

Once the nomination is received the nominee will be contacted and sent the appropriate material. If you have any questions, please contact Marlenn Maicki, Awards Chair at mmaicki@dcds.edu.

To nominate an educator, please fill out the form on the following page.

2014 MSTA Awards Nominations Form

Award: (select one)

❑ Elementary Teacher of the Year ❑ Middle School Teacher of the Year ❑ High School Teacher of the Year ❑ College Teacher of the Year ❑ Teacher of Promise ❑ Administrator of the Year ❑ Informal Science Educator of the Year

Grades or Subject Taught _____

Nominee

Please go to this link **2014 MSTA Awards Nominations Form** on the MSTA website, to download this writeable PDF form. **Follow the directions closely** at the bottom of the form to submit it (*If you don't save a copy of this completed form as directed, you will submit a blank form.*)

This form must be viewed in **Adobe Acrobat Reader** in order to work properly.

If you have any questions or problems please contact the MSTA office at 734-973-0433.

Nominee Name: _____

School: _____

School Address: _____

_____

District: _____

School Telephone

School E-mail Add

Home E-mail Add

Home Phone: _____

Cell Phone: _____

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_____

Nominated By:

Name: _____

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Professional relationship to nominee: _____

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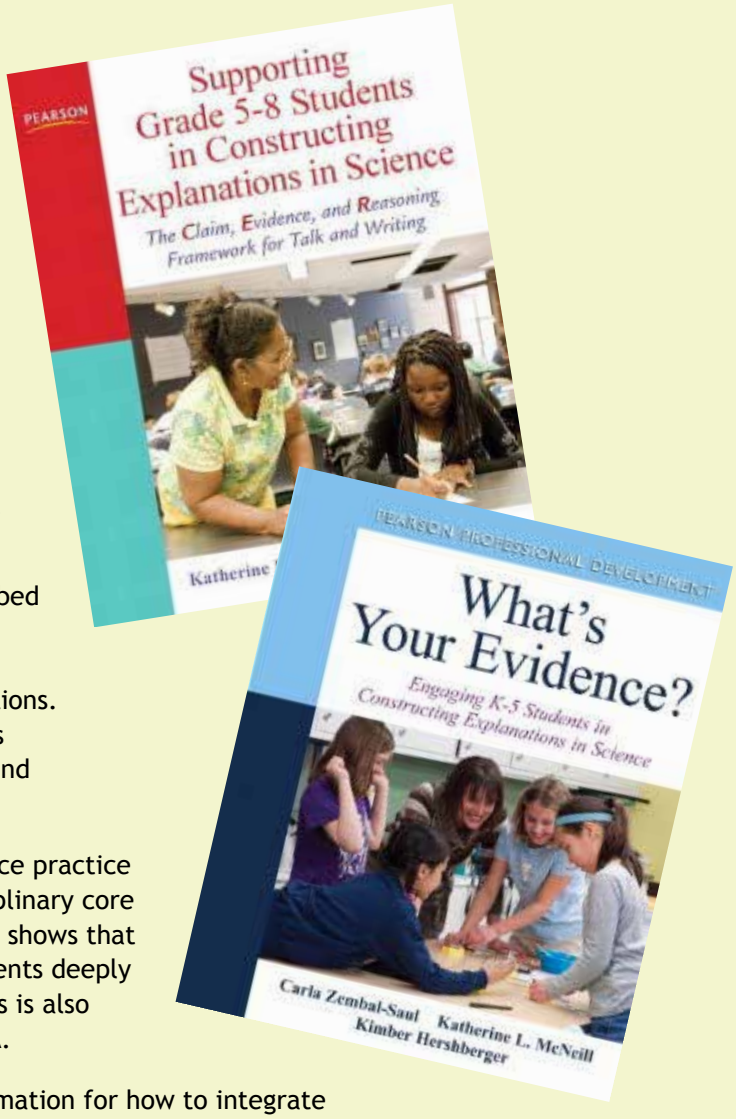
Book Reviews:

Supporting Grade 5-8 Students in Constructing Explanations in Science: The Claim, Evidence, Reasoning for Talk and Writing *(Pearson Professional Development… by Katherine McNeill and Joseph Krajcik, 2011).*

and

What's Your Evidence?: Engaging K-5 Children in Constructing Explanations in Science *(Pearson Professional Development...by Carla L. Zembal-Saul, Katherine L. McNeill and Kimber Hershberger, 2012).*



One of the eight science and engineering practices described in the NRC Framework for K-12 Science Education (2011) is constructing explanations. In science classrooms, K-12 students are expected to write coherent science explanations. These explanations are not just opportunities for students to show learning, but also to learn through the iterative and collaborative creation of science explanations.

Not only is the writing of explanations an important science practice in the Framework, students will be asked to explain disciplinary core ideas in the Next Generation Science Standards. Research shows that discussing and then writing these explanations helps students deeply learn science content. The process of writing explanations is also consistent with the Common Core State Standards for ELA.

Two recent books provide teachers with a wealth of information for how to integrate the writing and discussion of explanations into their classroom. Both Supporting Grade 5-8 Students in Constructing Explanations...(2011) and What's Your Evidence…(2012) provide a multitude of strategies for supporting students as they learn to write and talk about scientific explanations. Working from the beginning steps of why you should have students engage in explanations and then clearly showing how to help students begin to think about explaining their science ideas, these two books answer many of the questions teachers have about incorporating this practice in their science teaching.

The development of the strategies described in each book has been part of collaborations with classroom teachers and research projects over several years. Each book provides sample student work, ways of assessing the work, and exact methods for how to increase both the quantity and quality of students' scientific writing. Either book would be an excellent addition to a book discussion group or a professional learning community, especially one focused on the Next Generation Science Standards or ways to integrate CCSS ELA and NGSS.

About the article author:

Mary Starr, PhD, (mary@starrscience.com) works as a science teacher coach and K-12 science education professional developer throughout the United States. She is currently creating professional development experiences for science teachers as they think about implementing the Next Generation Science Standards. She is an author of Project-Based Inquiry Science, a middle school science curriculum published by It's About Time.

Our Day Trip to the Michigan Science Center

By Cheryl Hach, Biomedical Science Instructor, Kalamazoo Area Mathematics and Science Center, and her Biomedical Science Students (Michael Elluru, Ansh Chaudhary, Amber Salome, Stephanie Ray, Laura Conley, Andrew Labadie, Paras Mehta, Geneva LaForce, Fiona Beaton, Trisha Ramsdell

Students from Ms. Hach's Biomedical Science class at the Kalamazoo Area Mathematics and Science Center recently took a field trip to the Michigan Science Center to view the Bodies Human: Anatomy in Motion exhibit and IMAX theater presentation of The Human Body. They have studied the human body and its systems quite thoroughly throughout the year, and this was an opportunity to actually see human organs "up close and personal." Students really enjoyed the experience and offered feedback. The collective "thumbs up" for the exhibit was unanimous!

- Now, I have to say that when I went to "Body Worlds" in fifth grade I was extremely freaked out. The reason being that all the bodies were real. As a junior in high school, I am still freaked out about this fact. However, I thought the exhibit was neat and informative.
- I have seen the exhibit before, back when I was in middle school, but now that I have learned so much more about the body through class, it was a more fulfilling visit. Instead of some dissected cats, it was the real deal!

- I learned that the capillaries, arteries and veins can be plastinated separately, which I thought was pretty cool!
- It was exciting to see things that I learned this year come to life on the really big screen.
- Although some of the ideas and exhibits may be age specific, the science center has an exhibit for everyone and even difficult concepts are broken down into very understandable parts.
- I have seen stuffed animals and things like that, but never human bodies broken down into muscles and different layers. It was really cool to see all the muscles defined so clearly and all models "acting" out different scenarios.
- It was the culmination of all the anatomy we had learned about: the muscles, bones, organs and brain. The cadavers impressively displayed all parts of the human body.
- Although the food video (in the Diabetes exhibit) was quite strange, it was a great example for visual learners like me.
- Some parts of the movie were cheesy, but that made it even more enjoyable!
- My favorite part, by far, is the baby room. It's amazing how the creators of the exhibit were able to find examples of the fetus at all stages of development, especially very early in the pregnancy when the fetus is barely visible.
- Who knew that babies have a reflex to not try to breathe under water?

The Fledgeling

The Fledgeling flies! MSTA science lessons for elementary teachers is published as a recurring feature in the MSTA Newsletter. Establishing good science practices are essential for a solid science program. This is true for all age groups. Through hands-on, Inquiry based science, special needs students are achievers too! The Fledgeling is edited by Sally DeRoo, MSTA.

START A HERB GARDEN

Start an Herb Garden Indoors. Herbs started indoors are easily transplanted. They are excellent projects for students in need of a class project and a gift for Mother's Day. Herb Gardens are suitable for sunny windows and container gardens where space is limited.

Seed and Plant Projects meet the National and State Science Guidelines for both Content and Process Requirements. Growing Projects provide extensions into all areas of the Curriculum.

HERB GARDEN MATERIALS YOU NEED:

Egg cartons (paper or Styrofoam), potting or seed starter soil, newspaper, pencils, scissors, Science Journal, selected Herb seeds. Use common varieties of parsley, basil, oregano, dill, etc. table spoon, marking pen, Popsicle or craft sticks, pots (yogurt cups) for plant transplant and/or transplant demonstration ruler

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GETTING STARTED:

1. Cut the egg carton in half so the sections are separated from the lid.
2. Carefully' poke" a hole in each cell from the inside on a flat surface (you don't want to split the cell).
3. Cut newspaper into 4" to 6" squares. Shape the squares into cones that fit loosely into the cells.
4. Bend the tip of each cone and place it a cell. Bend back the points of the cone and fold down to firm the cone. Cones should be an inch or so above the rim of the carton cell.
5. Fill each cone ¾ full of soil.
6. Read the directions on the seed package as to seed growth requirements. Following directions on the packages is a must.
7. Place selected seed carefully in the center of the cone, on top of the soil. Students can easily see their seed.
8. Prepare the craft stick (marking stick) with student's name and seed variety. Mark each cell or section of cells with stick.
9. Place a tablespoon of soil on top of the seed, to bring the soil level almost to the top of the cone.
10. Place the cell section of the carton in the top of the carton section, place in bright light.

11. Gently, slowly water the newly planted seed until water appears in the carton bottom. (Caution: Watering will secure the seed and push out the air trapped in the soil. Watering too fast will displace the seed and push soil out of the cone.)

12. Seed germination time varies with seed variety. The seed package will give approximate germination time under ideal conditions.
13. Do not let the soil dry out. The tiny root hairs on the germinating plant require moisture. If there is a concern over weekends, place a chair on each side of the "growth table" and drape a plastic painters cloth over the gardens to retain the humidity (moisture).

TRANSPLANTING HERB GARDENS

1. Transplanting the small seedling can easily be done when the seedling is an inch or two high. The young plant has established a root system and is ready to start vigorous growth.
2. Plants to be grown outdoors should not be transplanted until the danger of frost is gone. When Planting in Zone 5, recommendations are not to plant outdoors until Memorial Day or after. In recent years, it has been necessary to cover tender plants, temperatures dropped into the 30's(F).

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DEMONSTRATE TRANSPLANTING

1. Demonstrate how to transplant seedlings, before classroom container transplants begin. Transplants from the carton to the backyard garden, follow similar procedure.
2. Select a suitable container. Poke a hole in the bottom if necessary.
3. Cut a piece of newspaper to fit the bottom of the container. This will act as a filter
4. Fill the container approximately half full depending on the size.
5. Gently scoop the cone containing the seedling out of the carton cell and lower it into the waiting container. The cone should be "flush" with the top of the container. Fill the remaining space with soil, and then water carefully.
6. When transplanting to larger containers or the outdoor garden, simply dig a hole in prepared soil and lower the cone/ seedling in place. The paper will biodegrade and help to sustain the new plant. Carefully tuck soil around the new plant and water. If using paper carton, try planting the entire carton. It too will biodegrade.

   Transplanting the cone and young plant as a unit helps to prevent root damage.

KEEPING THE SCIENCE JOURNAL

During the entire project remember to keep a daily science journal. Record what is happening when, where and why! Use proper vocabulary when possible, illustrate, measure, construct a growth graph, observe and record data. Discuss observations and share information, compare projects.

PROCESS COUNTS!

CONSIDER STARTING A SCHOOL OR COMMMUNITY GARDENB PROJECT!

Email MSTA with questions, needs, or project assistance. Sally DeRoo will contact you with resources that are available for all your garden/growing projects. (scampbell@managedbyamr.com)

MSTA Mini-Grant Application

The Michigan Science Teachers Association announces a $1000.00 mini-grant for its current MSTA members.

- **Up to 2 awards of $1000.00 each will be given to current MSTA members.**
- **The grant deadline is June 28, 2013**
- **As part of the Grant process, award winners are required to write a narrative of their project to be published in the MSTA Newsletter or Journal.**
- **Award winners will be notified by September, 2013.**
- **Projects MUST be completed by June 13, 2014**
- **Grant money is released upon demonstration of expenses.**
- **A final report must be submitted that includes evaluation of outcomes.**

Grant Narrative:

- Begin with a summary of your project. (Maximum one page).
- Describe how this project relates to the MSTA mission statement, ("…to stimulate, support, and provide leadership for the improvement of science education throughout Michigan.") the Michigan Curriculum Framework and authentic assessment in Science. (Maximum one page).
- Purpose of Grant: Give your statement of needs or problem to be addressed. Describe the target audience and how they will benefit. (Maximum one page).
- Describe the Project: Include a description of project goals, expected outcomes and how they will be evaluated. Indicate timelines when appropriate. (Maximum one page).
- Budget Details: Describe costs involved with the project. Give complete item descriptions and costs of purchases to be made. Indicate in-kind support.
- Payment: Winners will receive $900 of the $1,000 grant up front. Winners MUST submit an article for publication in one of MSTA's 4 Newsletters or 2 Journals. The last publication is the May Newsletter and is the final publication with which an article must be submitted. Once the article and receipts of expenses has been received, the final $100 will be paid to winner(s). **Request for payment of the $100 must be received no later than June 13, 2014.**

Name: _____

Home Address: _____

City: _____ State: _____ Zip: _____

Phone Number: _____ Email Address: _____

School District: _____ School Name: _____

School Address: _____

City: _____ State: _____ Zip: _____

Position/Title: _____ Grade Level(s): _____

Completed application MUST be postmarked by June 28, 2013.

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Traverse City, MI 49684

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"What Happened at School Today?"

By Chris Modrack

Question: What's cheaper than a field trip, causes fewer sneezes than live animals in the classroom and provides longer lasting learning opps than an all---school science assembly in the cafeteria? **Answer:** A Raptor Resource Project live webcam feed set up in the lobby of your school.

Eagles in the Lobby: Winter 2012, Northville, Michigan. Excited Thornton Creek Elementary students welcome a nest with two adult American bald eagles into school life via Raptor Resource Project's 24/7 broadcast. As children enter at the first bell, walk the halls single file from class to class, line up for lunch, and finally head for the buses, they stop and check out the TV broadcast chronicling the comings and goings of the pair. These nesting raptors of Decorah, Iowa --- some 500 miles away as the eagle flies --- find a virtual home at Thornton Creek with several hundred cheerleaders willing them through severe weather, predator threats and birth day uncertainties. First pip to last fledge, wide---eyed students focus on the 1500---pound tree fort balanced 80 ft up in a cottonwood.

And what a feast for those eyes! One thrilled second grader claims it's like she climbed all the way up the tree to peak into the nest. Fascinating daily dramas of the natural world unfold in a surprising array of action. The male and female take shifts incubating the eggs, sometimes in harsh Iowa winter storms, calling to each other when ready for relief from egg duty. Both eagles fiercely ward off menacing predators, a raccoon, crow and owl intent on eggs for breakfast. After hatching, feeding is continuous. One parent lands in the nest with a 14---inch trout freshly caught from the stream below and parcels it out, torn bit by torn bit to the open beaks. And of course, the fledge. The young eagles hop and hover a foot above the nest, wildly flapping their wings to prep for that first dive off the nest edge into free flight.

Back in the classrooms, teachers tap into the eagle mania to inspire writing, drawing, reading and even math problems. Comparing and contrasting the bald eagle to species studied in life science at the individual grade levels, students meaningfully find likenesses and differences to their school mascot family. The interactive all---school study plays out through to the last week of school when, impervious to the best laid plans, pure good luck finds the eaglets fledging just days before the students burst out the double doors for summer break.

What is the Raptor Resource Project and who are the Decorah Eagles? In 2009, the Raptor Resource Project, a non---profit whose mission is the preservation of birds of prey, planted a webcam in an existing bald eagle nest in Decorah, Iowa. For the next two years, they video streamed the Decorah eagles' instinctive antics through a partnership with two utility companies and a local college. In 2011, RRP upgraded their broadcast switching to Ustream, a website platform for interactive video streaming of live events. From that time to now, over 250 million people worldwide have key stroked www.Ustream.tv/decorah eagles to watch nature's #1 reality show. Capturing the fascination of scientists, school children and just ordinary folk, RRP hopes to galvanize a protective instinct toward their raptor stars and engender a passionate stewardship of nature. They just may tip the balance toward preservation of their subjects as well as lay claim to creating the next generation of naturalists.

Eagles in the Lobby

"What Happened at School Today?" *continued*

2013 Update on the Decorah Eagles: Yes, the Decorah eagles built a second nest 350 feet away from the first during the 2013 season. And yes, eventually opted to occupy it rather than the nest that hosted their progeny and the RRP video cam for the former 3 nesting seasons. Getting up close and personal to the newer nest wasn't possible in 2013 but long shot stills and video footage are posted on the website. With RRP's plans to outfit Nest #2 for close---up live streaming in the fall, the chance is yours to plan for next winter. In the event the mating pair return to their original on---the---air aerie, both nests will be ready with infrared lights, action, camera ...and your class, or better yet, school.

Eagles in Your Lobby: Why not design an all---school interactive science lab using the Decorah Eagles to line up with the Next Generation Science Standards? These standards, based on The K---12 Science Framework devised by the National Research Council, emphasize 3 areas of expertise our students need to become scientifically literate members of society: Science Practices, Crosscutting Concepts and Core Ideas. Planning a live webcam lab using the 8 Practices – skills needed to DO science --- can serve as a model for use of The K---12 Science Framework and NGSS for future best science practice. Note: The Framework gives equal billing to engineering practices though this work---up is based solely on the science practices.

2nd grade teacher Jennifer Eagle reviews the data collection.

Materials and Set-up: Choose a central location where classroom groups of students can gather on the floor. Equip it with a computer with Internet access and large television monitor. A showcase, bulletin boards, moveable white boards and chart easels are effective for displaying related reading materials and instruments, hanging resource posters or anchor charts, collecting data, recording 'field' observations and displaying model drawings and diagrams. A feedback box keeps the loop open for active participation with the lab. Don't forget to acquaint yourself with The Raptor Resource Project website as well as Ustream.

Practice One - Asking Questions: Allow a few days for virtual exploration of the nest with a simple 'Decorah Eagles ' label on the monitor. Morning and afternoon viewing can be differentiated with live streaming coverage in the am and a daily featured montage of highlights available from the website queued up for classrooms that stop by in the afternoons. After this exploration period, ask classes to submit questions arising from their curiosity and initial observations. Post the questions, sorting them into those that lie outside science (involving opinions and beliefs), testable questions that simply cannot be answered through observation of this particular lab and those that plausibly can be answered using the lab. The testable or observation questions might center on incubation period, eating habits, development time to first flight or diurnal versus nocturnal classification. Assign questions requiring outside research rather than observation to students or classrooms to write up in a Daily Question format with answers announced and revealed the following day. Even after the initial questions are asked, sorted, posted and investigations planned, the feedback box can continue to be used for questions that develop anytime throughout the lab. Loosen up the lockstep Scientific Method of yore, as scientific inquiry is non---linear. New observations and evolving data lead to new questions, new data and interpretations, which make deeper understanding possible.

Practice 2- Developing and Using Models: In each practice, The K---12 Science Framework delineates a progression of grade level appropriate expectations moving students from simple concepts toward complexity; from teacher models to decreasing degrees of scaffolding to self direction. Practice 3 calls for students to begin using models. Elementary students start with pictorial representations and diagrams of the lab and the actual phenomena with all parts labeled. In the drawings include quantities and measurements; dates, times, weather statistics, perhaps the size and weight of the nest, distance from the ground, size and weight of adults or number of eggs and successful incubations. Some of this information will be available through observation, some through the RRRP website or other researched sources.

Practice 3 - Planning and Carrying Out Investigations: With the testable questions selected, students identify the data they hope to gather and then brainstorm ways to collect and record it. Simple chronologically written entries suffice until patterns develop. Individual science field journals can be used or group records kept on the white boards and chart tables. Predict how much data or how big a sample will be

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needed to make satisfactory interpretations. Always post the original question above the written, pictorial or graphic record to focus the collection.

Practice 4 - Analyzing and Interpreting Data: Referring to the key questions of your observational investigation, assess the data collected for each. Discuss some ways to organize the data; on a calendar, a table, a time---line or any number of graph forms. This all---important step makes the collected information accessible so it can be more easily analyzed and meaning derived. A bar graph could represent what the eagles were fed, tallies could mark each time they ate and colored X's on a calendar could denote the incubation periods and number of days of development before fledging the nest.

Practice 5 - Using Mathematics and Computational Thinking: Science investigations offer an important chance to show the relevance of math to real life. As noted earlier, models and diagrams can feature quantities and measurements; dates, times, current temperature and wind velocity. Display examples of actual tools used for measuring data relevant to the study; rulers, clocks, thermometers and calendars. Find ways to use math computation to work with the data while modeling the importance of computing precisely and accurately when answering the key questions.

Practice 6 - Constructing Explanations: Science experiences like these offer students early chances to construct explanations from their observations and critique the explanations of others. Observing the behavior of the eagles and collecting and analyzing data, students are able to construct answers; the number of days in the incubation period, feeding habits and diet, ages of first flights and rationale for assigning diurnal status. From this students can then theorize larger application of these ideas or developing theories i.e., all birds are carnivores like those in the study. Next, ideas can be offered up for collecting evidence to validate or invalidate the theory whether in a real or hypothetical lab.

Practice 7 - Engaging in Argument from Evidence: This practice establishes an active place in all scientific investigation for discussing the constructed explanations. During planned sessions, students share their explanations and support them with the chosen data or evidence. They learn to listen to other students share similar or differing explanations and through this come to experience the way forward in the development of scientific theory. This part of the process is the Show and Tell phase that develops important attributes in students allowing scientific theory to evolve. Scientific thinkers require a comfort with differing opinions, a focus on coming to truth over harboring a partiality to ones own ideas, an ability to sit with unsolved or failed plans and a familiarity with the process of arguing evidence, something that evolves later into formal peer review.

Practice 8 - Obtaining, Evaluating and Communicating Information: At all levels students need to read, speak and write using content specific and science process language

Collect non---fiction books about eagles for display, read---aloud at the lab or short duration classroom checkout. These texts model the conventions of science writing – graphs, tables, and diagrams as well as scientific vocabulary. The texts expose students to science jargon setting up a familiarity that facilitates comprehension and accurate retrieval of information. Use the texts along with computer searches to answer the questions deemed unsuitable due to the limits of the lab. The larger goal of Practice 8 is to develop both written and spoken fluency to promote fluent scientific thinkers. This practice coexists with all former practices as fluent communication in all forms enhances each former practice.

The Take Away: Don't be surprised when your all---school interactive science display draws in the custodian, parents trying to stay abreast of the new school fad, school board members and a photographer from the local paper. The Decorah Eagles project became a community study at Thornton Creek; the eagles nest a vehicle for shared learning and celebration of nature. Content aside, aligning your project with The K---12 Science Framework and the NGSS shows off both the depth of these high level standards and their practical use in planning meaningful investigations.

If the Decorah Eagles defy predictability and the Raptor Resource Project is unable to provide live webcam coverage next winter, the RRP has several other raptor nests with webcams available through their site.

Maybe you decide to go solo and make this a classroom experience rather than all school. Either way, zooming in on the compelling lives of one tree---bound family of one species creates a desire to study others, the fascination for one widening the learning lens to a broader and broader perspective. And… practicing the practices creates the skills necessary to DO it.

"What happened at school today?"
"You won't believe!"

***Chris Modrack**, MSTA Michigan Elementary Science Teacher of the Year 2010 Now retired, Chris devotes her time to science writing, curriculum development and tutoring.*

Resources and References

Decorah Eagles on Ustream: www.ustream.tv/decoraheagles

Next Generation Science Standards: www.nextgenscience.org/

Pratt, Harold, (2012). The NSTA Reader's Guide to a Framework for K 12 Science Education, Expanded Edition: Practices, Crosscutting Concepts and Core Ideas. NSTA Press.

Quinn, Helen, Schweingruber, Heidi, Keller, Thomas and The National Research Council (2012). A Framework for K---12 Science Education: Practices, Crosscutting Concepts and Core Ideas.

Raptor Resource Project: www.**raptorresource**.org/

Ustream: www.**ustream**.tv/

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Request for Proposed Presentations

St. Clair County Community College

STEM Education Conference

Science, Technology, Engineering, Math

Oct. 25 and 26, 2013

The conference will feature appearances by world-renowned paleontologist **Dr. Robert T. Bakker,** curator of paleontology at the Houston Museum of Natural Science, and an explanation and discussion of the **New Generation Science Standards.**

The format of the conference will be a Friday evening lecture on popular paleontology by Dr. Bakker and a day of workshops and learning experiences Saturday, including Dr. Bakker and the New Generation Science Standards.

St. Clair County Community College in Port Huron, Mich., is requesting proposed presentations by members of the local and state education community for the conference. The three areas of focus for the conference are:

- A series of sessions directed toward educators on topics of interest related to STEM subjects designed to improve the skills of the attendees and grant the awarding of Continuing Education Units.
- A series of sessions for families intended to introduce and promote the idea of children pursuing STEM-related careers.
- A series of sessions for K-12 students highlighting particular aspects of the content of the various STEM-related disciplines.

The overall purpose of the conference is to provide an atmosphere for improving STEM-related education and informing young people and their families of the potential for employment and accomplishment in STEM-related careers. Proposed presentations will be selected based on their relation to the three focus areas and their perceived potential to contribute to this overall purpose.

Each session will be limited to 45 minutes with the potential for consecutive sessions on a particular subject.

To submit a session proposal, download and complete the form provided on the St. Clair County College Community website at **www.sc4.edu/stemconf** and submit it by **May 15, 2013.** Those proposals accepted for inclusion in the program will be notified by mail by June 15, 2013.

St. Clair County Community College ● 323 Erie St. ● P.O. Box 5015 ● Port Huron, MI 48061-5015 ● (810) 989-5505