

Montana Science Teachers Association



NEWS JOURNAL

A publication of the Montana Science Teachers Association

September 2013



**President
Beth Thomas**

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From the President



Dear K-12 Science Educator,

My colleagues and students have often heard me say the following quotes/sayings and some have incorporated these statements in their daily lives.

“You don’t get if you don’t ask”, “No Excuses”, “Goldilocks – balance”, “Be a Problem Solver” and one of my favorites I have heard myself mutter to myself frequently lately is, *“Less is more.”*

Have you heard this quote? Ever wondered where it came from? The term was first used in 1855 by English poet Robert Brown. This quote can be applied to our roles as science educators. I have heard many colleagues say one of the following: they are somewhat overwhelmed, can’t keep up with all of the new technology, and are simply having difficulty finding balance. As educator’s, we tirelessly spend oodles of our time and money on planning and purchasing materials for our classroom and students. Where can one find the extra energy to keep up? How do you know you are providing the best opportunities and support for your students? How can you find the balance and hold it all together?

I have two thoughts for you for this new school year as you try to teeter on the totter balancing all of those things that are near and dear to your heart. These thoughts revolve around the **“Less is More”** quote:

1. COLLABORATE (“to work together jointly on an educational endeavor” Free-Merriam Webster Dictionary)

In the 21st century, it amazes me that we still have teachers planning and working in isolation. With all of the available technology, resources and people willing to help/collaborate, it is counter productive to try to do it by yourself. MSTA is one such avenue – a means to assist you and your students. It can help you learn more and teach

more meaningful lessons, by doing less. Please ask for help and support if you need or would like it – really, anyone on the board would be **MORE** than willing to offer support and help you find what you need. If there is someone in your building or district teaching the same thing try collaborating with them. The potential for added creativity, enthusiasm and depth to your instruction by collaborating with a team or colleague is powerful. Please consider opening your door, heart and mind to this idea! Learn more and teach more meaningful lessons, by doing less.

2. Pick a few things and be REALLY good at them!

We are inundated with information and opportunities for growth. Being an ambitious 21st century educator, you are eager to learn about and embrace as many new tools and strategies as you can. I would encourage you to not get caught up in the “WOW” of things and examine the tools and strategies carefully. The most important things to remember are to:

- ❖ keep the purpose and focus of the lesson in tact
- ❖ evaluate the power of what the tool or strategy can do for you so your students can learn more

I wish you the best this year and wanted to share these thoughts with you. I know how easy it is to get caught up in the work you are passionate about, but remember to take care of yourself as well as your personal and classroom relationships. Let your students and classroom be an inspiration - because you are choosing to **do more with less!**

Respectfully,

Beth Thomas

Remember...



Writing in Science

Mary Leonard, MSU-Bozeman

Teachers of science have always recognized that communicating is part of doing science. Now, too, Montana Common Core Standards for English Language Arts (ELA) recognize the need for developing reading and writing skills in science. Indeed, the complete name of the ELA standards includes the phrase: “literacy in history/social studies, **science** and technical subjects in grade-band K-12.” ELA thus officially integrated science communication. In turn, the Next Generation Science Standards (NGSS) have identified the ELA standards applicable to each new science standard. To support teachers of science in achieving this important aspect of science literacy, this article identifies some resources for developing students’ writing skills in science throughout grades K-12.

A theme in ELA writing standards is using valid reasoning and relevant and sufficient evidence. What better context in which to do this than science? The *Claim-Evidence-Reasoning* framework for writing science explanations (McNeill & Martin, NSTA’s *Science and Children*, April/May 2011; Novack, McNeill, & Krajik, NSTA’s *Science Scope*, Sept 2009) leads students through constructing scientific arguments from data. The claim is a statement that answers the question under investigation. Evidence is a summary of the data that supports the claim. Reasoning is an explanation of why and how the evidence supports the claim, including other ideas in science. The box below shows an example of the framework used in a 4th grade investigation to answer the question, What causes sound? The framework is equally useful in higher grades (see the Novack et al. article for middle-school examples).

4th Grade Investigation of Sound

Claim: I believe sound is caused by vibrations.

Evidence: When I plucked the guitar strings, they moved back and forth rapidly and I heard a sound. But when I pressed my fingers on the strings, the sound stopped. In another example, when I hit the tuning fork it looked shimmery from moving back and forth very quickly. When I placed the tip in the water, the water moved away from the tuning fork in ripples. When I tightened a rubber band and plucked it, I heard a noise and felt the rubber band moving against my finger.

Reasoning: In each of the examples, I saw an object moving rapidly at the same time I heard sound. When I stopped the movement, the sound also stopped. Thus, sound comes from vibrations.

A versatile writing technique for kindergarten through high school and even university students is *Talking Drawings* (McConnell, *Journal of Reading*, 1992; Paquette, Fello, & Jalongo, *Early Childhood Education Journal*, August 2007). Talking Drawings contribute in at least two ways to developing students’ science writing skills: they allow students to communicate understandings of concepts even if they don’t know scientific vocabulary, and they develop drawing skills important for communicating scientific observations and results. Besides, they’re fun! In this technique, students first represent

what they know about a concept or topic in a picture (a form of pre-assessment, too). Students then share and discuss their drawings with a partner. Instruction on the topic ensues, after which students create another drawing, this time with written labels or descriptions (useful for formative assessment). Discussion among students then allows them to compare and contrast their drawings, both pre- and post-instructional drawings of a single student, and the drawings of multiple students.

LEGO Directions (Peters, *Science Scope*, April/May 2006) require students to write detailed descriptions, a skill necessary for communicating scientific procedures and findings. In this technique, Investigator A builds a LEGO structure and writes directions for how to build it (diagrams may be included). Investigator A gives the instructions to Investigator B, who tries to build the same structure using the directions alone, without looking at the built structure. Investigators compare their completed structures, discuss what was clear and unclear about the directions, then swap roles and repeat. Be aware: this activity may provide “teachable moments” about respectful and productive disagreement!

A number of other techniques add variety and fun to writing in science. An article in the Dec 2006 issue of *Science Scope* (by Turner & Brommel) offers 14 strategies to use with students, including:

- Writing hypothetical letters between scientists
- After observing a demonstration, write steps to recreate it
- Identify and list the critical attributes of an object (what makes the object what it is)
- Collaboratively write science stories after learning a topic
- Write a detailed summary of the chain of evidence for a crime
- Write directions to a place using natural features for navigation (and try them out!)
- Analyze the label of a product and write a description of the product from that
- Write a proposal for a science project, paper, or research study

NSTA has many more resources to get your students writing in science – check them out! Now, what would Darwin have written to Mendel ...?

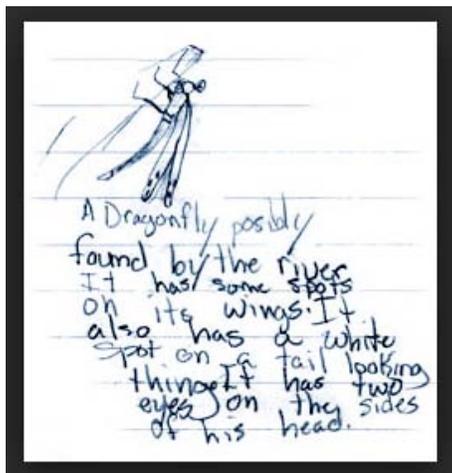


Image from seagrant.uaf.edu

The Elementary Science Conundrum

Tom Cabbage MRI/HHMI

With all the emphasis on STEM education and careers in the areas of engineering, technology, math, and science, it would seem impossible that science education at the early grades would be seeing a sharp drop in time and as a result opportunity. Several recent articles and studies indicate this is exactly what is happening even in Montana. Potential causes cover the range of historical primacy of reading and math instructions (it's conspicuously missing from the traditional three R's), the ever present funding issues, as well as the more recent enacting of the federal No Child Left Behind (NCLB) legislation that took effect in 2002. Anne O'Brien (Learning First Alliance) explains, "It may all come down to the fact that while political rhetoric supports science education, policy doesn't prioritize it. Current federal accountability policy has been widely criticized for years for its emphasis on reading and math to the exclusion of science, social studies and other subjects." The bottom line is that the message about the importance of STEM instruction is not having the intended consequence of boosting science instruction in the elementary grades.

Several recent studies are shedding light on the reduced teaching time and subsequent instructional de-emphasis on science instruction in the elementary grades around the United States. A publication by Rolf K. Blank PHD, for the Noyce Foundation in 2012 concludes that "Instructional time for science in the elementary grades has dropped to an average of 2.5 hours per week, the lowest since 1988." Another study by the Center on Educational Policy compared school districts nation wide in the 2001-2002 school year (one year prior to the implementation of NCLB), to 2006-2007 and found an increase in reading/language arts instructional time of 58%, which results in an average gain of 142 minutes per week. Also of note was an increase in Math instruction time of 42% or an average of 89 minutes of instruction per week. This resulted in a reduction of instruction time for other subjects that averaged 145 minutes per week, and even more to the topic at hand, more than half of the districts decreasing their science instruction by between 75 and 150 minutes per week or an average change of -45%. We in Montana might think that we are immune from the effects of the national mandate, but an informal poll of elementary educators indicates the same trend here at home with some smaller districts limiting science instruction to a single day experience and no individual teachers doing any explicit science instruction at all in grades K-5. A paper by

Elizabeth Swanson and Ron Jones of Montana State University in Bozeman in the 2009 Journal of Mathematics and Science indicates that teachers in Montana are indeed reducing their teaching of science in the elementary grades, even those enrolled in programs specifically designed to boost science instruction such as the Big Sky Science Partnership that serves grades K-8 in schools near three American Indian reservations in Montana. In that study another troubling finding is that the length of science lessons is reducing as well, with the Montana educators typical lesson lasting less than 30 minutes. “The brevity of the majority of science lessons taught, bring into question at what point lesson duration affects the coherence and quality of the curriculum.” The HHMI Teacher Cohort’s survey of Montana teachers indicates that state wide there is also a reduction in science teaching time. We found that teachers reported spending two or less hours per week in science instruction and the duration of those lessons was 40 minutes or less for 60% of respondents. This coupled with the fact that many commented that they were incorporating science into their reading and that they considered that science instruction is also telling. As many also commented that they were sneaking in science when ever they could, as they did not have enough time to teach it as a separate subject. This does have consequences however as “As illustrated with NAEP data...time on task in science has a demonstrable connection to student performance.” (Jones 2010) Montana like many other states has great and visionary K-12 science standards, but teachers are clearly not having the time or giving consistent learning opportunities to students in elementary classrooms.

So what is to be done? To answer that question and give teachers some ammunition to discuss the issue with their administrators, a review of recent studies on the effects of science instruction on the tests that have lead to the decline. One of the pieces of information that is helpful is the finding that “Aggregated state-level and national data indicate that less time for elementary science is correlated with lower NAEP science scores.” (Jones 2010) The results compare teacher reports of time spent teaching science in their classes, to the scores those students received on the standardized test. The type of instruction is also a factor in test scores and the same study concluded that “states with higher average classroom time spent on hands-on science activities have higher NAEP scores.” Because hands-on science activities in many cases take more class time, it is not surprising that this relationship was noted as well. Finally, the effects of time on science instruction affect students of poverty at a rate higher still than the general population. The study found that “A clear pattern emerges when the 2009 NAEP 4th grade data is analyzed as a nationally aggregated sample by time

and percentage of students from low-income families.” (Jones 2010) As the students receiving the least amount of time in science instruction are also those receiving the lowest scores on the test, and that the difference in the same school districts between the students who receive free and reduced lunches test scores are a surprising 12 points. Clearly there is a benefit to spending class time on science instruction, even if schools find themselves struggling to meet the goals mandated by the NCLB.

Blank, Rolf K. PHD “What is the Impact of Decline in Science Instructional Time in Elementary School?” Report prepared for the Noyce Foundation. 2012. Access online 7/10/13 www.csss-science.org/downloads/NAEPElemScienceData.pdf

Jones, R. M. and Swanson E. PHD, The Journal of Mathematics and Science: Collaborative Explorations Vol 11 (2009) pages 163-192 Science Math Resource Center, Montana State University, Bozeman Montana.

O’Brien, Anne Executive Director of The Learning First Alliance which is a partnership of 16 education associations with more than 10 million members dedicated to improving student learning in America's public schools. They share examples of success, encourage collaboration at every level, and works toward the continual and long-term improvement of public education based on solid research.

Time to do the research and writing provided by a grant from the Howard Hughes Medical Institute and The McLaughlin Research Institute.



MSTA on Twitter



Opportunities for Teachers

The Montana STEM Initiative will host an event called **STEM: Imagine the Future** at the Museum of the Rockies on Wednesday, October 16th, from 5 pm to 9 pm.

The event focuses on the future of STEM (Science, Technology, Engineering and Mathematics) education and how it enhances college and career readiness in Montana. Vendors, presenters and exhibitors will provide information to support educators in engaging students in STEM. Participants will have the opportunity to experience hands-on activities and learn about resources they can use in a wide range of classroom environments.

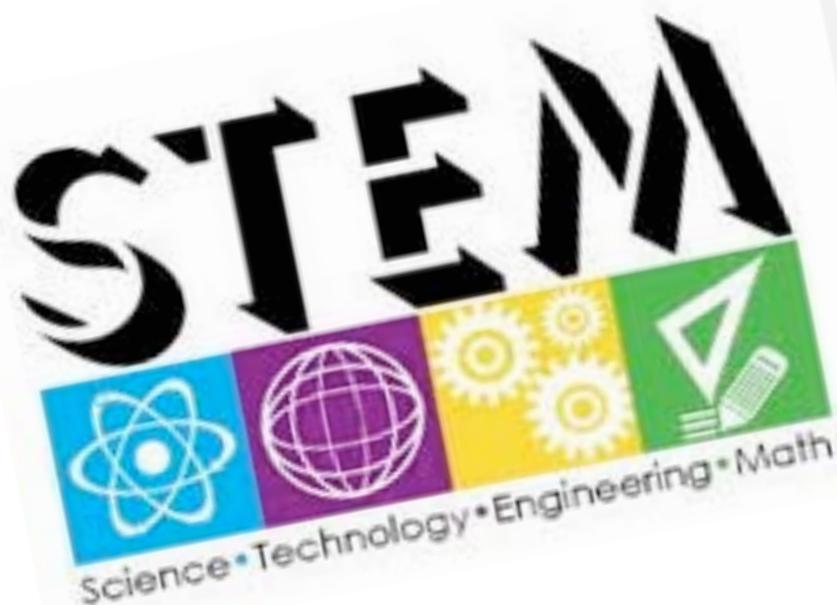
Educators and community members who are interested in learning more about providing or supporting STEM Education are welcome to attend. The event is structured to allow for a flexible schedule and participants can navigate the exhibits, presentations, and vendors at their leisure from 5 pm to 8 pm. Join us from 8 pm to 9 pm for *Montana STEM Ignite*, a collection of five minute live presentations designed to energize participants about STEM Education.

Register for STEM: Imagine the Future!

<https://sites.google.com/site/stemimaginethefuture/registration>

Apply to be a sponsor, vendor, exhibitor or presenter

<https://sites.google.com/site/stemimaginethefuture/applications>



Montana Educators...



MEA-MFT Educators' Conference
October 17-18, 2013
Belgrade, Montana

MSTA Conference held at the MEA-MFT
Conference, October 17-18.

The **ONLY** schedule you'll get is **ONLINE**, so get
it before the conference:

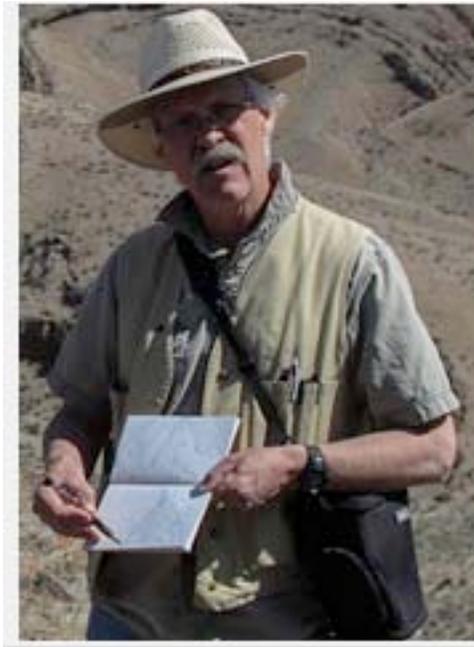
http://www.mea-mft.org/educators_conference.aspx

Highlights of the Conference include...

- New Teachers Breakfast both days
- MSTA Annual Meeting and Luncheon
- Keynote Speaker Dave Lageson: Geology of Everest
- Over 70 sessionals in ALL areas of science

1:00 PM

Thursday



Dr. Dave
Lageson

MSTA Keynote Address

Dave Lageson

[Geology of Everest: 2012 Everest Education Expedit](#)

Keynote will focus on the 2012 Everest Education Expedition and Dave's work on understanding the geology of the Everest region.

Thursday, 10/17/2013 1:00PM - 1:50PM

HS Auditorium

Dave is a field-based structural geologist with primary interests in brittle deformation of the upper crust and its sedimentary cover. His research program addresses various aspects of the structural geology and tectonic evolution of the Rocky Mountains. In spring 2012 he joined Conrad Anker, National Geographic and other mountaineers on the Everest Education Expedition. Dave's primary work was exploring and understanding the geology of the Mt. Everest region. His presentation will focus on his work and discoveries.

MSTA KEYNOTE ADDRESS

Dr. Dave Lageson, MSU-Bozeman
Geologist

Montana Science Educator,

In an effort to introduce myself, my name is Larry Giordano, from Samsung Electronics and I'd like to make you aware of a nationwide program that Samsung is sponsoring noted as Samsung Solve for Tomorrow.

>From now until October 31st, we are accepting applications from teachers in all disciplines representing grades 6-12, and there's no limit to the number of teachers that can enter from each school. Prizes will be awarded at each stage of the competition, from the 255 State Finalists to the final Five National Winners.

Entrants must answer a few, simple questions about their school and STEM education at www.samsung.com/solve. One school per state will win a technology kit to produce a video addressing the challenge, "Show how STEM can be applied to help improve your local community." National Winners will receive \$140,000 in technology and prizes, and a trip to Washington, D.C. for a celebratory event.

The full contest rules and additional information are posted at: www.samsung.com/solve. You'll also be able to see examples of videos from previous winning schools.

Larry Giordano
Employee Ambassador for Montana, Samsung Solve for Tomorrow
201.229.4160

See the poster on the next page

YOUR SCHOOL
CAN WIN A SHARE OF

\$2
million



Don't wait!
Application deadline is
10/31/13.

IN TECHNOLOGY.



West Salem High School,
2011 Samsung Solve
for Tomorrow Winners

Public school teachers nationwide can help their school to win a share of \$2 million* in Samsung technology by entering the Samsung Solve for Tomorrow Contest. Simply show how science, technology, engineering and math (STEM) education can be applied to help improve your local community.

The contest is open to all public schools, grades 6-12.

To enter or learn more, visit
samsung.com/solve

*Estimated retail value.



SAMSUNG
SOLVE
FOR TOMORROW



Opportunities for Students

Informed by Nature has just launched its completely free Online Science Fair (OSF) that offers much more than a simple competition. The OSF offers every student the ability to upload, share, and store his/her project for years to come. We are also working with educators to help them develop programs around the platform that encourages hands-on, self-guided learning among their students. The integrated social media functionality enables students to share their work with peers, family, and even future college admissions boards, highlighting their scientific prowess and building pride in their work.

Encourage your students to become involved or integrate it into the classroom! Visit the OSF at <http://informedbynature.org/science-fair-projects/index/>.



The Montana Science Olympiad will be held in Bozeman on Nov.26. The Olympiad is a statewide competition for students in grades 6th through 12th. While some schools have Science Olympiad clubs that meet throughout the week, other schools make this event more individual-base by having students work on their own. Check this out at at <http://www.montana.edu/wwwmtso/> or email Annie at: mtscioly@gmail.com.



2013 Youth Incentive Award Program

THE COLEOPTERISTS SOCIETY



An International Society Devoted to the Study of Beetles



The Coleopterists Society is sponsoring a grant project for students 7-12th grade. This program encourages youth to become involved with study of the most diverse organisms on earth – the beetles (one out of every four organisms is a beetle).

The deadline is Nov. 1 and more information and the application can be found at:

http://www.coleopsoc.org/default.asp?Action=Show_SocietyInfo&ID=Youth

Interested in YOUR students doing science research?
See what Jeff Wehr is doing with his school students...

Recent ASR news from the Washington State Academy of Sciences:

<http://www.odessarecord.com/story/2013/09/05/news/wehr-gets-washington-state-academy-of-science-award/1619.html>

For easier updates, you can follow us on Twitter: @WehrdScience or #ohsASR



- NASA's Climate Kids website just got a lot more teacher-friendly. The website now features a new helpful tool for educators—an easy to use page that identifies articles that align with the Next Generation Science Standards. Search for articles and activities that match the standards' disciplinary core ideas, science and engineering practices, or cross cutting concepts. Check it out at <http://climatekids.nasa.gov/science-standards>. Climate Kids is a NASA educational website about climate change and sustainability. It targets upper-elementary-age children.

- Bozeman high school Paul Anderson has done a series of short videos on NGSS. These are perfect to use as a school lesson study or just view them on your own. Check them out at:

<http://www.youtube.com/watch?v=o9SrSBGDnfU>

- National NGSS stie: <http://www.nextgenscience.org/next-generation-science-standards>

- NSTA's NGSS webpage: Follow the NGSS link off the homepage <http://www.nsta.org>

Bylaws Change

This serves as the 10 day prior notice to propose an amendment to the MSTA Bylaws as outlined in Article XII, Section 1. A 2/3 vote of the members at the annual meeting must be conducted in order to make this bylaw change. A copy of the MSTA Bylaws are available on the MSTA website: montanascience.org

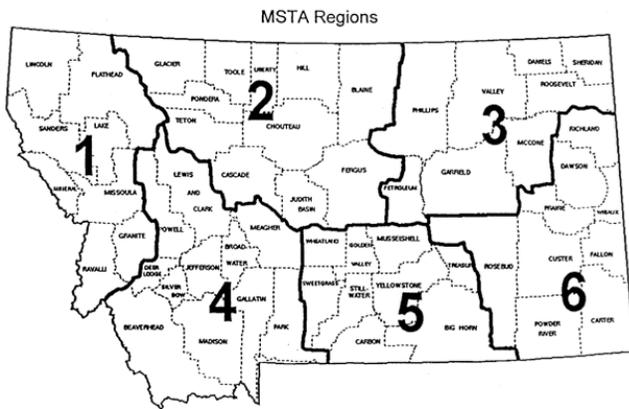
Old Wording:

Section 3: The Directors shall consist of six directors elected at large from the membership and one member, each from 6 geographical regions in Montana. An Executive Director, a Treasurer, and a Communications Director shall serve as staff to the Board of Directors.

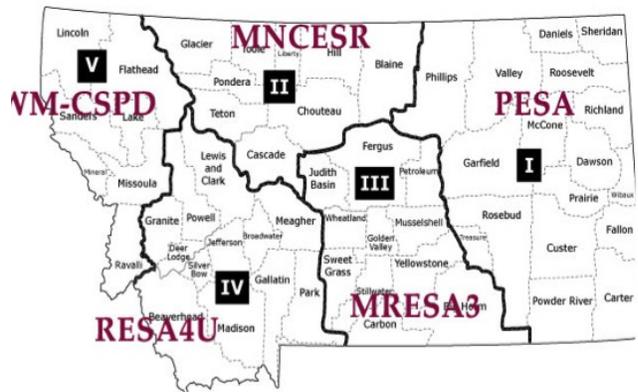
Proposed NEW Wording:

Section 3: The Directors shall consist of six directors elected at large from the membership and one member, each from 6 geographical regions in Montana. An Executive Director, a Treasurer, and a Communications Director shall serve as staff to the Board of Directors.

Rationale: We are currently operating under a 6 region system. OPI has created and is using a 5 region system designated by RESAs (Regional Educational Service Areas). It makes sense for MSTA to follow the RESA districts.



Existing MSTA Regions



Proposed MSTA Regions

MSTA E-blast Listserv

to sign up, visit the website and
follow the E-blast link

Be sure to sign up for the
MSTA E-blast



Montana Science Teachers' Association

Teacher Award Opportunities

For information on awards, visit nsta.org

NSTA Awards

AWARD	WHO CAN APPLY	BRIEF DESCRIPTION
Robert H. Carleton Award–Dow	NSTA member	\$5000/citation/all expense paid trip
Ciba Middle/HS Teaching Awards	middle/high school science teachers	\$2000 prize/\$500 expenses
Ciba Middle/HS Principal Awards	middle/high school principals	\$2000 prize/\$500 expenses
DCAT Making a Difference Award	grades 6-12 science teachers	\$2500 prize to school/flight & 2 nights-principal and teacher
Delta Ed/Frey-Neo/CPO Science Award	preK-12 science teachers	\$1500 prize/\$500 expenses
Distinguished Informal Science Award	NSTA member	citation/3 nights hotel/\$500
Distinguished Service to Science Education Award	NSTA member	citation/3 nights hotel/\$500
Distinguished Teaching Award	NSTA member	citation/3 nights hotel/\$500
Faraday Science Communicator Award	not a science teacher/ but an individual or organization which promotes science	\$2500 expenses
Fellow Award	NSTA member	citation & pin
Legacy Award	NSTA member	\$500 expenses-family member/ 2 nights lodging
Maitland P. Simmons-Memorial Award for New Teachers	NSTA member	\$1000 expenses/certificate
Wendell G. Mohling Outstanding Aerospace Educator Award	K-12 science teachers	\$3000 prize/\$2000 expenses
SeaWorld/Busch Gardens Environmental Educator of the Year	K-12 science teachers	\$5000/all expense paid trip Deadline: November 28
Shell Oil Company	K-12 science teachers	\$10,000 prize/all expense paid trip/ finalists all expense paid trip
Sylvia Shugrue Award	elementary science teachers	\$1000 prize/\$500 expenses/citation
Vernier Technology Awards	K-12 science teachers	\$1000 prize/\$1000 products/\$1000 expenses
Zula International Awards	preK-2 science teachers with memberships in either NSTA, CESI, NAEYP, or NHSA	\$400 prize/\$1000 expenses

All award deadlines are November 30, except for Shell Oil Company which is October 15 and SeaWorld/Busch Gardens which is November 28.

RODNEY'S HOMEPAGE for Earth Science Teachers

Have you seen Rod Benson's Earth Science website?
Check it out: formontana.net/home.html



Meet Tim Maze, NSTA's District 15 Director

Tim teaches in Tongue River, Wyoming. He was the president of the Wyoming Science Teachers Association and was the Tongue River Teacher of the Year.



Here's a video on his teacher of the year award:

<http://edu.wyoming.gov/video/2013/01/02/tongue-river-teacher-of-the-year-tim-maze>

You can contact Tim at trmstnm@sheridan.k12.wy.us



Nomination for MSTA Recognition Awards

If you know of a science teacher, university person, administrator or organization in Montana who deserves recognition for contributing to science education in Montana and beyond, please consider nominating them for an MSTA Award in one of the following areas:

Elementary	Earth Science	Chemistry
University member	Middle School Science	Biology
Distinguished Service	Physics	Administrator
Organization or Group		

Criteria for selection is based in part, but not limited to, the following: longevity or service, contribution to topic area, participation in MSTA and/or NSTA, presentation of workshops, improvement of fellow teachers and community service.

Nomination Form

Name _____ Award Area _____

Address _____

Current Position _____

Name and address of the person making the nomination:

Email address: _____

Attach a 500 word or less statement of why you are making the nomination. This statement may include the nominee's resume, educational background, teaching positions, awards and honors, leadership positions and professional activities.

Nominations may be emailed.

Send to

**Beth Thomas
601 Carol Dr.
Great Falls, MT 59405**

Mark Your Calendars

Oct. 16 – STEM: Imagine the Future – MOR, Bozeman

Oct. 17-18 – MEA – Belgrade, MT

Oct. 24-26 – NSTA Regional Conference – Portland, OR

Oct 23 - Great Rocky Mountain ShakeOut – OPI, Helena, MT.

Oct. 23-25 – NCTM Regional Conference – Las Vegas, NV.

Nov. 26 – Science Olympiad – MSU, Bozeman

Dec. 12-14 – NSTA Regional Conference – Denver, CO

April 3-6 - NSTA National Conference – Boston. M

April 9- 12 – NCTM National Conference – New Orleans, LA



MSTA Officers

Board of Directors

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MSTA Regions

