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
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 8th and January 29th, 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
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
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.

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
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.

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

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 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
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 7th grade, but they are easily made appropriate for grades 4 – 12. You can find more information at 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

## Awards

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

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  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 Drive
Great Falls, MT 59405
beth_thomas@gfps.k12.mt.us
## MSTA Officers

### MSTA Board of Directors

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Location</th>
<th>Email</th>
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<tbody>
<tr>
<td>President</td>
<td>Beth Thomas</td>
<td>Great Falls</td>
<td><a href="mailto:beth_thomas@gfps.k12.mt.us">beth_thomas@gfps.k12.mt.us</a></td>
</tr>
<tr>
<td>President Elect</td>
<td>Tom Cubbage</td>
<td>Great Falls</td>
<td></td>
</tr>
<tr>
<td>Executive Director</td>
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<td>Bozeman</td>
<td><a href="mailto:graves@montana.edu">graves@montana.edu</a></td>
</tr>
<tr>
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<td>Carol Pleninger</td>
<td>Havre</td>
<td><a href="mailto:pleningerc@havre.k12.mt.us">pleningerc@havre.k12.mt.us</a></td>
</tr>
<tr>
<td>Region 1</td>
<td>Karen Hutchison</td>
<td>Kalispell</td>
<td><a href="mailto:hutchison@sd5.k12.mt.us">hutchison@sd5.k12.mt.us</a></td>
</tr>
<tr>
<td>Region 2</td>
<td>Cynde Jacobsen</td>
<td>Great Falls</td>
<td><a href="mailto:cynde_jacobsen@gfps.k12.mt.us">cynde_jacobsen@gfps.k12.mt.us</a></td>
</tr>
<tr>
<td>Region 3</td>
<td>Mariann Prewett</td>
<td>Roundup</td>
<td><a href="mailto:shylo.science@gmail.com">shylo.science@gmail.com</a></td>
</tr>
<tr>
<td>Region 4</td>
<td>Rick Hannula</td>
<td>Bozeman</td>
<td><a href="mailto:rick.hannula@bsd7.org">rick.hannula@bsd7.org</a></td>
</tr>
<tr>
<td>Region 5</td>
<td>Sarah Lord</td>
<td>Billings</td>
<td><a href="mailto:lords@billingsschools.org">lords@billingsschools.org</a></td>
</tr>
<tr>
<td>Region 6</td>
<td>David MacDonald</td>
<td>Sidney</td>
<td><a href="mailto:jswords@hotmail.com">jswords@hotmail.com</a></td>
</tr>
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</table>

### MSTA Advisory Board

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<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Location</th>
<th>Email</th>
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</thead>
<tbody>
<tr>
<td>CheMST</td>
<td>Nathan Talafuse</td>
<td>Billings</td>
<td><a href="mailto:talafusen@billingschools.org">talafusen@billingschools.org</a></td>
</tr>
<tr>
<td>Biology Rep</td>
<td>Kim Popham</td>
<td>Belgrade</td>
<td><a href="mailto:pophamk@hotmail.com">pophamk@hotmail.com</a></td>
</tr>
<tr>
<td>Earth Sci Rep</td>
<td>Patrick McNelly</td>
<td>Billings</td>
<td><a href="mailto:mcnellyp@billingsschools.org">mcnellyp@billingsschools.org</a></td>
</tr>
<tr>
<td>Physics</td>
<td>Daniel Baker</td>
<td>Rosebud</td>
<td><a href="mailto:dbak4420@yahoo.com">dbak4420@yahoo.com</a></td>
</tr>
<tr>
<td>Elementary</td>
<td>Kristen Crawford</td>
<td>Helena</td>
<td><a href="mailto:crimsonkristen@gmail.com">crimsonkristen@gmail.com</a></td>
</tr>
<tr>
<td>Middle School</td>
<td>Jean Jones</td>
<td>Great Falls</td>
<td><a href="mailto:jean_jones@gfps.k12.mt.su">jean_jones@gfps.k12.mt.su</a></td>
</tr>
<tr>
<td>Post Secondary</td>
<td>Mary Leonard</td>
<td>Bozeman</td>
<td><a href="mailto:mleonard@montana.edu">mleonard@montana.edu</a></td>
</tr>
<tr>
<td>Past President</td>
<td>Shirley Greene</td>
<td>Billings</td>
<td><a href="mailto:greenes@billingsschools.org">greenes@billingsschools.org</a></td>
</tr>
<tr>
<td>BaP</td>
<td>Walt Woolbaugh</td>
<td>Manhattan</td>
<td><a href="mailto:walter@montana.com">walter@montana.com</a></td>
</tr>
</tbody>
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## MSTA Regions

![MSTA Regions Map]

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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

Montana Science Teachers Association
Membership Application

Name ___________________________ Date ____________
Last First

Address ___________________________ Phone (___) ________

City ___________________________ County ___________________________ State ____________ Zip ____________

School/Affiliation ___________________________

School Phone (___) ___________________________

Email ___________________________

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

Dues Category
1 year $20.00
MSTA/MCTM $30.00
MSTA/MEEA $30.00
3 years $50.00
Life $150.00
Student $5.00
Retired $5.00

Make checks payable to MSTA

Return to LeAnne Yenney
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: 15th Annual Water Summit, Glacier National Park

Search for Montana Science Teachers Association and click “Like!”