

Montana Science Teachers Association



**News Journal**  
**A publication of the Montana Science**  
**Teachers Association**

**From the President**



Dear Fellow Montana Science Teachers,

*“The times they are a-changing.”* ~ Bob Dylan

Rapid changes in the world—including technological advancement, scientific innovation, increased globalization, shifting workforce demands, and pressures of economic competitiveness—are redefining the broad skill sets that students need to be adequately prepared to participate in and contribute to today's society (Levy and Murnane 2005; Stewart 2010; Wilmarth 2010). We are so fortunate to be living in this time where the number of tools available to us to involve our students in meaningful and engaging activities is growing by the minute. It is overwhelming and quite frightening at times to think about what our educational system might be just five or ten years from now. Are we adequately preparing our students for their futures? Please read and view the following two points.

1. Click on the link and watch this four-minute video about a vision for our students in today's world. [A Vision of K-12 Students](#)

**In this issue....**

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2. Recently, Montana's Office of Public Instruction came up with a definition of STEM. It is as follows:

**STEM Education...**

*\*Is a habit of mind that encourages the integration of strategies and core content from all four disciplines while valuing the particular perspectives of thinking and learning embedded in each discipline.*

*\*Includes early and continual development of problem solving, persistence, critical thinking, creativity, innovation, collaboration, communication, and reasoning.*

*\*Helps Montanans to be informed citizens and stewards of the state's natural resources, to improve our social and economic conditions, and to compete in the local and global economy.*

Montana has been a lead state in the review process of the Next Generation Science Standards (NGSS). The last public review was held during January of 2013. **THANKS** go out to our new Science Instructional Coordinator, Chris DeWald. Between January 8<sup>th</sup> and January 29<sup>th</sup>, she was able to hold 8 ½ meetings with over 100 attendees. Discussions have occurred and public comments have been submitted. The information about the standards development and progress was spread digitally and through conference presentations, such as the Montana Leadership Conference in Bozeman. The NGSS are scheduled to be released in May. Key features of the standards are:

K-12 science education should reflect the interconnected nature of science as it is practiced and experienced in the real world

The NGSS are student performance expectations - not the curriculum and how to teach it

They focus on deeper understanding of content as well as application of content

Science and engineering are integrated in grades K-12

Common Core State Standards (math and language arts) are aligned with NGSS

Regardless of how Montana addresses NGSS in the coming years, I would encourage you to think about the implication of our changing world and how you as an educator are cultivating these skills in your students. Think about your vision for K-12 students and OPI's definition of STEM. Does your instruction include a variety of opportunities for students to investigate and build scientific explanations? Are you seeking out a wide range of technology tools to engage students in real-world problem solving, critical thinking and conceptual development? I encourage you to embrace these changes and one step at a time, try something new in your classroom - whether it be one of MSTA's awesome lessons from our journals or web pages, something from an NSTA journal, sign up for a professional development workshop, a new technology tool or an idea shared from a colleague. MSTA has a wealth of resources to help you begin to build and rethink your lessons and pedagogical approach.

Be the force that changes . . .

Beth

## **MSTA Information**



The URL for the MSTA webpage is

<http://montanascience.org>

**If you have trouble with that address, try**

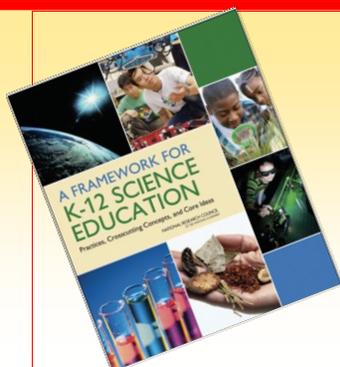
<http://www.ivymerriot.com/montanascience/index.html>

The page has many new listings and links, be sure to visit it often.

Update your membership information on the MSTA web page

MSTA E-blast Listserv

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



Do you have a copy of the K-12 Science Framework?

You can download a copy by entering the following URL into your browser:

[http://www.nap.edu/catalog.php?record\\_id=13165](http://www.nap.edu/catalog.php?record_id=13165)

Stay informed. Get educated. The Next Generation Science Standards (NGSS) are coming. Check out the NSTA webpage for the latest information regarding the NGSS at [nsta.org](http://nsta.org).

## Next Generation Science Standards



### Next Generation Science Standards Now in Development

In a process managed by Achieve, 26 states are leading the development of the Next Generation Science Standards (NGSS). The science education community got a first glimpse of the NGSS draft when it was released during the first public comment period from May 11 through June 1. According to Achieve, the writers are now working to review all of the comments and develop a second draft to be released for public comment in the fall 2012. Achieve has removed the first draft from the web while it undergoes revision.

Science educators are encouraged to continue to become familiar with the **NRC Framework**—the foundation for the **NGSS**—to prepare for implementation of the standards when a final version is completed in 2013.

QUESTIONS? E-mail your questions or concerns about the NGSS to [ngss@nsta.org](mailto:ngss@nsta.org).

## Professional Development Opportunities for Teachers

Summer Institute in Physics and Physical Science for Inservice Teachers  
June 24-July 26, 2013 (tentative)  
Department of Physics, University of Washington, Seattle

The Center for Physics Education in the University of Washington Physics Department offers a five-week, 10-credit summer institute in physics and physical science for full-time inservice teachers. The 2013 institute is tentatively scheduled for June 24-July 26 at the UW in Seattle. Classes meet from 9 a.m. to 3:45 p.m. Monday-Thursday, except for occasional Fridays. Directed by Professor Lillian C. McDermott and supported by the National Science Foundation, the institute is tuition-free and a \$1500 stipend is offered upon successful completion of the course work. Additional money may be available if needed to help defray the cost of lodging for persons from outside the Seattle area.

The Physics by Inquiry curriculum used in the course has been especially designed to strengthen the subject matter background of teachers in topics typically covered in precollege physics and physical science using a hands-on, inquiry-oriented method of instruction. The materials emphasize the development of fundamental concepts and reasoning skills through laboratory experience. The class is divided into two sections: one for elementary-middle school teachers who may have little or no background in physics; the other for high school teachers of physics, physical science, and mathematics.

The application deadline is March 1, 2013. Additional information is available on our website <<https://courses.washington.edu/uwpeg/2013-summer>>.

For further information contact:

Nina Tosti  
University of Washington  
Department of Physics, Box 351560  
Seattle, WA 98195-1560  
Telephone: 206-685-2046  
[pegsi@phys.washington.edu](mailto:pegsi@phys.washington.edu)

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## Opportunities for Teachers and Students

Montana has many regional and one state science fair. The state competition is held in Missoula on March 18-19. Students and teachers can find all necessary paperwork, deadlines, restrictions, ISEF guidelines, and a schedule of events for the state competition at their website: <http://www.mtsciencefair.org/>. Any questions can be directed to Desirae Ware at (406) 243-4074 or [mssf@mso.umt.edu](mailto:mssf@mso.umt.edu).



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**Science Expo**, March 22 – 23. Guest scientist Hunter Lloyd will delight your students with his robot. Check all this out at <http://www.billingsclinic.com/scienceexpo>.

### 2013 Guest Presenter



#### **"How to Train Your Robot"**

Hunter Lloyd and Looney  
Adjunct Professor, Department of  
Computer Science  
Montana State University - Bozeman



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May 8- 10, **Water Summit**. Essex, MT  
March 25, Application deadline.

Come participate in a natural resources learning experience for middle and high school students that addresses current water issues in Montana. The theme of this year's Summit is hydraulic fracturing and will be held in Essex, MT near Glacier National Park. Teachers and students will learn about the ecologic, economic, and cultural issues surrounding the topic of hydraulic fracturing in Montana through lectures, discussions, field trips, and hands-on group activities. Come ready to work and play hard! Registration packets can be found at: <http://mtwatercourse.org/educators/page.php?pageID=45> or contact Stephanie McGinnis [mcginnis@montana.edu](mailto:mcginnis@montana.edu) with questions.



**Inviting all Montana High School Chemistry Teachers to participate in the 2013 National Chemistry Olympiad.**

**Each spring the U.S. National Chemistry Olympiad (USNCO) seeks to support achievement in high school chemistry and to identify and recognize our nation's most outstanding high school chemistry students. The Montana local section is allowed ten students to participate in this national program. In order to qualify, teachers will need to administer the preliminary qualifying exam to their students by the end of March. Each school's top two students may be eligible to take the national exam. The Montana Section of ACS offers scholarship money to the ten students that represent the state of Montana in this program.**

**For more information contact the Montana USNCO State Coordinator:  
Carol Pleninger, Havre High School  
[pleningerc@havre.k12.mt.us](mailto:pleningerc@havre.k12.mt.us)  
406-265-6732**

## **Lesson Ideas**

### Pendulum Lab

Question: What variables affect the period of a pendulum?

Hypothesis: \_\_

Materials:

Cordage  
Different masses  
Ring stand  
Meter stick  
Protractor  
Stop watch

Procedure

1. Tie one end of the cordage to the ring stand so that it does not slip.
2. Tie a loop in the other end of the cordage. You will be attaching various masses to this end of the cordage to test the effect of these masses.
3. Attach a mass to the loose end of the cordage. Measure the length of the pendulum from the ring stand to the bottom of the mass.
4. Displace the pendulum from equilibrium and measure the angle of displacement.

5. Release the pendulum and start the stop watch at the same time. Time 10 complete oscillations of the pendulum. Record this time in a data table. Repeat steps 4 and 5 two more times.
6. Calculate the average period of your pendulum for this length and mass. Record your results in your data table.
7. Repeat steps 4 – 6 displacing the pendulum a different amount.
8. Repeat steps 4 – 6 displacing the pendulum a different amount again.
9. Attach a different mass to your pendulum and repeat steps 4 – 8.
10. Attach another different mass to your pendulum and repeat steps 4 – 8.
11. Change the length of the cordage and repeat steps 2 – 8 using the same mass you used in step 9.
12. Change the length one more time and repeat steps 2 – 8 using the same mass you used in step 10.

Encourage students to create their own data tables and graphs based on the data.

### Analysis and conclusion

1. How did the different masses affect the period of the pendulum?
2. How did the different displacements from equilibrium affect the period of the pendulum?
3. How did the different lengths of the pendulum affect the period of the pendulum?
4. If you had a pendulum driven clock that was running slow, how could you adjust it?
5. If you had a pendulum driven clock that was running fast, how could you adjust it?

## More

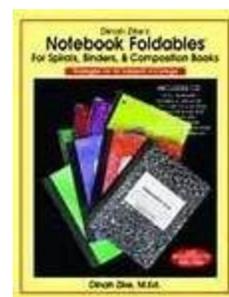
### Books, Books, Books

Have you heard of Dinah Zike, M.Ed? She's the author of many books, mostly on Foldables, Notebooks, and Organization. I've picked up several over the years, but recently she published a series called Notebook

Foldables. Notebook Foldables are ways to use paper to glue into science notebooks to organize their notes, questions, maps, diagrams, and other types of responses. Students have found them very helpful in my class

"Life Science: Cells, Interdependence, Flow of Matter and Energy, Biodiversity" was incredibly useful this year. There are pages and pages of ideas to visually help students organize their notes and thoughts. Most include pictures on the outside so students can write notes underneath the fold. Papers can be glued on the top, side, or bottom, depending on how it makes most sense for that particular foldable.

I've used other books in the series, and get great comments from the students on how fun (!) they are to use. There are even some foldables that create 3-D notes! Dinah Zike has these books for Life, Earth, and Physical Science. I use them in 7<sup>th</sup> grade, but they are easily made appropriate for grades 4 – 12. You can find more information at [www.dinah.com](http://www.dinah.com). The books in this series are worth every penny, so I'd rate them a five out of five.



Shirley Greene

# Teacher Award Opportunities



For information on awards, visit [nsta.org](http://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.



## 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  
University member  
Distinguished Service  
Organization or Group

Earth Science  
Middle School Science  
Physics

Chemistry  
Biology  
Administrator

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:

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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 Drive**  
**Great Falls, MT 59405**  
[beth\\_thomas@gfps.k12.mt.us](mailto:beth_thomas@gfps.k12.mt.us)

# MSTA Officers

## MSTA Board of Directors

President	Beth Thomas	Great Falls	beth_thomas@gfps.k12.mt.us
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Region 6	David MacDonald	Sidney	jswords@hotmail.com

## MSTA Advisory Board

CheMST	Nathan Talafuse	Billings	talafusen@billingschools.org
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BaP	Walt Woolbaugh	Manhattan	walter@montana.com

## MSTA Regions



## Submitting Articles to the MSTA News Journal

When submitting articles, please adhere to the following criteria:

- Electronic submissions are preferred in Microsoft Word format. These can be attached to your email message
- If in doubt about format, submit your work in .rtf format.
- If truly in doubt, paste your submission in the body of the email message.
- Lab activities may be mailed. Please cite any references and also state which National Science Standards your activity meets.

John Graves, Editor  
 1112 Hunters Way  
 Bozeman, Montana 59718  
 graves@montana.edu

Tentative Submission/Publication Dates:  
 August 15/September  
 November 15/December  
 February 15/March  
 April 15/May

<div style="border: 1px solid black; padding: 5px; margin: 0 auto; width: 80%;"> <b>Montana Science Teachers Association                      Membership Application</b> </div>																			
Name _____		Date _____																	
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City _____	County _____	State _____	Zip _____																
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Grade Level		Subject																	
___ K-6	___ All sciences	___ Physics																	
___ 6-9 MS or JH	___ Life Science	___ Chem																	
___ 9-12	___ Phys Science	___ Other																	
___ College/Univ.	___ Earth Science																		
___ Sup/Admin.	___ Biology																		
Make checks payable to MSTA  Return to LeAnne Yenny 3880 Equestrian Lane Bozeman, MT 59718																			



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

The MEA-MFT Educators' Conference is dedicated to bringing top-quality professional development to Montana teachers. Each year, teachers from all over Montana come to our conference for inspiration, information, and renewal units.

Submit an application to present at this year's conference and inspire your science colleagues! Enter this URL in your browser and you will be directed to the application link:  
<https://www.mea-mft.net/ecLogAddUser.aspx?ReturnUrl=%2fecMenu.aspx>

### MARK YOUR CALENDAR!



February 20: Mount Everest and Montana, Museum of the Rockies, Bozeman

March 18-19: State Science Fair, UM, Missoula

March 22-23: Science Expo, MSU-Billings

April 11-14: NSTA National Conference, San Antonio, TX

April 17-20: NCTM National Conference, Denver, CO

April 20: Astronomy Day, Museum of the Rockies, Bozeman

April 26-28: Springtime in the Rockies STEM Conference, Montana Learning Center, Canyon Ferry

May 8-10: 15<sup>th</sup> Annual Water Summit, Glacier National Park



Search for Montana Science Teachers Association and click "Like!"