Montana Science Teachers Association

MSTA

Dedicated to Quality Education

NEWS JOURNAL

A publication of the Montana Science Teachers Association

March 2009

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 Yenny
3880 Equestrian Lane
Bozeman, MT 59718

From the President

Spring is fast approaching. Instead of looking forward to tulips beginning to burst through the frozen ground, warmer days, and of course the annual blizzard in March, it has become a time of high stress due to the "testing window". Spring brings the Montana Comprehensive Assessment System – MontCAS testing. Required as part of the No Child Left Behind Act, all students in grades 3-10 are subjected to a week of testing. Montana's Criterion Referenced Tests are administered in grades 3-8, and 10 in Reading and Mathematics. And starting in the spring of 2008, science tests are now administered in grades 4, 8, and 10. A criterion-referenced test (CRT) compares student achievement to content standards. Montana's criterion-referenced test compares student achievement to Montana content standards.

The 2008 science CRT results present a discouraging picture. The complete results can be viewed on the OPI website. In grade 4, 62% of students met the benchmark. In grade 8, 59% of students are proficient and advanced. But by grade 10 – it drops to 42% of students are rated proficient and advanced. A third of our K-8 students are not where they need to be in science. And nearly two-thirds of our students, by grade 10, are below proficient. Katie Burke, the Science Specialist at OPI, is digging deep into the scores through an item analysis. Hopefully her analysis will begin to shed more light on the situation. But the time is now to begin to focus on the standards and inquiry based teaching to insure that a larger number of our students reach the benchmark of proficient!

Rather than look at the onset on spring as a time of testing induced stress, we must begin to use the data as one measure of our work as teachers. Researchers Black and William (1998) emphasize that teachers who regularly use assessments to inform teaching *in real time,* can raise the achievement for all students. The critical element is that we don't look at one single test as a measure of achievement – but as a part of the whole picture of student achievement. The CRT is part of the assessment picture, and we can learn from it, but we also need to value the assessments we do in our classrooms daily to present the complete picture as a measure of student progress.

We will look to the universities and OPI to offer more professional development in science and inquiry teaching. As a science community, we need to engage in discussions with our colleagues about how students learn. We need to look at schools that are doing an exceptional job in teaching science to their students and learn from their best practices. The science community in Montana is strong and committed to their students. By continually raising the bar for us professionally, our students' achievement will rise as well.

All the best!

Alyson Mike
MSTA President
alyson.mike@gmail.com

MSTA Webpage Information

The URL for the MSTA webpage is

http://montanascience.org

If you have trouble with that address, try
http://www.abaetern.com/montanascience/

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

Register NOW to present an MSTA sectional for the fall MEA/MFT conference.

Complete a sectional proposal at
http://www.mea-mft.net/
Submission Deadline is May 8, 2009

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.

Not getting NSTA information? Contact our District Representative

Sharla Dowding

418 Salt Creek Road, Newcastle, WY 82701
sharla@tribcsp.com

Register NOW to present an MSTA sectional for the fall MEA/MFT conference.

Complete a sectional proposal at
http://www.mea-mft.net/
Submission Deadline is May 8, 2009

For each session that is accepted for the MEA-MFT conference, your name will be entered into a drawing for 1 of 3 - $25 gift cards.

The IPSE Department at Montana State University offers an online ***Master of Science in Science Education*** (MSSE) degree program for practicing science educators. Highlights of the MSSE program include: emphasis on National Science Education Standards, wide choice of distance and campus courses, and degree completion in two to three years. In addition to the NTEN courses found in this newsletter, most of which will count toward the MSSE program of study, the MSSE summer 2009 online science courses include:

* PHYS 401 Physics by Inquiry I (3 cr)
* PHYS 402 Physics by Inquiry II (3 cr) (may be taken concurrently with Physics by Inquiry I)
* EDCI 580 Technology in the Science Classroom (2 cr) Evening and Saturday course
* BIOL 520 Understanding and Managing Animal Biodiversity in the Greater Yellowstone Ecosystem (2 cr)
* BIOL 523 Wildlife Ecology of the Northern Rocky Mountains (2 cr)
* BIOL 522 Birds of Prey of the Greater Yellowstone Ecosystem (2 cr)
* LRES 557 Thermal Biology in Yellowstone National Park (2 cr)
* PS 548 Flowering Plants of the Northern Rocky Mountains (2 cr)
* ESCI 500 Field Geology - Bahama Montana (1 cr)

* BIOL 580 Land Use Issues in the Greater Yellowstone Ecosystem (2 cr)
* CHEM 500 Science Lab Safety (1 cr)
* EDCI 580 Teaching Inquiry in the Science Classroom (2 cr) Dual campus (evening) and on-line component
* LRES 569 Ecology of Invasive Plants (2 cr)
* PS 580 Biomimicry (2 cr)
* GEOL 521 Dinosaur Paleontology of Hell Creek Formation (2 cr)
* CHEM/BIOL 580 Examining Life in Extreme Environments (2 cr)
* ESCI 516 Northern Rocky Mountain Geology (2 cr)
* GEOL 560 Geology of the Yellowstone Volcanic Center (2 cr)
* CHEM 506 Integrating Computers in the Chemistry Laboratory (2 cr)
* EE 580 Solar Cell Basics for Teachers (2 cr)
* MB 538 Cell & Molecular Biology Laboratory (2 cr)
* PHYS 580 Electricity & Magnetism Using Research-Based Curriculum (2 cr)

For more information about the MSSE program or to register for classes, go to http://www.montana.edu/msse

email mail questions to: dianap@montana.edu
Online registration opens March 30, 2009.

Montana Learning Center at Canyon Ferry Lake - Student and Professional Development Programs

Student Programs
There are many exciting youth camps available this summer including a NEW Outdoor Adventures experience for students entering grades 9 - 11. See the descriptions below, then move to the MLC website for more details, registration and teacher recommendation forms: www.montanalearning.org. From a **teacher nomination of one or more student**s, MLC will send a letter to the home indicating that you have nominated the student for a MLC camp. This **recognition is an honor** in itself. There will be no arm-twisting, just information shared from which parents and student may make an informed decision. E-mail nominations to Carol Brock: cbock@MontanaLearning.org

Outdoor Adventures in Math and Science
Students entering grades 9-11
Campers will explore, discuss and seek answers to water and wildlife management problems in Montana. Other hands-on learning includes investigations in earth science. One overnight hike, water sports, problem solving and mental games.
Dates: Session 1: July 5th – 11th 2009
Session 2: July 26th – Aug 1st 2009

Innovations in Math & Science
Students entering grades 8-10
Campers will explore and discuss concepts from the world of physical sciences, life sciences, and mathematics as well as hike, swim and canoe.
Date: July 19th-25th, 2009

Young Naturalist Adventures
Students entering grades 4-7
Campers investigate water habitats, animals, and subjects in earth science including astronomy; participate in a float trip and other recreation.
Dates: July 20th-23rd -Students entering 4th & 5th
July 27th-30th -Students entering 6th & 7th

Camp Discovery
Students Entering Grades 1-3
Campers are picked up and delivered back to Helena each day for this 3-day camp where they participate in science experiments, create crafts, and listen to fun stories.
Date: July 20th-23rd, 20090

Teacher Professional Development Opportunities

A number of mathematics and science teacher professional development programs are sponsored or hosted by MLC. Selected examples are:

MCTM Professional Development Academy

What: Implementing the Algebra Standard
Who: K-6 classroom teachers, curriculum directors and instructional coaches
When: July 13 - 16, 2009
Information: For more details and registration form, go to: www.montanalearning.org. Click on the link for Montana Council of Teachers of Mathematics or go directly to: www.montanamath.org

A Forrest for Every Classroom (FFEC)
What: A professional development program which is focused on place-based education. Teachers develop curricula that fosters student understanding of and appreciation for the public lands in their communities. [Note: A year-around program with June workshop at MLC]
Who: K - 12 educators in all disciplines
When: June18th - 19th; 22nd - 24th
Information: Go to www.fs.fed.us/r1/helena/ffec/index.shtml and/or contact Liz Burke at lizburke@fs.fed.us; 406-495-3713

Science and Inquiry Learning in Classrooms (SILC)
What: Full year professional development activities in life sciences, inquiry learning and Native American culture. ESEA Title II Part B Mathematics and Science Partnership (MSP) Grant awarded by OPIto MLC with Bozeman and Helena School Districts, and MSU as partners.
Who: Cohort of 30 Gr. 3 - 6 teachers from Helena and Bozeman areas.
When: Applications due April 30 [Initial Orientation: August 10 - 12 in Bozeman; August 12 - 14 in Helena PLUS Academic year program of workshops and online learning]
Information: Go to www.montanalearning.org, click on Programs, then SILC and/or contact Bozeman Area [Adrian Advincula 406-522-6019]; Helena Area [Mary Larsen 406-324-1022]

Qwest Ambassador's Program
What: Hone leadership skills enabling to become ambassadors and recognized experts for advancing the improvement of mathematics and science education by working with students, teachers and community groups.
Who: Ten Montana grade 7 - 12 science and mathematics teachers
When: One week at MLC Summer 2009 and 2009-10 academic year
Information: Go to www.montanalearning.org or contact e-mail Carol Brock at cbock@MontanaLearning.org

Broadwater to Bozeman Professional Development
What: On-going year around in-service program in mathematics; summer workshop at MLC
Who: Middle school mathematics teachers from Broadwater to Gallatin Counties
Information: Contact Jennie Luebeck (PI) at luebeck@math.montana.edu

Flinn Scientific Announces

Available Now from Flinn Scientific

Flinn eLearning Video Series Covering Oxidation and Reduction

Three unique video packages offering training for chemistry teachers regarding imaginative ways to teach oxidation and reduction are now available through the Flinn eLearning Web site. These videos help teachers explain that while oxidation states may be "imaginary charges" for electron bookkeeping, they help provide a "real" way to identify the changes taking place in redox reactions. One video package, *Oxidation States*, discusses oxidation states and includes four colorful demonstrations. A second, *Activity Series of Metals*, addresses the activity of metals and compares the ease of oxidation and relative reactivity of different metals. The third, *Copper, Silver and Gold Redox Reactions*, produces some elegant reactions with beautiful results.

All are part of the new low-cost, online Flinn Teaching Chemistry™ eLearning Video Series developed to help chemistry teachers build their content knowledge and teaching strategies— making it easier for their students to learn and understand chemistry. Each video package is only $9.95 and can be viewed for 14 days anywhere you have a computer with a high speed Internet connection. The Flinn eLearning Video Series features 20 award-winning high school chemistry teachers demonstrating their best demos, experiments and activities and sharing enormous amounts of content knowledge, teaching tips and instructional techniques. Each video is approximately 40 minutes in length—containing multiple episodes and support materials printable as PDFs.

Flinn eLearning Video Series for Chemistry Teachers

To view free samples go to:

www.flinnsci.com

Discovering Montana's Ecosystems

Montana teachers seeking new tools to connect students to Montana's natural world can now turn to a new interactive website created by Montana Fish, Wildlife & Parks.

"FWP's website is designed to provide educators with new, interactive, and entertaining learning opportunities aimed at increasing their students' awareness and understanding of the flora, fauna, and natural processes that are a part of life in Montana.

The website was created with the help of Bill Hug, former Montana State University education professor, to meet specific science curriculum standards and is designed to provide upper elementary and middle school teachers with in-the-classroom projects specifically geared to Montana communities.

Much of the fish and wildlife information contained within the website is associated with FWP's recently completed Comprehensive Fish and Wildlife Management Strategy, which lists and assesses the condition of 170 fish and wildlife habitats—from the mountains to the prairies—and the animals that live there.

Students, teachers, and others who visit the website can learn about Montana's fish and wildlife species, and the places where they live, from videos, interactive lessons, images and more.

The web site was designed with Montana youth in mind and Montana's Life Sciences Standard.

To access the web site click on Go Explore! (www.mt.gov)

A fun and exciting way for learners of all ages to Discover, Explore, Conserve and Learn about our natural landscapes!

2009 Science and Mathematics Conference - Grades 7-10

Spring Time in the Rockies – Math, Science, Technology

Join us at the Montana Learning Center at Canyon Ferry Lake from March 27th to 29th 2009. Update your Mathematics and Science Curriculums to include effective use of technology.

Research Topics for the Conference:

- What are the MT standards related to science, mathematics, & technology?
- What math & science technology skills do our students need for the 21st Century?
- What is technology (hardware and software) are needed for grades 7-10?
- What does a model technology curriculum look like for science and mathematics?
- How does this fit my district math, science and technology objectives?
- How can technology improve student performance?
- How do we assess our students' ability to use technology?

This year's *Spring Time in the Rockies"* conference will work with teachers and districts to engineer a powerful technology component for mathematic and science education.

What: A working conference, participants will develop a model curriculum for using technology with science and mathematics.
Who: District and school lead teachers in science and mathematics grades 7 to 10.
Where: The Montana Learning Center at Canyon Ferry Lake
When: March 27th to March 29th 2009

Registration Form:

Name: _____ Email _____

Registration Fees:			Indicate Number
Conference (Includes Meals, and Housing)	$200.00	($350 for teams of 2)	_____
Conference (Conference Meals – no Housing)	$125.00	($200 for teams of 2)	_____

Note: Onsite conference housing for Friday and Saturday is limited and on a first come basis. Teachers may stay Thursday night if needed.

Mail Registrations to: Carol Bock, Montana Learning Center, 7653 Canyon Ferry Road, Helena, MT 59601 or Email Registration to CBock@MontanaLearning.org

www.MontanaLearning.org **Registration may be emailed to CBock@MontanaLearning.org**

2009 Science and Mathematics Conference - Grades 7-10

Conference Agenda

Friday

10:30 am – 3:30 pm Montana Mathematics and Science Standards
Jean Howard (OPI Mathematics Curriculum Specialist) and Katherine Burke (OPI Science Curriculum Specialist), and Colet Bartow (Library Media Curriculum Specialist) will update participants on the newest revisions of the state standards. Light lunch provided.

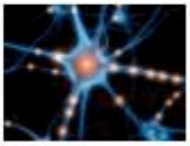
4:00 pm – 5:00 pm Initial Brainstorming

- What technology is essential to middle school and high school mathematic?
- When should technology be introduced?
- How do you ensure students are competent with and without technology?

5:00 pm – 7:00 pm Reception and Barbecue (Salmon & Spuds)

7:00 pm – 8:00 pm The Future of Technology – Where are we going?
A panel group will talk about where technology is taking society and schools.

Saturday



8:00 am – 8:45 am Continental Breakfast

9:00 am – 11:00 pm Discussion Draft of Technology in Mathematics and Science
Participants will review a proposed model curriculum for Science and one for Mathematics. The remainder of the day will consist of groups working to revise that curriculum

11:00 am – 3:00 pm Working Groups & Working Lunch & Progress Checks
Participants will work in groups revising the model curriculum so that it fits the needs of their districts. Teams will be asked to make suggestions to the Montana Curriculum Guide to Technology in Science and Mathematics.

3:00 pm – 5:00 pm Working Groups & Progress Checks

- What revisions is your group suggesting?
- What steps for district implementation are you working on?
- What questions do you need answered?
- How do you ensure students are competent with and without technology?

5:00 pm – 7:00 pm Reception and Barbecue (Burgers and Beans)

7:00 pm – 8:00 pm Evening Activities Magic Show for Math and Science!

Sunday

8:00 am – 8:45 am Continental Breakfast

9:00 am – 11:00 pm Action Plans and Implementation Guide
Participants will develop timelines and action plans designed to prepare their district to implement a more powerful technology component in mathematics and science teaching.

SUMMER MODELING WORKSHOPS FOR HIGH SCHOOL AND MIDDLE SCHOOL SCIENCE TEACHERS:

Modeling Workshops in high school physics, chemistry, and/or physical science will be held in summer 2009 in Arizona, California, Miami FL, Chicago IL, Kansas, Maine, New Jersey, New York, North Carolina, Ohio, Philadelphia PA, Pittsburgh PA, Tennessee, Dallas TX, and Wisconsin. Pending funding, also in Georgia, New Orleans, and Missouri.

For details, visit http://modeling.asu.edu .
Click on "Modeling Instruction Workshops Nationwide in Summer 2009".

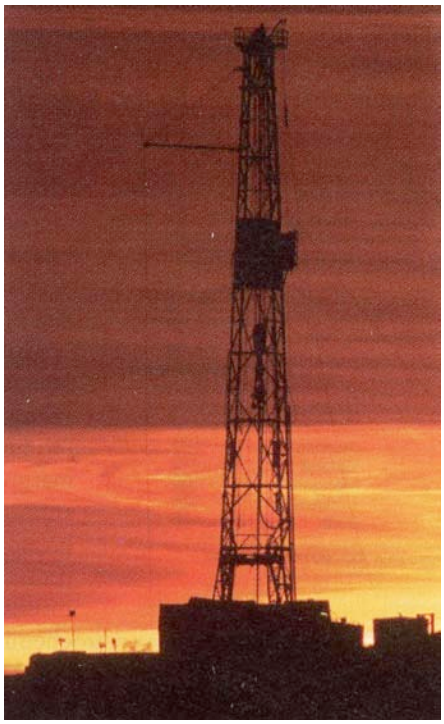
At some sites, stipends and/or free tuition are available for in-state teachers. Teachers nationwide can apply for a stipend at Miami FL.

Modeling Workshops are peer-led. Content is re-organized around basic models to increase its structural coherence. Participants are supplied with a complete set of course materials and work through activities alternately in the roles of student or teacher, as they practice techniques of guided inquiry and cooperative learning.

Modeling Instruction is recognized by the U.S. Department of Education as an EXEMPLARY K-12 science program.

Jane Jackson, Co-Director, Modeling Instruction Program
Box 871504, Dept. of Physics, ASU, Tempe, AZ 85287
480-965-8438/fax:965-7565 <http://modeling.asu.edu>

For 17 years, the Modeling Instruction Program has been helping teachers attain knowledge and skills needed to benefit their students. Modeling Instruction is recognized as an Exemplary K-12 science program by the U.S. Department of Education



Summer 2009

Petroleum Resources Workshop

Sponsored by:
Montana Board of Oil & Gas

Monday – June 22nd
through
Friday – June 26th

MSU-Billings
Campus

Summer 2009 Petroleum Resources Workshop

The Workshop is being offered as an opportunity for Montana teachers to learn more about the Petroleum industry and its impact on the people and economy of Montana and the nation.
The Montana Board of Oil and Gas Conservation is sponsoring the expenses of the Workshop. All lodging, meals, and course materials will be provided for the participants at no charge. Attendance at the Workshop will earn 29 Renewal Units for Montana Educator license requirements.
Lodging, meals, and classroom facilities for the 5-day Workshop will be on the campus of Montana State University-Billings.
Registration will be limited to 40 participants, and prompt registration is encouraged.

Registration Information:

Name

Address

Phone

E-mail

School

Grade/Subject Taught

Registrations will be accepted until June 1, 2009 as space is available. A $100 registration deposit by check or money order must be submitted to hold the Registration.

MAKE CHECKS PAYABLE TO:
"2009 Petroleum Workshop"

Send completed Registration Info and check for Registration Deposit by postal mail to the address shown to the right.

All registrations will receive a return Confirmation Receipt.

Dates – Times - Location

When
Monday, June 22nd through Friday, June 26th 2009

Times
8:00 am to 11:30 am and 1:00 pm to 4:30 pm,

Except for two all-day bus field trips on Tuesday and Thursday, and a half-day field trip on Friday.

Location
Campus of Montana State University-Billings, Billings, MT

Instructors
Workshop is coordinated and instructed by professional Petroleum Engineers and assisted by other petroleum industry professionals from the Montana area.

What You Will Learn
- How oil and gas are discovered and produced
- How crude oil is processed and delivered to consumers
- How the petroleum industry positively impacts our lives
- How you can present this information to students

What You Will Take Away
- A more complete knowledge of the petroleum industry
- A set of notes and teaching aids for classroom use
- An opportunity to earn 29 License Renewal Units

Who Should Attend
- Montana secondary and elementary school teachers, especially those teaching science and math based classes
- Montana secondary and elementary school counselors

Questions
- For questions about the Workshop or registration, contact Sylvan Petroleum in Butte:

Phone: 406-782-2342

e-mail: ljpet@hotmail.com

Sylvan Petroleum
c/o Lana Petersen
2406 Locust
Butte, MT 59701

E-mail: ljpet@hotmail.com

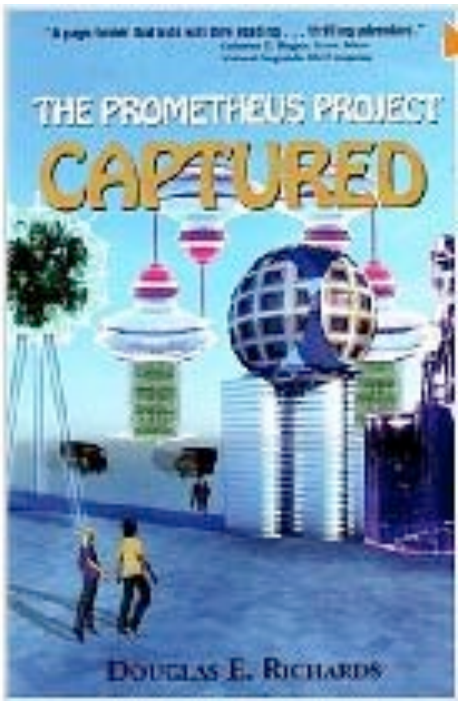
The Prometheus Project:

Captured

A BOOK REVIEW

This second installment in the *Prometheus Project* series stars our two heroes Ryan and Regan, who are back in Prometheus (an uninhabited alien city) again to save not only their co-scientists and their parents, but also America this time, and quite possibly, the world. In *Captured*, Ryan and Regan put their heads together to outsmart a group of brainwashed mercenaries under the control of an alien from the planet Morca by the name of Tezoc Zoron. He, like the children, has telepathic powers that allow him to communicate telepathically and take control of other people's minds. With the whole team of scientists captured (except for Ryan and Regan, of course) he supposedly plans to destroy the force-field protecting Prometheus and claim the city as his base of operations. Tezoc forces the children's father to build a force-field nullifier (basically a key), telling him that his wife's life is on the line. He has six hours to construct it. Ryan and Regan then rush to save the scientists and their parents, find a force-field nullifier, outsmart a genius of an alien, and solve the intricate puzzle that they have been confronted with in only six hours.

The Prometheus Project: Captured is action packed and perfect for middle-schoolers and beyond who like science fiction, thrillers, and mysteries. Around every corner, there are more perils to face and more threats to overcome. This book will keep you turning the pages until you've finally reached the end. No matter how carefully you read this book, you will still be surprised and thrilled at the outcome of the story. As the children face impossible odds, you will find yourself cheering them on. I would give this book three-thumbs-up, but I only have two thumbs. This book has a fantastic storyline, and it is definitely worth the read.



~Nicholas

7th grade

Joliet Middle School

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Complete a sectional proposal at
http://www.mea-mft.net/
Submission Deadline is May 8, 2009

For each session that is accepted for the MEA-MFT conference, your name will be entered into a drawing for 1 of 3 - $25 gift cards.

From Popular Science Magazine

The NATIONAL SCHOOL INVENTORS CHALLENGE calls upon the youth of America to "Improve Our World." It's free to enter and can only encourage students to learn more about science and technology. All winners will be featured in our September issue and on our website at <http://www.popsci.com/> .

FROM KATIE BURKE, MONTANA SCIENCE SPECIALIST, OPI

Dear Montana Science Educator:

The Office of Public Instruction (OPI) is assembling a group of K-12 science educators to write performance rubrics that will serve as an assessment tool for the Science Essential Learning Expectations (ELE). The rubrics will describe students' knowledge and skills at the levels of novice, nearing proficiency, proficient and advanced. Educators can utilize these rubrics to assess student success in meeting the ELE, benchmarks and content standards.

The writing of the performance rubrics requires grade-band teams of three to five teachers with strong content knowledge in science. The criteria for selection of team members include:

- content knowledge expertise at the specific grade level;
- experience in writing rubrics;
- representation from small/medium/large districts;
- geographic distribution;
- representation from teachers special populations (gifted and talented, limited English proficient, special education); and,
- Montana's diverse cultures.

The work session will be held June 22-26, 2009, in Helena, Montana. Travel, lodging, and per diem expenses at state rates are offered to those educators working to develop the performance rubrics for K-12 Science. OPI renewal units will be offered to participants.

If you are interested in participating please submit the Science Performance Rubrics Participant Information Form by April 3, 2009. If you have questions, please contact Katie Burke, Science Curriculum Specialist, by telephone, (406) 444-3557, or by e-mail, kburke@mt.gov .

Sincerely,

Katie Burke
OPI Science Curriculum Specialist

Elementary, Middle and High School Science Activities

Interested in a Powerpoint Jeopardy Review Game for Bacteria & Viruses or Macro Invertebtrates?

Check here:
http://www.abaetern.com/montanascience/lessonplans.htm

Review Jeopardy

Bacteria	Virus	Immunity	Disease Today	Mish-Mash
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Aquatic Organisms

by LeAnne Yenny

Check here:
http://www.abaetern.com/montanascience/lessonplans.htm

Cylinders of Color

Materials:

Ammonia
Phenolphthalein Solution
2 Tall jars or graduated cylinders
2 Alka Seltzer Tablets

Procedure:

1. *Fill the two tall jars with water. Leave about 5 cm. empty at the top.*
2. *Put 10 ml. of ammonia in each jar. a dilute sodium hydroxide solution works better. It is not as safe, but it will not make suds.*
3. *Add 5 ml. of phenolphthalein solution and stir. The liquid should turn hot pink.*
4. *Drop one Alka Seltzer tablet in one of the jars and observe. Use the other jar as a control.*

Explanation:

In this demonstration, each of the solutions is initially made basic by adding ammonia or sodium hydroxide to an indicator. Therefore, the initial color is the color of the indicator in basic solution. When CO2
dissolves in water, it gives an acidic solution:
CO2 + H2O ----> H2CO3(aq) ---> H+(aq) + HCO3-(aq)
The acidity of the carbon dioxide first neutralizes the basic solutions then causes the solutions to turn acidic; as this occurs, the indicators change from their characteristic color in basic solution to the color characteristic in an acidic solution.

How the Ice Age Helped Shape Montana

A Virtual Field Trip Name: _____

Period: _____

Go to the following web site: http://formontana.net/base.html

A. Click on the link titled MISSOURI RIVER.

1. On the map shown on the web site, what does the **solid** (not dashed) red line mark the location of?
2. What is unusual about the Milk River Valley from Havre to Nashua? (This suggests that the valley was not formed by the Milk River.)
3. The Missouri used to flow northeast toward Canada's Hudson Bay. Now if it flows through the Dakotas, emptying into the Mississippi River near St. Louis. What caused the change?
4. Click on the Hot Link titled "*Compare the Map to an image that shows topography". Which valley is wider? Circle one.

a. The pre-ice age Missouri Valley from Big Sandy to Havre

b. The present valley of the Missouri southeast of Big Sandy

B. Click on RETURN TO BASE CAMP. Then click on the link titled HI-LINE.

5. How do geologists know that the rock in the photo was not formed in north-central Montana?
6. Rocks like this one from Canada can be seen scattered throughout north-central Montana. Why aren't rocks from Canada found south of the Missouri River?
7. What river's valley is marked #4 on the photo?

C. RETURN TO BASE CAMP. Then click on the link titled STRIATIONS.

8. Explain how a glacier caused the striations shown in this photo.
9. What do the scratches help geologists figure out?
10. Besides striations, what two other types of evidence help geologists figure out how far south the ice advanced during the last ice age?

D. Click on the link titled ICE AGE AMERICA.

11. In which part of the United States did the ice sheet extend the farthest south?
12. This map depicts the continent as it appeared _____ years ago.
13. Was Alaska covered with ice during the ice age depicted on the map?

E. Go back to the base camp: http://formontana.net/base.html. Click on LAKE GREAT FALLS.

14. What two conditions combined to cause the formation of Glacial Lake Great Falls?

15. The cut bank in the photo shows silt and clay deposited on the bottom of prehistoric Lake Great Falls. Why would the smallest particles (silts, clay) only settle to the bottom of the lake as it froze over during the winter?
16. How do geologists know how deep the lake was where the city of Great Falls sits today?
17. Scroll down to the map at the bottom of the screen. List three other glacial lakes that existed in Montana at times during the last ice age.

F. RETURN TO BASE CAMP. Then click on LAKE MISSOULA.

18. What caused the unusual parallel lines highlighted by snow on this Missoula mountainside?
19. Explain how a glacier caused prehistoric Glacial Lake Missoula to form.
20. What caused the waters of the lake to rush across Eastern Washington in a cataclysmic flood?
21. It is believed that the waters of Lake Missoula flooded eastern Washington many times. How long ago did these floods happen?
22. Scroll down to the map at the bottom of the screen. Describe the location of the ice dam that blocked the Clark Fork River.

G. RETURN TO BASE CAMP, and then click on FLATHEAD LAKE.

23. When the glacier reached the Mission Range it split, with one lobe flowing into the Swan Valley and the other moving toward present-day Polson. Why did the lobe that extended into the Swan Valley reach farther south?
24. What is the Polson Moraine, and how did it form?
25. Why didn't the area where Flathead Lake sits today fill with sediments as the ice age came to a close?
26. Why are moraine-dammed lakes usually short-lived?
27. Why didn't the lake drain itself as it overflowed the Polson Moraine?

H. RETURN TO BASE CAMP. Then click on the link titled MORAINE.

28. This photo, taken 30 miles north of Missoula, shows a "lateral moraine". Where did the rock material that makes up the moraine originate?
29. Why did the glacier deposit this rock material (till) here?
30. One aspect of "till" that helps geologists identify it is that it is unsorted. What does "unsorted" sediment consists of?
31. Was this moraine formed by a continental glacier (a.k.a. icecap), or by a valley glacier?

I. RETURN TO BASE CAMP. Then click on TROUGH.

32. How can geologists tell that a glacier once flowed through this valley?
33. Why do alpine glaciers eventually stop advancing?
34. What must be true of the climate in order to an especially large "end moraine" to form?

J. RETURN TO BASE CAMP. Then click on TRIPLE DIVIDE PEAK.

35. Triple Divide Peak, shown near the center of the photo, is a horn. Explain how a horn is formed.
36. Why is it called "Triple Divide Peak"?
37. Scroll down and click on "*A more detailed look at Triple Divide Peak". What three bodies of water does runoff from Triple Divide Peak drain into?

38. Which part of the ocean would the melted snows of Mt. Stimson flow into?

K. RETURN TO BASE CAMP. Then click on WARMING.

39. When were the two photos taken, and what's the point of showing the photos side by side?

40. According to some experts, how long will it be until all of the glaciers in Glacier National Park have melted away?

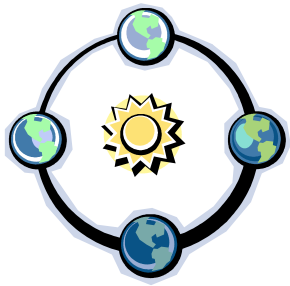
41. List 3 things you have done in past few days that caused fossil fuels to be burned, putting more carbon dioxide into our atmosphere. List one for each fossil fuel.

Petroleum (oil):

Natural Gas:

Coal:

Modeling the Sun and its interaction with the Earth and Moon



Beth Thomas, Environmental Education
Great Falls Public Schools

Objectives:

1. Students will examine size relationships between the Earth, moon and the sun.
2. Students will demonstrate the rotation of the Earth, Moon and Sun as well as the revolution of the Earth and Moon around the Sun.

Grades 4-8

Montana Science Content Standards

Grades K through 4

Content Standard 1:

1.4 Use models that illustrate simple concepts and compare those models to the actual phenomenon

1.6 Identify how observations of nature form an essential base of knowledge among the Montana American Indians

Content Standard 4:

1.4 Identify objects in the sky and their patterns of movement and explain that light and heat comes from a star called the sun

Grades 5 through 8

Content Standard 1:

1.4 Create models to illustrate scientific concepts and use the model to predict change

1.6 Compare how observations of nature form an essential base of knowledge among the Montana American Indians

Content Standard 4:

4.5 Describe and model the motion and tilt of Earth in relation to the sun and explain the concepts of day, night and year

4.6 Describe the Earth and Moon in terms of force of gravity, structure and movement in relation to the Sun

Materials

- Chart or board for writing K-W-L
- Candle
- Matches
- Pea and a beach ball
- Cards with Sun, Earth and Moon written on them
- Orbital paths outlined (tape if inside, chalk if outside)

Engage

1. Display and light a candle. Ask students to think of ways the candle is like the Sun.
2. Using a K-W-L as a whole group activity, fill in the K-W portion.
3. Some facts about the Sun include (Teacher Background):
    - Is the closest star
    - Is at the center of the solar system and most massive object in the solar system
    - Because of its large mass, it has a tremendous amount of gravity
    - Spins slowly compared to Earth (27 day rotation for Sun , 24 hours for Earth)
    - Is very hot (The middle of the Sun is at least **10 million** degrees. The "surface" of the Sun (what we see) is only 5800 degrees.)
    - The sun is 93 million miles away. If the Sun were the size of a basketball, and Earth the size of the head of a pin, the basket (150 million kilometers)all and the pin would be separated by about 100 feet -- a third of a football field (30.5 meters). If you were standing at the basketball (and didn't have a telescope to help you), you wouldn't even be able to see the pinhead Earth.
    - The Sun is about 4.5 billion years old.
    - We study the sun using computers to predict what it may do in the future. The SOHO satellite has provided new images and information about the sun.

4. Native American language piece. Using the terms for Sun, Moon and Earth, students will practice saying the phrases from the Blackfeet, Michif/Objibway, and Sioux.

Native Language	Star	Moon	Sun	Planet
Blackfeet	Kah Kah Too Sii	Nah Too Sii	Ksi Tsi Koo Mah Too Sii (day moon)	No Word
Michif/Ojibway	Anang	Gis Iss Ish Kwaia Ssigi	Gisiss	Akki - Earth
Sioux	Wicahpi	Hanhepiwin	Anpawi	Uncimaka- Grandmother Earth Maka- Earth

Explore

Part 1 – Relative Sizes - The diameter of the Sun is 109 times the diameter of the Earth and the distance is 93 million miles (150 million kilometers) between the Earth and the Sun. The 93 million miles is called an ASTRONOMICAL UNIT and is abbreviated as an AU. Ask students to estimate the size of the sun relative to the size of the Earth and the distance between the two. Models are tools to explain relationships and phenomena too large or abstract to be seen.

1. Show students the round objects ranging in size from a beach ball to a pea
2. Have students make predictions (share with a neighbor) about which objects would best represent the size comparison of the Sun and Earth. (beach ball and the pea represent the Sun and Earth's size comparisons)

Part 2 – Motion of the Sun and Earth (rotation and revolution) The Earth's diameter is about 7,926 miles and the Sun's diameter is about 865,400 miles. The scale of the Earth to the Sun (diameter) is approximately 109 to 1.

1. Select one student to act as the Earth and one student to act as the Sun. Have students hold the cards with "Earth" and "Sun" on them.
2. Explain that the Sun is the center of the solar system and that it rotates approximately once every 27 days. Explain that it is a cycle. Ask the "Sun" how he or she should move. Ask, "Is this fast or slow?"
3. Using the model on the floor, slowly turn the "Sun" to demonstrate rotation (turning on an axis). The Sun should spin slowly in counterclockwise direction while standing in one spot.
4. Add the earth to the sun model and explain that the Earth also rotates in a cycle, too. The rotation is completed once every 24 hours. Ask students if the Earth is faster or slower than the Sun? They should answer, "faster than the sun". Ask the Earth how he or she should move.
5. Turn the "Earth as it moves along the lined orbit to demonstrate rotation and revolution. Note that the Earth should rotate and revolve in a counterclockwise direction. Have students define what the term revolution is. A revolution is one trip around the sun.
6. SAFETY NOTE: This is not a race…the rate of speed is constant and steady.
7. Ask students, "How long does it take to complete one revolution around the sun?" (365 earth days) Ask, "How many times has the Earth revolved around the Sun since you were born?"
8. Have the Sun and Earth move in a rotation and revolution pattern.
9. Assign the roles to two other students and have them repeat and complete the process.

Explain –

1. At the conclusion, have students reflect on what role they thought was the most difficult to play and why? Generally students will respond the Earth because it rotates faster and also has to revolve
2. Have students summarize the movement of the Sun and Earth using the terms rotation and revolution. Remind students that models are tools that are used to

help explain relationships between objects too large, small or abstract to be seen.

Elaborate – Teacher background: The Earth's diameter is about 7,926 miles and the diameter of the Moon is about 2,160 miles. The scale of the Moon to the Earth is approximately 4 to 1.

- The distance between the Earth and the Moon is about 238,906 miles.
- The Earth and Moon spin counterclockwise with north being "up".
- The Earth and Moon are in synchronous rotation. The moon rotates slowly in comparison the Earth. The Moon rotates in the same amount of time that it takes to revolve around the Earth – 27 days, 7 hours, 43 minutes and 11.47 seconds. This is why we always see the same side of the Moon
- The time between two consecutive full moons is 29.5 days. This longer period of time is due to the fact that the Earth is also moving along its orbit as it revolves around the Sun.

1. Now that students understand the motions of the Earth and Sun, ask them, "What revolves around the Earth? What do you see almost every night and also during the day?"
2. Have two students assume the roles of the Sun and the Earth as they did in the previous activity.
3. Ask a student to be the "Moon". Have them stand about three feet from the Earth. Review with students how long it takes Earth to rotate. (24 hours)
4. Explain the Moon rotates and orbits around the Earth at the same time. Ask the Moon how he or she should move. The Moon character will spin and revolve in a counterclockwise direction as seen from above, with north up. Remind students: It is not a race and the rate of speed is constant and steady. The same side of the moon should always face the earth.
5. Ask the "Earth" how he or she should move. The Earth, like the Moon, is spinning counterclockwise, as seen from above.
6. Once the Earth and Moon characters are moving in a rotation and revolution motion, add the Sun so that students can see all three moving together.
7. At the conclusion, ask students to determine which role was the hardest to play.

Elaborate – As a whole group, fill in the "L" portion of the KWL chart.

1. On a blank sheet of paper, have the students draw the sun and color it.
2. Next on the paper, have students draw the Earth and color it. Have them sketch the Earth's orbit.
3. Have students then draw the moon and color it. Draw the moon's orbit.

Note: Our district science coach visits each fourth grade classroom and teaches a lesson on moon phases following this lesson.

Acknowledgements – Some of the ideas for this lesson were taken from lessons found at the following: http://www.eyeonthesky.org/

Readings from the Throne
By Mrs. Greene the Science Queen (AKA Shirley Greene)

Using Forensics: Wildlife Crime Scene!
By Laura M. Sanders Arndt, Grades 6 – 12, NSTA press
http://www.nsta.org/store/product_detail.aspx?id=10.2505/9780873552707

Yes, CSI is a hit. And yes, kids LOVE doing CSI "stuff" in the classroom. But who has time to come up with a unit and/or lessons in the classroom without doing a lot of research or work to come up with something that is true to life? Here is your answer! Using Forensics: Wildlife Crime Scene is a book based on true crimes against wildlife. You can use the lessons in the book in ANY sequence, and either do the whole unit, do a few lessons here and there, act out an entire crime scene or let the kids read the crime details and solve it that way. Lessons include fingerprinting, blood typing, DNA typing (including a cool way to actually "do" the DNA fingerprinting), hair analysis, fossil tracks, etc. The end half of the book is taking all of the crime scene skills they learned and applying it to solving the wildlife crime scene?
Why do I like this? Well, I rarely take a lesson or unit and follow it exactly. This book is designed for people like me! Don't want to do the fingerprinting? Don't do it! If you still want to do the crime scene (the illegal shooting and dismemberment of a bear) at the end, just don't include the fingerprint evidence. EVERYTHING is there for you to use, so you don't have to make ANYTHING up yourself (a real time-saver).
So, this book gets FIVE jewels in the crown (out of five)!

Shirley Greene

Uncovering Student Ideas in Science, Volumes 1, 2, and 3
Page Keeley, Francis Eberle, and Chad Dorsey
Grades K – 12, NSTA Press
http://www.nsta.org/store/product_detail.aspx?id=10.2505/9780873552554

These books are great formative assessment probes to determine what kids are thinking before (or even after) a new topic. Each probe quickly allows teachers to quickly find out misconceptions students might have, assess knowledge, and ways to help correct these preconceptions. Follow up articles and websites are included in the book to help the teacher learn more about the specific topic.
While I love these books (I bought all three), the authors definitely focus on physical science topics. This means that about half (or more) of the books are physical science topics, while the remainder is split between life and earth science topics. I took all three books and pulled out the life science, combining them into one binder. This put everything in one place for me. It would be nice if the books were sold as separate disciplines, but since they aren't, you might want to share the costs of the set with a teacher or two in the other disciplines. If you are a physical science teacher, you'll love

the set (and maybe you could share the rest with your other teacher buddies). You can also buy each book separately (25 formative assessment probes per book).
I give the three books four out of five jewels in the crown (because of the way the books are set up).

Shirley Greene

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

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