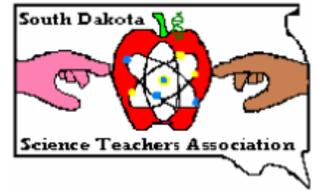


December 2013 Volume 131
Science Teachers' Association
From the President's Desk



SDSTA Newsletter

Winter's Chill

*Winter arrived no warning snow covered the ground
like a weightless blanket the air was brisk sweeping
across my face chilling to my spleen you touched
me I was warm again. Heather Burns*

Winter has entered our state with a vengeance and my hopes are that you have all kept cozy warm and that your critters are safe and sound. Christmas is still a few weeks away and my elf shoes are once again calling my name encouraging me to unpack my festive foliage and to “get in the mood”. My “to do” checklist, however, reminds me that I have several marks of completion to make before I can don the apparel. In all the craziness of professional demands and personal desires, this is my most favorite time of year when my inner self takes the upper hand and permits the reason of the season to surround me. I do hope you will take/have taken time as well to reflect and that your holidays were wonderfully blessed!

I am very excited for the 2014 Math and Science Convention February 7th, 8th, and 9th. For those of you still waiting to get signed up...don't procrastinate any longer. Ellie Cooch and I look forward to hosting the week-end event and both science and math teams have been working very hard to find the best of entertainment to stimulate your professional interests! As you peruse this newsletter,

you will find the guest list of speakers covering a wide range of topics and overflowing our professional buckets with inspiring ideas to take back to our classrooms and incorporate in our curriculum to hook our students into the wonders of learning.

I have enjoyed my time with you as president of SDSTA. Thank you for allowing me this opportunity. Remember that we will be electing officers in February at the Friday night meeting. Please brainstorm some names of potential candidates and get them to us so our elections are rich with diversity filled with energized people ready to take the reins to lead SDSTA to new heights and adventures.

See you in Huron!

Brenda Murphey.

SDSTA President - Feb. 2012-Feb. 2014

In This Issue

- *Science Academies*
- *Conference information*
- *Competitions*
- *Labs*





SCIENCE ACADEMIES—SAM SHAW

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The *Framework for K-12 Science Education* states, “an important role of science education is not to teach ‘all the facts’ but rather prepare students with sufficient core knowledge so that they can later acquire additional information on their own.” In life, students will need not only a structure of core ideas to help them acquire new information, but also an organizational framework for how those ideas are connected and a set of skills to help them obtain, evaluate and communicate information. The *Framework* goes on to state that by building “a strong base of core ideas and competencies,” that students will leave school better grounded in scientific knowledge and practice and with further interest in science, than if they were taught to memorize a plethora of disconnected topics to be assessed and forgotten soon after. [4]

This “shift” from memorization is often difficult, since many classroom teachers have not been exposed to appropriate pedagogy during their professional development. South Dakota’s two largest Universities only require 3 credits for content specific science methods courses for those preparing to be secondary science teachers. This means that the majority of exposure to science instruction comes from the 59-65 credits of lecture-style instruction with only about one separate laboratory per week. This format of education does not allow enough time for the students to perform science at the intersection of the three dimensions from the *Framework*, nor does it always model what should be expected from K-12 teachers.

In addition, the state elementary generalist programs usually only offer one science methods course. [1] [2]

The lack of preparation in science-specific pedagogy has led to the development of a capacity building initiative in science instruction based on the vision for science education within the *Framework*. This vision sets the expectation for students to perform science at the intersection of three dimensions. Current concerns include the preparation of science teachers as described above, but also the amount of instructional time for science in grades K-5. Rolf Blank did a recent study of NAEP data which indicates the national average instructional time in elementary science education is just over 2 hours per week. [3] To address these concerns, South Dakota has developed statewide Science Academy trainings to build instructional capacity K-12 and to create an access point for elementary teachers to incorporate more science into instruction.

The Science Academy trainings would not exist without Governor Dennis Daugaard’s Investing in Teachers package, which was introduced during the 2012 legislative session. This package demonstrated a commitment to education through a significant investment in the teaching profession, including \$8.4 million for professional development. A portion of this

funding was solely dedicated to academies for science teachers to create a shift in instructional practice to challenge students to higher levels of understanding and performance. Through these Science Academy trainings, South Dakota will build capacity in science instruction for elementary teachers to build a base-level understanding of student performance at the intersection of the three dimensions and integrated literacy standards and corresponding strategies. [5]

The upcoming Science Academies will allow K-5 teachers specific opportunities to engage in student performances in obtaining, evaluating and communicating information. Some example expectations include having students pull meaning from text, produce text to express ideas, engage in discussions about a text or another student’s idea, carefully describe observations, ask questions to clarify other students’ thinking, and answer questions about their own thinking. Again, these trainings are about building capacity in the *Framework for K-12 Science Education*. This is the first step in the implementation process. Adding the literacy expectations became a logical access point for the elementary teachers to be able to see the role of science in the classroom and to

connect it to current efforts in Common Core implementation. Registration for the K-5 Science Academies will be open in the Spring of 2014. Dates are listed, below.

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2. "Academic Programs." Colleges & Departments. Web. 22 Nov. 2013. <<http://www.sdstate.edu/academic/programs/index.cfm>>.
3. Blank, Rolf K., and Carla Toye. "Closing the Gap in Science Achievement: Using NAEP Science Assessment Scores to Analyze State Trends." *Council of Chief State School Officers*. Web. 21 Nov. 2013. <http://www.ccsso.org/Documents/2007/Closing_the_Gap_in_Science_Achievement_2007.pdf>.
4. "Guiding Assumptions and Organization of the Framework." *A Framework For K-12 Science Education*. Washington, DC: National Academies Press, 2012. 29-33. Print.
5. "Investing in Teachers." - *South Dakota Department of Education*. Web. 24 Nov. 2013. <<http://doe.sd.gov/secretary/investinginteachers.aspx>>.



Date	Location
June 11-12, 2014	Sioux Falls
June 11-12, 2014	Rapid City
June 11-12, 2014	Chamberlain
June 18-19, 2014	Watertown
June 18-19, 2014	Rapid City
June 18-19, 2014	Pierre
June 18-19, 2014	Mitchell
June 25-26, 2014	Aberdeen
June 25-26, 2014	Sioux Falls
June 25-26, 2014	Yankton



The Arts and Science—ideas for activities

1. Chemistry Christmas Carols -Mr. Palmer's Neighborhood—Science themed songs to the tune of Christmas carols. Challenge students to make their own. Bonus points if they sing it for the class. <https://sites.google.com/site/hhspotionmaster/chemcarols>
2. Mitosis Fingers video—This 5 minute video uses famous people's hand/finger positions to model the stages of mitosis to the tune of the Chicken Dance. Challenge them to make their own video. <http://www.youtube.com/watch?v=QHPT08tKhTU>
3. Alexander Calder—How do balance and motion connect art and science? Arts Edge Kennedy Center—Alexander Calder makes kinetic sculptures/mobiles. Utilize this to bring the topics of art, balance, mobiles, kinetic energy together. Have students create their own Calder mobile that illustrates their own lives and hobbies. http://artsedge.kennedy-center.org/educators/lessons/grade-5/Alexander_Calder_Master_of_Balance.a.spx and [Alexander_Calder_Master_of_Balance.a.spx](http://www.youtube.com/watch?v=QHPT08tKhTU)
4. Doing DaVinci— Discovery Channel—<http://artsedge.kennedy-center.org/educators/lessons/grade-5/> Many students don't know that Leonardo DaVinci was also an inventor. They can view short clips from the Discovery Channel show Doing DaVinci then challenge them to build a model of their own interpretation of one of Leonardo's inventions.
5. Car model design. Students create a model of their dream car using plasticine clay. They must make it a scale model (utilizes math). After it is done, they can cast it with dental plaster (a negative model) and see an exothermic reaction take place. They can build and test its wind resistance with a wind tunnel (EHow—http://www.ehow.com/how_7676961_build-small-wind-tunnel.html).

Design and Discovery—from INTEL An Engineering Process Activity Guide

<http://www.intel.com/content/www/us/en/education/k12/design-and-discovery/curriculum.html>

Design and Discovery is a comprehensive inquiry-based curriculum, which introduces students ages 11-15 to engineering through design. The curriculum is organized into six sections which are further divided into 18 sessions. Each session is 2.5 hours and includes two to four 20-90 minute hands-on activities.

Each activity includes a facilitator instruction page and a student handout with directions for students. Many activities also include a student reading. Some sessions include a Home Improvement activity, which should be completed at home with input from family members. Key Concepts provide supporting information for the facilitator on new concepts introduced in sessions 1-12.



World of 7 Billion Video Contest

Announcing another [World of 7 Billion](#) student video contest. This year's contest challenges high school students to create a short video (60 seconds or less) that illustrates the connection between population growth and one of the following global topics: climate change, global poverty, or water sustainability.

Videos will be judged by topic, with four cash-prize winners (ranging from a grand

prize of \$1,000 to an honorable mention of \$250) per topic. The contest is open to high school students worldwide. Participating teachers have an added benefit! If 10 or more of your students participate, we will send you a complimentary set of [Population Education curriculum and resources](#). This is a great opportunity to get your students thinking about global issues and the interdependence of people and the planet!

Contest information is available at www.Worl dof 7 Billion.org along with contest rules, judging rubrics, and [background readings](#) on each topic. You can also view last year's [winning videos](#).

World of 7 Billion
www.Worl dof 7 Billion.org



Off the Shelf Chemistry Lab Experiments

Robert Farber and Senendip

[Robert Farber](#) teaches Chemistry at Central High School in Philadelphia, PA, and was a participant in Serendip's [Brain and Behavior Institute](#) in 2002. He has informally collaborated with [Ingrid Waldron](#), professor of Biology at the University of Pennsylvania, (see also: [Hands-On Activities for Teaching Biology](#) ...) over the years. He encourages other teachers to copy and modify these labs for use in their teaching, and Serendip is pleased to make these activities available to a wider audience.. *All of the reagents (except chemical indicator solutions) for these experiments may be purchased in supermarkets, drugstores, paint stores, etc. The lab manual is downloadable in pdf format. Activities such as Alchemy (uses galvanized nails and drain cleaner); What is the Pop in Popcorn? (good for data collection, observations, and drawing conclusions); Can the Mettle of Metal be Improved? (exposes hair pins to different situations and then tests their properties).*

OBJECTIVES : http://serendip.brynmawr.edu/sci_edu/farber/

1. The student will learn that **chemicals are not something just found in laboratories**. Our physical environment is composed of chemicals. Our bodies are composed of chemicals. Understanding the principles of chemistry helps us better understand our world.
2. The student will learn to read and understand the ingredient labels on consumer products. In doing this the student will become a **more sophisticated consumer**.
3. The student will be able to use both English and SI systems of **weights and measures** to conduct experiments and to compare different brands of similar products.
4. The student will learn the importance of making and recording **accurate observations**.
5. The student will learn that in science, **language** is very important. Terms must be carefully defined in order for scientists to communicate with each other. The student will learn the difference between operational definitions and conceptual definitions.
6. The student will develop an **appreciation of the chemistry** that is used in our everyday lives.

Design Challenge 2014: Red Planet Rover

Design Challenge 2014:

Red Planet Rovers

Exciting News! Scientists have just discovered a new planet in a distant galaxy! They have named it RP – for Red Planet – and have begun to study and explore this strange planet through images gathered from satellites. The next challenge will be landing a rover on RP for an unprecedented scientific exploration. Do you have what it takes to design and build a rover that is up to the challenges it will face on this unknown planet?

Event Date: Saturday, April 5, 2014 at the Washington Pavilion

How to Get Involved:

Participation is as simple as registering to let us know you're in! There is no cost involved. Anyone is eligible to register a team – schools, community groups, or families are all welcome.

Please fill out the registration form and submit it to the Pavilion by February 28, 2014.

Schedules for April 5th and set-up details will be mailed to teams by the 2nd week of March.

Age Categories: Competitors will be grouped according to the following grade levels: K-2nd, 3rd – 5th, 6th – 8th, 9th – 12th. Teams with members that span multiple age groups will be placed accord-

ing to its oldest member.

Team Size: Teams should have at least 2 and up to 5 individuals.

Cost: There is no cost to participate in the Design Challenge. Project costs should be low. The investment should be primarily in time and effort. <https://www.washingtonpavilion.org/ArticleMedia/Files/Design%20Challenge%202014%20Guide%20to%20Greatness.pdf>



WASHINGTON
PAVILION

**TEACHER EXPRESS—MELODY SHAW
UPPER ELEMENTARY**

Veteran educator Melody Shaw's website presents a smorgasbord of activities, lesson plans, tips, and teaching tools amassed through her years teaching fourth and fifth grade. The site's science resources include experiments, labs, lessons, and links focused on getting upper-elementary students excited about science. Who could resist Christmas chromatography, classification with jelly beans, or Newton's Laws through Wile E. Coyote? Several science disciplines are represented. <http://www.melodyshaw.com/>



GOLDBURGER TO GO

System engineering activities can be difficult to find, especially ones for elementary students. In this fun activity to introduce simple machines and Rube Goldberg, the mission is to serve lunch to the PBS Kids ZOOM cast and crew. To successfully deliver the burger and fries, students must adjust 13 moveable "contraption" parts. When the parts are "just right," the burger moves forward, and applause is heard all around. The site includes hints in the form of questions to help students complete the path correctly. <http://pbskids.org/zoom/games/golburgertogo/rubegame.html>

Science Discovery Days at Sanford Research

Janet Wagner—HS Liason

When graduating from high school in the early 1970's, I thought the only fields open to girls was teacher, nurse or secretary. What a change has occurred in the years since that time! The Science Discovery Day put on by Sanford Research is a wonderful experience for those students starting to figure out what field of study they would wish to pursue. The students were exposed to hundreds of career opportunities which are open for them in the field of science and research.

The day started off with Dr. Barbara Szczerbinski, a physics teacher from DSU, telling of her interesting adventure after being accepted into law school in Poland. She changed her mind at the last minute and started a career in physics. She had not been schooled in physics and it took a leap of faith by the higher education institute to allow her into the program. Another challenge came when she came to the United States to further her studies but didn't speak English. After the keynote speaker, the students were able to attend 4 sessions of the many professional sessions offered. We watched professionals discuss Exercise and Sports Medi-

cine. They illustrated how to record data during vigorous exercise by an athlete. Information such as the internal body core temperature, how they map out the exact movement of a cyclist or testing for impact on a football helmet could be tested.

At the Rare Diseases session, the students worked on identification of rare diseases. The presenter actually had a rare disease which impressed to the students the need for more research. The students had studied of some of the diseases but to identify the disease by the symptoms was a unique opportunity.

Some were able to go on the SIMS semitrailer and work with the fully automated manikin. The manikin is able to respond just as a human



would and is used in training medical personal from doctors, to nurses, to EMT's.

We were also given a tour of the Sanford Research center and watched people doing actual research. The young lady who gave our tour was actually working on diabetes 1 research. They explained that research is simply only finding an answer to a question. Research could be as simple as looking up an answer to a worksheet question.

It was not a quiet bus trip back home as the students were excited about the different fields of science they had been exposed to and every one had a story to tell. A free lunch had been served to the students and even the football boys were filled up with the delicious lunch. Everyone also received a "humorous" t-shirt and several won raffle prizes.

If you are interested in exposing your 10th and 11th graders to this wonderful experience, you may contact Liz McMillian at Sanford Research for more information.

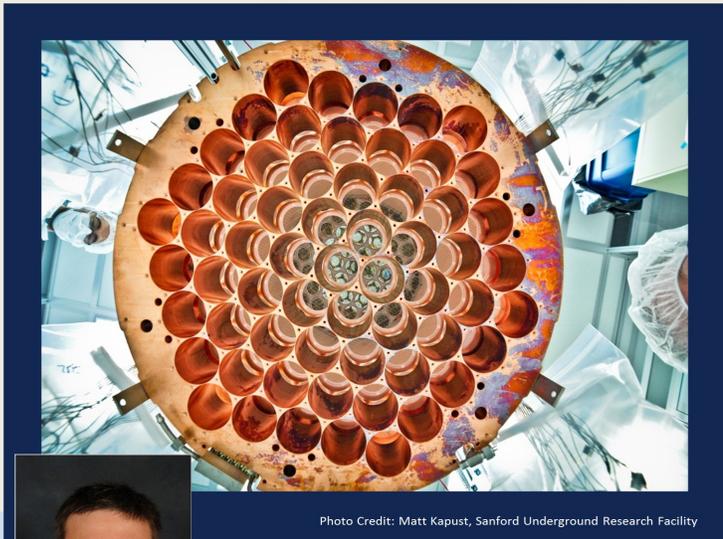


Photo Credit: Matt Kapust, Sanford Underground Research Facility



Ben Saylor, PhD

Director, Education and Outreach at Sanford Underground Laboratory at Homestake
Professor, Physical Science and Mathematics at Black Hills State University

Community Lecture Series

A monthly seminar series aimed at educating our community on research initiatives in our own backyard

December 12, 5:30 p.m. Seminar

Sanford Center | 2301 East 60th Street N | Sioux Falls

**“Exploring the Universe from
Deep Underground in the Black Hills”**

RSVP: SanfordOutreach@sanfordhealth.org

or 605-312-6590

Please enter through the main Sanford Center entrance

(Southeast side of the building adjacent to the large globe)

Sanford PROMISE Community Lecture Series – Thursday @ 5:30 pm

Upcoming Presentations:

January 9, 2014

Jay Trobec, PhD

Chief Meteorologist, KELO-TV

Title: Meteorological science in South Dakota

February 13, 2014

Peter Vitiello, PhD

Associate Scientist, Children’s Health Research Center,
Sanford Research

Title: Back to Basics: The Role of Basic Research in a Clinical World

February 27, 2014 – Special Rare Disease Day Lecture

Michael Kruer, PhD

Associate Scientist, Children’s Health Research Center,
Sanford Research

Title: A Day in the Life of a Physician-Scientist

March 13, 2014

Megan Landsverk, PhD

Director, Clinical Molecular Genetics Laboratory, Sanford Health

Title: When your powerhouse goes bad: Mitochondrial Diseases and Disorders

One more reminder that the Science and Math Conference will begin Thursday night, February 6th with sharing sessions. (Please bring 25 copies of your favorite activity or lesson to share.) On site registration will begin Friday morning at 7 am.

Remember to bring a little spending money along. Three different large posters listing best practices will be available for about \$5 each. SDSTA will have polo shirts, sweatshirts and bags available for prices between \$15 to \$20 each.

KidWind Announces National KidWind Challenge

Student teams compete for the national title with their hand-crafted wind turbines



Building on the success of local and regional KidWind Challenge events, and to spark the competitive spirit of students while helping them study and build environmentally friendly energy options, [KidWind](#), the international leader of clean energy education, is launching the inaugural National KidWind Challenge. The event will take place at the [USA Science & Engineering Festival](#), the only science and engineering festival in the United States, on Saturday, April 26, 2014 in Washington D.C. The National KidWind Challenge will bring together student teams to compete for the National KidWind Challenge title by showcasing their hand-crafted wind turbines in front of wind industry experts.

“By launching the National KidWind Challenge, we are creating excitement around clean energy,” said Michael Arquin, Founder of KidWind. “KidWind Challenges over the past few years have shown students how important it is to think critically about alternative energy as they prepare for careers in science and engineering. During the National KidWind Challenge, wind energy industry leaders will be on site to witness our leading teams demonstrate their knowledge of wind energy and engineering.”

Teams can qualify for the National KidWind Challenge by participating in one of two ways — by winning a KidWind Challenge Event in their local area, or by winning a monthly KidWind Challenge Online. The KidWind Challenge Events allow teams of students in grades 4-12 to come together to test efficiency and design of their wind turbines in the high-speed KidWind Wind Tunnel and be judged by wind industry experts. The KidWind Challenge Online allows students across the world to build wind turbines, calculate their own energy output and upload pictures and results to the KidWind website for judging.

The three top-performing teams from each KidWind Challenge Event and all monthly KidWind Challenge Online winners are invited to showcase their winning wind turbines at the National KidWind Challenge in Washington D.C. To qualify for the National KidWind Challenge teams must register between now and March 1, 2014 for their local KidWind Challenge Event or the KidWind Challenge Online.

“The KidWind Challenge is one of the most effective programs we have seen for K-12 education, in terms of reach and content,” said Darlene Snow, executive director

of the Wind Energy Foundation. “The KidWind Challenge educates and excites thousands of our future scientists, engineers, technicians, and business and community leaders every year.”

“KidWind is a fantastic resource and partner for helping teachers engage students in science and technology projects that matter,” said Andy Lueth, 7th grade science teacher from Buffalo, NY and a KidWind WindSenator, a trained advocate of renewable energy. “KidWind puts tinkering and discovery back in the classroom - where it belongs.”

For more information about the KidWind Challenge, visit: <http://challenge.kidwind.org>.

About USA Science & Engineering Festival

The USA Science & Engineering Festival is a national grassroots effort to advance STEM education and inspire the next generation of scientists and engineers. Our exhibitors, performers, speakers, partners, sponsors and advisors are a who-is-who of science and engineering in the United States: from major academic centers and leading research institutes and government agencies to cutting-edge high tech companies, museums and community organizations.

About KidWind

KidWind has been the leader of clean energy education for nearly a decade and is guiding the delivery of green STEM education today. In addition to offering its own curriculum, science kits, training, and student competitions, the company partners with leading universities, developers, and museums to plant the seeds for clean energy development. For more information about KidWind, please visit its website at www.kidwind.org or email

Rachael Ballard,
Public Relations for KidWind
rachael@kehcomm.com

or

Michael Arquin,
Director and Founder of KidWind
Michael@kidwind.org

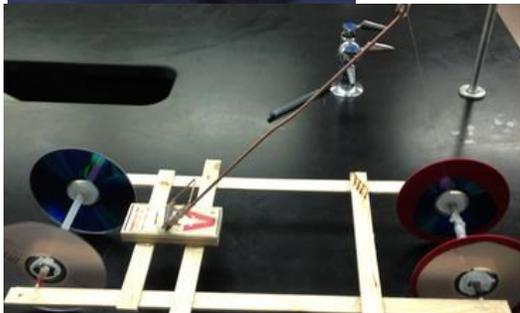
SD-AAPT High School Physics Photo Contest

The photo contest is open to high school students in grades 9-12. Students must print out, sign, and return the Contest Rules and Entry Agreement when submitting their entry. Failure to submit this form will invalidate the contest entry. Entries are limited to 6 per teacher per school each year. If possible, please place all entries from the school in one package.

Photos may be in one of two categories described below, and will be judged on the quality of the photo and the accuracy of the physics in the explanation that accompanies the photograph.

Categories

Students may submit an entry in one (not both) of two categories: Natural – any situation that you saw occurring and photographed – or– Contrived – a situation where the objects were manipulated to produce the phenomena photographed



Prizes

SD-AAPT will award cash prizes & certificates. (Usually given to the top three places only.)

Judging

The photos entered will be displayed and judged during the annual Winter Meeting at the Joint Science & Math Conference in Huron in February. ([Click here for registration form](#) for conference.) If more than 50 entries are received, a group of volunteer physics teachers will determine the 50 best entries to be displayed & judged in Huron. Failure to abide by all rules will result in disqualification.

Deadline

Entry deadline is January 15.

At left are last years first, second and third place winners. The first place hydrophobic flower was described by the nonpolar molecule that doesn't interact with water droplets. Second place fire water told of internal reflection and third place told of the potential to kinetic energies transferred in the mouse trap car.

Come to the conference and vote for your favorite photo or best description of a scientific principle with a penny or two in their jar!

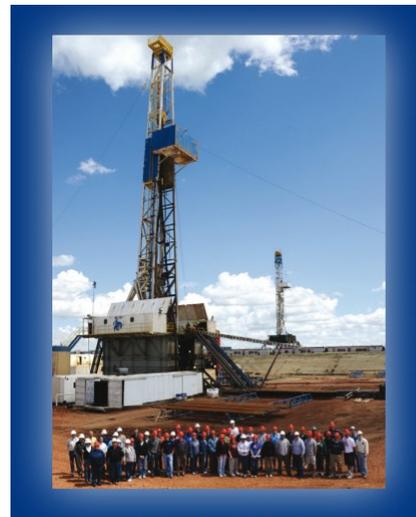
Teacher Education Seminar

June 9-12, 2014 Bismark, ND



The ND Petroleum Council is announcing a basically FREE learning opportunity. Learn about one of ND's most important industries, explore the Bakken, tour an oil field, visit a drilling rig and the Tesoro Mandan Refinery, and much more! Two hours of graduate level credit available for a small fee.

This seminar for educators to learn and bring projects and ideas back to the classroom. Find out more about one of ND's most abundant forms of energy from this informational, hands-on and entertaining seminar. Take advantage of this professional opportunity to pick up new information and interact with other teachers from across the state. Comments from several teachers indicate that the material from this seminar can be used at almost any grade level and by various subject areas, including science.



Registration is limited to 40 primary and secondary educators. Application deadline is May 1. To get the registration brochure or additional info, go to http://www.ndoil.org/events/teacher_education

The ND Lignite Energy Council sponsors the second seminar, and I haven't seen application forms out yet for that. Last year 130 teachers participated in the lignite seminar.

Season's Greetings Everyone

Can you believe that November has ended and December is here? It seems like we just started school. I hope you are planning on attending the joint math/science conference in Huron in Feb. I have heard that the number of presentations is phenomenal so it is shaping up to be an awesome conference. This will also be the time to elect new SDSTA officers. As you know, Brenda Murphey is our current president. Julie Olson is our president-elect and will be our new president. We will be electing a secretary, treasurer and president-elect. If you are interested in being on the ballot for any of these positions, please email me. My email address is on the second to last page of this newsletter. You can read about the duties of each office by looking in the Officer's Handbook that is on the SDSTA website.

If your school is like my school, your administrators are focusing a lot on the common core curriculum. Luckily, the *Framework for K-12 Science Education* interlocks beautifully with the common core curriculum. Words such as research, gather, describe, reason, analyze, explain and evidence are all words taken out of the CC literacy in science standards document. These words are also emphasized in the science framework. Reasoning, explaining, modeling, interpreting data and distinguish between are terms/phrases taken out of CC math standards. They are used frequently in the framework. That makes the transition to common core less difficult for science than some other areas. As we enter a new era of science education, remember that change takes time. I know how busy **you** are because I know how busy **I** am. Pick one area from CC and the Framework that you would like to improve in and then focus on that area. Doing too much too soon leads to frustration. For example, I am focusing on student research this year in biology. I do not do any lecturing or explaining until the students have done their own preliminary research on the topic we are covering. I have a series of questions they have to research—many are structure/function, cause/effect, compare/contrast questions. My students really struggled at first but are getting much better at it. They can use any resource they want to answer the questions. They have found that “googling” the question often results in conflicting information. They are learning to be selective with their information sources. By the time we discuss it, they are very familiar with the terminology and the basic concepts. My point is that we need to realize that change takes time so take **your** time. Start small and see how it goes. Be easy on yourself—baby steps. Good luck and have a great school year.

Molly TenBroek, Past President, SDSTA

NGSS@NSTA – Resources

Coming Soon for All Teachers

By Dr. Janet Briggs, Black Hills State University
The National Science Teachers Association has gathered a group of experts from across the country to identify resources that will help teachers implement the *Next Generation Science Standards* (NGSS). Mrs. Ramona Lundberg and Dr. Janet Briggs have been selected to serve as curators of these resources. Janet will be working on “Weather and Climate” for Middle School. The resources will be available for all educators under a web portal under development. All science and engineering areas from grades K-12 covered in NGSS will be included.

The group met in Charlotte, NC in November 2013 during the regional NSTA conference to receive their initial training. Additional training will be provided in the spring at the conference in Boston, MA. Janet noted that the level of expertise of others science educators in the room and the training were both very impressive. Janet said, “During the training we examined a couple of activities and discussed the level of practices and crosscutting concepts within them as they were written. We also talked about ways to increase the level of all 3 dimensions in the activity.”

Achieve (the organization spearheading the NGSS) and science education experts from six states are developing the EQIP Next Generation Science Standards (NGSS) Rubric. This rubric will be used by the curators to assess online resources. The curators will provide comments on the degree of implementation of the 3 Dimensions within NGSS: the Science and Engineering Practices, the Crosscutting Concepts, and the Disciplinary Core Ideas. They will also provide suggestions for increasing alignment with the 3 dimensions.

“This is very exciting work and I’m looking forward to assessing lessons and making them available to teachers,” Janet said. “NSTA is providing a great service for all K-12 teachers.”



The most volcanically active place is out-of-this-world!

By Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing **100 meters** at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

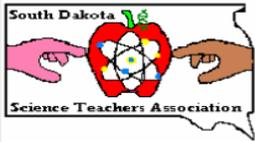
Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Download photo here: <http://photojournal.jpl.nasa.gov/catalog/PIA02308>

Learn more about Galileo's mission to Jupiter: <http://solarsystem.nasa.gov/galileo/>.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: <http://spaceplace.nasa.gov/volcanoes>.



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My kids, their kids...

Before I had my own child, I always had “kids”... when I’d talk about my school kids, I often had to clarify, “oh, not my own kids, my students.” This is the 5th semester since I left the classroom and the thing I miss the most is the everyday relationships a teacher develops with their students. We don’t just teach the parts of the cell or the composition of the planets, we help to guide their development and their potential as future adults. Working with middle schoolers, it was as much a part of my job to teach them that – “yes, sometimes in the real world we have to turn in paperwork” and “it’s important to learn how to recognize another person’s mood; if they’re in a bad mood, you might not get a warning, if they’re in a good mood, you might not even get in trouble (and that’s fair, and a skill when dealing with people).” Teaching all of these other skills and life lessons are such a large part of what a teacher does for their “kids.” I hope that my son has teachers that think he belongs to them and are willing to help him learn to value others, and to be a hardworking, kind, helpful, generous adult. As a working parent I recognize that my

The SDSTA Newsletter is published four times a year. The December issue (this one) is e-mailed to 140 paid members, and several school science departments.

The Membership year in SDSTA starts with the February conference and ends the first of February. Dues are due at each conference for member discount rates.

SDSTA members may give a one year free membership to their student teachers by submitting the student teacher’s name & address.

One may be given to the SDSTA member that has made a submission to the newsletter (or given a presentation at the conference) and has referred at least three new members.

Members may also earn a 10% finder’s fee for any science related ads placed in the newsletter. Our rates are \$75 per page (or 3 to 4 quarter pages) or \$250 per page to place an ad in four consecutive issues.

child will spend nearly as much time with his teachers as he does with me and even though he won’t call them “mom” I hope they are teachers of life as well as content.

~LIZ

Liz McMillan | Sanford PROMISE |

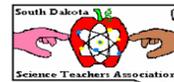
Sanford Research/USD

Elizabeth.McMillan@sanfordhealth.org

Just an FYI for all who did not receive or read NSTA’s position statement on the NGSS – also it really does a good job describing the Next Generation Science Standards and explains their purpose, differentiating it from a curriculum.

<http://www.nsta.org/about/positions/ngss.aspx>

Mail to: James Stearns, SDSTA Treas
15 North Fifth Street
Groton, SD 57445



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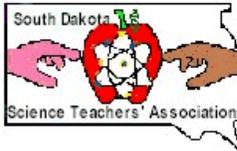
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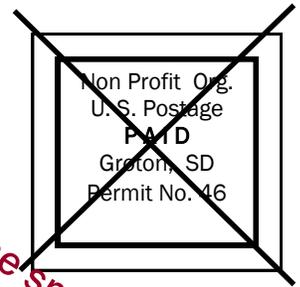
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South Dakota Science Teachers' Association

Julie Olson and James Stearns
Editors, SDSTA Newsletter
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Groton, SD 57445-2024



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Delivered at the speed of science!



OPSTA—Outstanding Physical Science Teacher Award

Teachers in the areas of physical science, physics, chemistry, meteorology, and astronomy including grades 7- 12, are eligible for the award.

The required forms are available from the SDSU Physics Department website:

www.engineering.sdstate.edu/~physics/OPSTA.htm or emailing Sally.Krueger@sdstate.edu.

Outstanding Biology Teacher Nominations.

Do you know someone (or yourself) that has been teaching a Life Science class consistently for the last three years? If you would like to make a nomination for this award, send the email address of the nominee to Julie.Olson@k12.sd.us. The necessary forms will then be sent to the nominee.

Kelly Lane Earth & Space Science Teacher Grant and Daniel Swets Robotics Materials Award

both have deadlines of January 23. More information & forms can be found at <http://sd.spacegrant.org>

Calendar of Events

- December 12-14 NSTA Area Conference—Denver, Colorado
- December 12 Exploring the Universe from Underground the Black Hills-Sanford Ctr, SF
- 100th anniversary of Bohr's atomic theory...many are calling him the "Father of the atom".
- January 9, 2014 Meteorological Science in South Dakota - Sanford Ctr 2301 E 60th St N, SF
- January 15, 2014 SD-AAPT Photo Contest deadline. SDAAPT.SDSTA.org
- January 23, Deadline for Space Science & Robotics Grant Awards
- February 6—8, 2014 22nd Annual Joint Math & Science Conference - Huron, SD
- February 13 Role of Basic Research in a Clinical World - Sanford Ctr 2301 E 60th St N, SF
- February 21 Contest deadline for www.Worldof7Billion.org.
- May 1 Registration deadline for ND Oil Seminar { free }—
http://www.ndoil.org/events/teacher_education/
- July 20-25 Student (grades 10-12) Cyper Stars Summer Camp - DSU, Madison
{ free } <http://ia.dsu.edu/cyberstars>

Homepage Located At <http://www.sdsta.org>