

September 2013
Science Teachers' Association
From the President's Desk

SDSTA Newsletter

<http://SDSTA.org>

Fall, leaves, fall

*Fall, leaves, fall; die, flowers, away;
Lengthen night and shorten day;
Every leaf speaks bliss to me
Fluttering from the autumn tree.*

Emily Jane Brontë

Once again, the South Dakota winds have blown away our long summer days and delivered a crisp cool breeze. The school bells have beckoned us to our classrooms and converted random chaos to order. I spent the morning looking at photos from summer activities and appreciate each day we have had to relax and enjoy!

SDSTA has celebrated its first electronic newsletter with the June edition. Our hopes are that everyone got their copy in their email accounts. If this is not the case, please notify James Stearns at James.Stearns@k12.sd.us of the missed opportunity, and he will make sure you are on the list for newsletter recipients. Electronic dispersal offers association members easy access to information and clearer images. It also saves us money four times a year. :o) Please feel free to share the SDSTA website with fellow science teachers/friends where the newsletter can be viewed <http://www.sdsta.org/>.

Mark your calendars for the first weekend of February when, once again, SDSTA and SDCTM will join forces to bring top quality professional speakers and sessions to enlighten and brighten your teaching performance. The 22nd Annual SDSTA/SDCTM Joint Conference will be held February 6-8, 2014 at the Cross-

roads Conference Center in Huron, SD. 2014 will be an election year, and you are invited to offer your services as an officer to the association. The SDSTA board is always looking for new faces and fresh blood to be leaders, so be sure to attend the meeting during the conference to get your name

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thrown in the hat for a leadership role. Visit the SDSTA website <http://www.sdsta.org/> to download registration forms.

Presenters are welcome for the 2014 Conference!! Now is the time to step up to the plate and offer to share your professional ideas! We are accepting speaker applications for the conference, and welcome new professional development topics to share with both math and science teachers from across the state. Again, visit the SDSTA website for speaker proposal forms.

For those of you who may be interested in the latest science conversations in the educational community, please be aware that once a year, the National Congress on Science Education meets to discuss issues that may be of interest to NSTA and science education. There are 94 NSTA Chapters and Associated Groups aka CAGS. SDSTA is one of the 94 chapters/groups, and we are responsible for sending a voting delegate to the annual meeting. This year's meeting took place in San Juan, Puerto Rico on July 17-20. If you are interested in looking over the minutes of this meeting, please visit their website at <http://www.nsta.org/about/collaboration/chapters/congress.aspx>.

My hopes are that you will enjoy this fall edition of our newsletter. James Stearns and Julie Olson spend loads of time on putting this together for your professional entertainment! Your thoughts and ideas are always welcome, so if you have something to share please forward it to either of these two people, and they will do their best to accommodate our members. Also, it is my sincere wish that your 2013-14 school year be the best ever and that you continue a lifelong learning process to improve your teaching pedagogies. Remember to get your applications in for presenting at the 2014 Conference, and get registered now to attend!!

Brenda Murphey

SDSTA President - Feb. 2012-Feb. 2014

SDSTA September 2013 Business Meeting

September 4, 2013 via DDN - Call to Order: 5:05; Adjourn: 6:31

Attendees: Brenda, Julie, Molly, James, Janet B, Larry, Liz, Jen, Ramona, Diedra Peck, David (@5:50)

Secretary's Minutes from Feb 8 Business Meeting. Larry move to accept. James Second. All in Favor

Treasurer's Report: Feb. 1, 2013: \$16,942. Current: 16,849 (10K CD, \$4750 Savings, \$2098 Checking). One outstanding check; Pending Income: E-Cyber-Mission (\$250-\$750), Conference Profit (should be paid in about one month). Molly move to accept. Larry 2nd. All in Favor

Old Business: *Non-Profit Status Pending - may require additional application fees, James working on process.

*Science Fair Students – 3 students returned forms, 4 awards could be given. 1 student without abstract, so \$30 checks sent to two students.

*Brochure – created/updated by James. Will send out to members and potential members in October or November.

New Business: *Executive Joint Board Meeting: Wednesday - October 2nd. Molly to set up via DDN

*Conference - preparation for presentations & booklet: November 2nd. Attendees: Brenda, David, Liz & ?Ramona ?Larry ?James

December 14th Attendees: James, Julie, Larry, ?Ramona ?Liz

*Conference Speaker(s) – need 2 Featured Speaker, 1 Banquet speaker – final determined by President Brenda, but suggestions & input are accepted from anyone.

Motivational Speaker from Rapid (Retired Science/PE teacher); Mike Marlow – University of Colorado at Denver; Cecelia Aragon – Aerobatics Team; Penny Noyce – Noyce Foundation; Same Kean – Author of Disappearing Spoon & Violist' Thumb (samkean.com); Sanford Scientist or USGS/EROS Scientist – Regional Research Science

*NGSS Posters to print and offer at Conference

BHSU/CAMSE has beautiful 24"x36" color posters with NGSS practices that will be sold at the conference for \$5 ea.

SDSU gave out 11x17 Cross Cutting Concepts and Science/Engineering Practices at workshop Summer 2013. SDSU or SDSTA to print Cross Cutting Concepts? Costs & Sizes vary? Investigate and TBD @ October Joint Science & Math Board meeting.

*Conference Pens – Micheline in charge - group likes lights/lasers

*Science Email List (first.last@k12.sd.us using names of 2013 DOE science and generalist teachers in SD) Won't reach everyone but a good start – will use to send brochure, NOT newsletters (privilege of membership). {{This is different than the email listserv.}}

*Electronic Newsletter: Liz moves to "do all new newsletters electronic" (pdf and link to web version). Ramona seconds. All in favor

*Bulk mailings (need to do 3 – already did 1 newsletter) Send Membership Brochure Oct. 2013, Conference Brochure Dec 2013. (Liz will provide list of Middle and High Schools in SD for membership brochure, Elementary list to be developed) Ramona Moves, Liz Seconds, All in Favor

*SDSTA Fashion Wear - James - new shirts=light blue, + women's sizes. Officers wear Friday of conference.

Presidential Awardees 2012 – not yet announced, **unsure of confirmation, waiting for more info**

•Adjourn – 6:31pm



Psst!...check out the Speaker Proposal form on Page 8

Regional Science Fairs

The South Dakota Science Teachers support the SD Regional Science fairs by awarding one junior high project winner at each Regional Science fair with a check for \$30. The abstracts of those winners are printed here.

This year, only two abstracts were received.

Alpha Brain Wave Generation

by Jesse Flores of RC

I've always been a fan of writing and of music, and the idea of music assisting in writing has always intrigued me. After I had begun my research, I found that what I was thinking about was a theory known as the Mozart Effect. What it stated was that after listening to Mozart, your brain would be more relaxed and would do better. I dissected the theory and found the brain waves of the human brain.

Alpha brain waves are generated when the human mind is in a state of relaxation, giving more concentration.

As a result, it is truly difficult to determine as to whether or not the Mozart Effect could really exist as such that everyone is different. As one person might enjoy classical music, another might loathe it, and enjoy rock more. As such, personal preference deals a role in the results as well as a truly uncontrollable factor, the brain itself. There is no way to manipulate what the mind thinks of, and that may have biased thoughts. As such, I actually don't like most of the music that was played.

If I were to try this experiment again, I would try to focus on a more specific subject of music, for a test rather than test with different types of music. Testing to see what types of tests work best for classical music.

Warm Hands

by Tate Wynia

People have used leather products for centuries. These products include tool, arms, clothing, and gloves. Today there are gloves made from leather originating from several different animals. I found six different kinds of leather gloves in one store.

One characteristic of leather is the ability to retain warmth (heat). In my experiment I wanted to do see if there is one type of leather that retains more heat than the others.

In my experiment I placed a wireless temperature probe in a leather glove, sealed the glove opening, places it in a freezer, and then recorded any temperature change in the glove over a thirty minute trial. I repeated the experiment with the different kinds of leather gloves that I purchased.

The results of my experiment showed there was a difference in the amount heat retained by the different kinds of leather. The best leather glove was the buffalo hide, and the one the retained the least was deer hide leather gloves.

I concluded that buffalo hide leather gloves will retain the most heat. This experiment is beneficial because a person that uses leather gloves while working in a cold climate may find that buffalo hide gloves will be warmer.

AEOP & eCYBERMISSION

eCYBERMISSION is one of several science, technology, engineering and mathematics (STEM) initiatives offered by the Army Educational Outreach Program (AEOP). The U.S. Army is committed to answering the nation's need for increased national STEM literacy and expanding STEM education opportunities across the country to open doors to new career paths for America's students that lead to a brighter tomorrow.

SDSTA is promoting the usage of this website. As you register at the site, you need to using the following code: **NSTA: referred by NSTA state chapter; & then select South Dakota.** This is the only way we can track the registrations that were generated from SDSTA (We're working on a grant). www.eCybermission.org
Good Luck to you are your students.

Student Competitions

World of 7 Billion Video Contest

Bring technology and creativity into your high school science classes by incorporating the World of 7 Billion video contest into your syllabi. Challenge your students to create a short (60 seconds or less) video illustrating the connection between world population at 7 billion and one of the following: climate change, global poverty, or water sustainability. Students can win up to \$1,000 and their teachers will receive free curriculum resources. The contest deadline is February 21, 2014. Full contest guidelines, resources for research, past winners, and more can be found at www.Worldof7Billion.org.



Science Olympiad

Science Olympiad—Students compete for awards in teams of two/ three or by themselves in science events. Examples of past events: Tower building, astronomy, Bridge building, egg drop, protein modeling. Many of these are great learning activities to use in the classroom. The event is held on the USD campus Mar. 22, 2014. Go to the South Dakota Science Olympiad website at <https://www.google.com/#q=SD+science+olympiad> for more information and team entry forms.

Photo Caption

More Science Competitions— MS and HS

Science Fair—South Dakota has four regions for students to compete in with high school students having a chance to qualify to attend the International Science and Engineering Fair to be held in Phoenix, Arizona this year in May.

Northern South Dakota Science and Math Fair

Dr. Jodie Ramsay:

Biology Department, 1200 S. Jay St., Northern State University, Aberdeen, SD 57401-7198

SPONSORS: Northern State University

TERRITORY: the counties of Roberts, Marshall, Brown, Day, Clark, Spink, Hand, Hyde, Sully, Potter, Walworth, Edmunds, Campbell, McPherson, Faulk and Grant (with the exception of Grant-Deuel High School)

Eastern South Dakota Science and Engineering Fair

Mr. Brad Blaha: WEB SITE: <http://www.sdstate.edu/sciencefair>

ABS Administration Office, South Dakota State University, Box 2207, SAG 156, Brookings, SD 57007

SPONSORS: South Dakota State University and Sigma Xi and The SDSU Foundation. TERRITORY: the South Dakota counties of Beadle, Codington, Kingsbury, Lake, Brookings, Hamlin, Deuel, Moody, Minnehaha, Turner, Lincoln, Yankton, Clay, Union, and Sioux County in Iowa. Also covers Grant-Deuel High School in Grant County, South Dakota.

South Central South Dakota Science and Engineering Fair

Mrs. Jody A Strand: WEB SITE: <http://www.dwsciencefair.com>,

Dakota Wesleyan University, 1200 West University, Mitchell, SD 57301

SPONSORS: Dakota Wesleyan University, The Mitchell Daily Republic, Twin City Fan & Blower, Touchstone Energy, 6th District Medical

TERRITORY: the counties of Bon Homme, McCook, Miner, Hutchinson, Davison, Hanson, Sanborn, Jerauld, Aurora, Buffalo, Gregory, Brule, Charles Mix, Douglas, Tripp, Lyman, Mellette, and Hughes

High Plains Regional Science and Engineering Fair

Dr. Donna Kliche—Atmospheric Sciences

South Dakota School of Mines & Technology

501 E. St. Joseph Street

Rapid City, SD 57701 Sponsor: South Dakota School of Mines & Technology **Territory:** the counties of Butte, Lawrence, Pennington, Custer, Fall River, Meade, Shannon, Haakon, Jackson, and Bennett

BLOSSOMS video lessons are enriching students' learning experiences in high school classrooms from Brooklyn to Beirut to Bangalore. Our Video Library contains over 50 math and science lessons, all freely available to teachers as streaming video and Internet downloads and as DVDs and videotapes.

Visit the BLOSSOMS Video Library anytime to browse and download lessons to use in your classroom. Every lesson is a complete resource that includes video segments, a teacher's guide, downloadable hand-outs and a list of additional online resources relevant to the topic. We carefully craft each BLOSSOMS lesson to make your classroom come alive. Each 50-minute lesson builds on math and science fundamentals by relating abstract concepts to the real world. The lessons intersperse video instruction with planned exercises that engage students in problem solving and critical thinking, helping students build the kind of gut knowledge that comes from hands-on experience. By guiding students through activities from beginning to end, BLOSSOMS lessons give students a sense of accomplishment and excitement.

<http://blossoms.mit.edu/>

MathBench Biology Modules

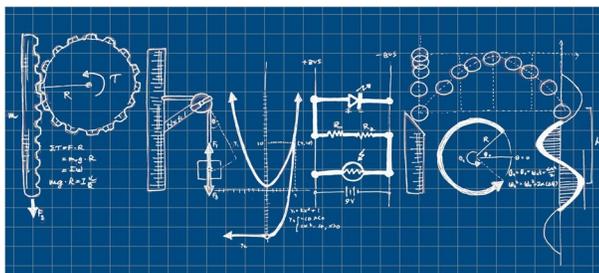
<http://mathbench.umd.edu/index.html>

These modules introduce students to the mathematical underpinnings of what they learn in biology courses. Unlike a textbook, the modules are not full of equations and proofs. Instead, they try to bring math to life using intuitive approaches, everyday situations, and even humor. The modules contain hundreds of interactive activities, games, and questions. They range from the relatively simple to the relatively abstruse. Modules include the following areas: measurement, visualization, probability and statistics, statistical tests, cellular processes, microbiology, population dynamics, environmental science, and climate change.

Mr. Martin's Physics Site

This is a fantastic site with resources for both physical science (labeled IPC—Integrated Physics and Chemistry) and Physics. There are worksheets as well as labs that can be downloaded. Newer versions can be purchased directly from the site by contacting the author. The physical science materials include worksheets and labs covering the following topics: lab safety, forces and momentum, kinetic energy and gravitational potential energy, work power and machines, thermal energy, electricity, waves, properties of matter, chemical bonding and reactions, solutions, and pH. Physics units include: Motion, force, momentum, work power and machines, thermal energy, electricity, magnetism, waves, and light.

http://www.nisd.net/taft/classrooms/martin/Physics_Worksheets_index.htm



Call for nominations for Outstanding Biology/Life Science Teacher

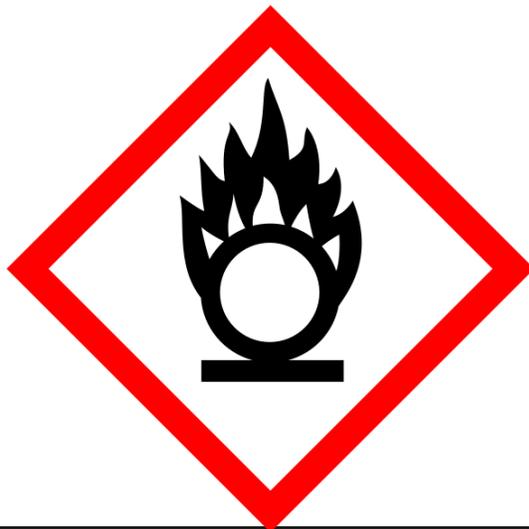
Please nominate a deserving teacher for the Outstanding Biology Teacher Award (can be a life science teacher). There are many deserving teachers out there that need to be recognized. They have to have taught and are currently teaching life science for three years or more.

Send an email with your name and email along with the nominee, their email and school to Julie.olson@k12.sd.us



TED Ideas worth spreading

Short videos from experts in a variety of fields.



Is your science department GHS safety trained?

What Is GHS? In March 2012 OSHA published the first major revision to the Hazard Communication Standard since its inception. In announcing the revision to incorporate what is known as GHS, OSHA stated that its goal was to transform the “right to know” into the right to understand chemical hazards. GHS stands for the Globally Harmonized System of Classification and Labeling of Chemicals. GHS is a document that establishes objective criteria for classifying and identifying chemical hazards. The overarching goal is to ensure the safe use of chemicals by providing practical, reliable, and comprehensible information on their hazards. Misunderstandings and misconceptions concerning chemical toxicity provide good examples for why OSHA decided to adopt GHS. For instance, the news media all too often describes chemicals using the adjective toxic. Yet the misunderstanding arises at least in part due to conflicting criteria for describing a chemical as toxic. Various regulatory and advisory organizations, such as ANSI, the NFPA, EPA, OSHA and DOT, employ a range of values, from 50 to 500 to 5000 mg/kg, to determine if a substance is harmful based on its acute toxicity or LD50. **Teacher Training** Passage of the GHS provisions in March 2012 started a three-year “clock” for employers and chemical manufacturers to comply with the new requirements. The first deadline under the law is December 2013. By this date schools and school districts must provide training for teachers and staff to understand how to read GHS labels and the new Safety Data Sheets (the “M” in MSDS has been dropped). Over the next three years Flinn Scientific will provide teachers with the information and training needed to meet GHS requirements and improve chemical safety in your school. Note that chemical manufacturers and distributors have until June 2015 to reclassify chemicals and produce GHS-formatted labels and SDS for all new products. Training precedes implementation!

Free Safety Training from Flinn

Just as you employ a range of differentiated instruction in your classroom to help your students achieve learning objectives, we encourage you to do the same to meet your safety training goals. Effective safety training is comprehensive, ongoing, and scaffolded. The free Flinn Scientific [Laboratory Safety Course](#) is available online for all teachers. Please take advantage of this opportunity now to become “Flinn Safety Certified.” We guarantee you and your students will benefit. In the months ahead Flinn Scientific will provide additional training tools, one step at a time, in the form of free videos, publications, and safety notes, to help you build knowledge and confidence in your understanding of GHS.

Go to the following website, register, watch the video and take the quiz. If you pass, you will get a printable certification certificate. It is suggested to post them as well as keep a copy on file to prove training. It is mandatory for all science labs to receive this training.

Do you know what these new GHS symbols mean?



NanoSpace Offers Teachers Fun, Interactive Games Designed to Increase Science Literacy

World-renowned professors and scientists from Rensselaer Polytechnic Institute, creators of **The Molecularium® Project** (www.molecularium.com), have launched **NanoSpace** (<http://nanospace.molecularium.com>), a website designed to teach kids about the nanoscale world of atoms and molecules. Teachers will find that the virtual scientific amusement park offers them fun activities and games that they can incorporate in the classroom.

Wondering how to do this? It's easy. Just visit the Guide to NanoSpace: www.molecularium.com/educators.html. Here are just a few tips on how to incorporate NanoSpace activities in your classroom. Additional discovery-based lessons may also be downloaded from the website's Educator Resources tab.

Periodic Table: Help students learn and remember the Periodic Table of Elements with the [Periodic Memory game](#), a concentration style memory game where players flip over elements and match them to their location on the Periodic Table in a race against the clock. Divide your class into teams and see how far each team gets.

Microscopes: Use [MicroLab](#) to teach about different types of microscopes and magnification ranges. Students can use high powered virtual optical, electron and atomic probe microscopes to zoom in and investigate a wide range of specimens and materials, from flowers and insects to grains of pollen and nanotubes.

Molecular structures and formulas: Demonstrate and reinforce the connection between molecular structures and formulas with [Build'em](#), an interactive molecular building game. Project and build the first few molecules in the class to clearly illustrate how their chemical and structural formulas represent their structure and how their atoms are arranged. Rotating molecules in any direction as you build makes this a very useful tool for demonstrations. Have students build all of the molecules on their own in class or as homework.

"NanoSpace provides educators with interactive activities and games to supplement what they are teaching in the classroom," Richard W. Siegel, Ph.D., Director of the Rensselaer Nanotechnology Center. "When learning is fun, it increases a child's capacity to absorb and retain knowledge," he added.

Teachers are already witnessing firsthand how NanoSpace engages students and improves their ability to comprehend the information. "I found "NanoSpace - Molecules to the Max" to be both educational and entertaining. It introduced my 4th graders to the world of atoms and molecules through kid friendly characters; Oxy, Hydra, and Mel, the molecularium computer," stated Laurie Brennan, a 4th grade science teacher from Lester Grove School, part of the Downers Grove District 58 in Illinois. She added, "The website is visually appealing to kids and uses 25 games in a virtual theme park. NanoSpace explained difficult concepts such as atoms, molecules, polymers and DNA at a level kids can understand. It's a great resource and my students loved the website!"

A recent report by the President's Council on Science and Technology estimates approximately 8.5 million STEM job openings will be available over the next decade. The Molecularium® Project and its NanoSpace program are helping to fill the forecasted gap of one million graduates during this time period who will not be qualified to fill these positions. These unique, online science resources are designed to supplement scarce school-based curricula and teach children through enjoyable interactions. The activities in NanoSpace teach and reinforce the National Science Education Standards, just as do all other Molecularium® Project programs. In addition to the Teachers Guides, which outline measurable goals related to these standards, free educator resources for the Molecularium® Project include lesson plans for grades K-4 and 5-8, crossword puzzles, songs, quizzes, printable posters, and more.

Research has proven that students retain more thorough knowledge of a concept through interactive learning. Independent analysts quizzed students before and after seeing Molecularium animations, and found that the core concepts were firmly grasped by young audiences. The percentage of correct answers for younger audiences more than doubled.

Thank you for teaching science and have a great school year!

2014 SPEAKER / PRESENTER PROPOSAL FORM

22nd Annual Joint Conference of SDCTM and SDSTA

February 6-8, 2014

Crossroads Hotel/Huron Event Center

Huron, SD

1-800-876-5858

Submission of this form constitutes acceptance unless otherwise notified.

OFFICE USE ONLY:

Session No. _____

Day _____

Time _____

Location _____

Repeat Session _____

All speakers must also register for the conference.

Download registration form at www.sdctm.org or www.sdsta.org

(Name as you wish it to appear in program booklet)

(Name as you wish it to appear in program booklete)

(Name of School/Affiliation)

(Name of School/Affiliation)

Preferred Address: work home

(Address)

(City)

(State)

(Zip)

(Work Phone)

(Home Phone)

Email _____

Include email in program? Yes No

Website http://

Grade level (select only one)
(select only one)

K-5
Math

6-8
Science

9-12

Title of presentation: _____

Description (may be edited) max. 50 words:

Length of presentation: One hour Two hours
Date of presentation: Friday Saturday
 Either day Both days
LCD projector? YES NO

Only requested equipment will be provided.

Speakers are encouraged to bring their own equipment.
The conference cannot guarantee compatibility of
electronic components.

**Speakers are expected to bring their own
computers and software.**

Speakers are encouraged to bring their own equipment. Each room will be equipped with a screen and power strip.

If you have a last minute change or cancellation (after midnight Feb. 5, 2014) please call Crossroads Convention Center 1-800-876-5858

Speakers are requested to provide handouts for 30 on a first come, first served basis.

Return this form by **OCTOBER 15, 2013** to:

Jean Gomer

Box 96

White, SD 57276

email: jean.gomer@k12.sd.us

Modified
07/15/2013
CK

I agree to comply with the guidelines in the "Minimum Safety Guidelines for NSTA Presenters and Workshop Leaders:" during my presentation. NSTA Minimum Safety Guidelines are located online at <http://www.nsta.org/coru/safety.html>

Signature _____

Date _____

Contact SDCTM with any special needs requests as defined by ADA by emailing Jean Gomer at jean.gomer@k12.sd.us before October 15, 2013

All speakers must also register for the conference:
Download registration form at www.sdsta.org or www.sdctm.org

Conference program information and booklets will be available for download from www.sdsta.org and www.sdctm.org

WHAT HAPPENS TO THE CONFERENCE EVALUATIONS???

Each year at the end of the SDCTM/SDSTA Joint Professional Development Conference, the participants have the opportunity to fill in an evaluation form. About 30 of the 250 attendees actually turn in these evaluations. The Joint Committee reads all of them and decides how to address the concerns for the next conference. Most of the comments are positive and require no action—just keep doing what we are doing. The negative comments give us something to discuss and decide whether or not we can use the suggestions to improve the conference. Some things we can do nothing about, some things are items of personal preference, and some things are great ideas for change. I would like to address a few recurring things that you may think the committee is ignoring.

A huge concern is the lack of elementary sessions. This has been discussed every year that I have been involved with the conference. Each year, SDCTM brings in one featured speaker that is elementary oriented. SDSTA also looks for a featured speaker that is of interest to elementary teachers. But, the main source of elementary speakers is YOU, the elementary teachers of SD. You have many great things to share with your colleagues. The first time you present is not easy, but our conference is a friendly place to start. Consider trying to present with a friend. The application form is available at www.sdctm.org and www.sdsta.org. Please return the form by October 15, 2013.

Another concern is the facilities and food. If you as an individual have trouble with your room or meals, please let the Crossroads

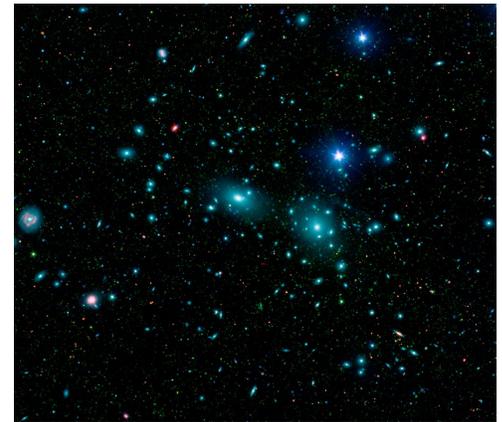
know. They want things to go well as much as we do. If your concern is with the lunches or banquet, let the committee know. Choosing a meal for 100 to 250 people within a budget is not an easy task. Remember, too, that the banquet ticket pays for the meal, the banquet speaker, the decorations, etc. Also remember that some of the other attendees may have liked the meal that was chosen.

The final concern that I am going to address is the vendors. We do not choose our vendors, they choose us. In their world, we are a small conference; and as budgets are cut, they stay with the larger conferences. We have been so fortunate to maintain a relationship with the book companies that come every year. We have also been excited to have people like the Vernier's come once. For those of you who wonder why the t-shirt man hasn't been back, he only comes once every three to five years to a conference our size.

If you have other questions about the conference structure, contact a Joint Board member. Or better yet, get involved in the leadership of your individual organization.

Jean Gomer, Conference Coordinator

February 2014 is an election year for SDSTA. If you are interested in being an officer in the SD science organization (or know of someone that would make a good officer), contact any of the current officers so that names may be placed on the ballot. Thanks for your help.



Size Does Matter, But So Does Dark Energy

By Dr. Ethan Siegel

Here in our own galactic backyard, the Milky Way contains some 200-400 billion stars, and that's not even the biggest galaxy in our own local group. Andromeda (M31) is even bigger and more massive than we are, made up of around a *trillion* stars! When you throw in the Triangulum Galaxy (M33), the Large and Small Magellanic Clouds, and the dozens of dwarf galaxies and hundreds of globular clusters gravitationally bound to us and our nearest neighbors, our local group sure does seem impressive.

Yet that's just chicken feed compared to the largest structures in the universe. Giant clusters and superclusters of galaxies, containing thousands of times the mass of our entire local group, can be found omnidirectionally with telescope surveys. Perhaps the two most famous examples are the nearby Virgo Cluster and the somewhat more distant Coma Supercluster, the latter containing more than 3,000 galaxies. There are millions of giant clusters like this in our observable universe, and the gravitational forces at play are absolutely tremendous: there are literally *quadrillions* of times the mass of our Sun in these systems.

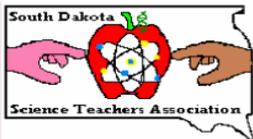
The largest superclusters line up along filaments, forming a great cosmic web of structure with huge intergalactic voids in between the galaxy-rich regions. These galaxy filaments span anywhere from hundreds of millions of light-years all the way up to more than a *billion* light years in length. The CfA2 Great Wall, the Sloan Great Wall, and most recently, the Huge-LQG (Large Quasar Group) are the largest known ones, with the Huge-LQG -- a group of at least 73 quasars -- apparently stretching nearly 4 billion light years in

its longest direction: more than 5% of the observable universe! With more mass than a million Milky Way galaxies in there, this structure is a puzzle for cosmology.

You see, with the normal matter, dark matter, and dark energy in our universe, there's an upper limit to the size of gravitationally bound filaments that should form. The Huge-LQG, if real, is more than *double* the size of that largest predicted structure, and this could cast doubts on the core principle of cosmology: that on the largest scales, the universe is roughly uniform everywhere. But this might not pose a problem at all, thanks to an unlikely culprit: **dark energy**. Just as the local group is part of the Virgo Supercluster but recedes from it, and the Leo Cluster -- a large member of the Coma Supercluster -- is accelerating away from Coma, it's conceivable that the Huge-LQG isn't a single, bound structure at all, but will eventually be driven apart by dark energy. Either way, we're just a tiny drop in the vast cosmic ocean, on the outskirts of its rich, yet barely fathomable depths.

Learn about the many ways in which NASA strives to uncover the mysteries of the universe: <http://science.nasa.gov/astrophysics/>. Kids can make their own clusters of galaxies by checking out The Space Place's fun galactic mobile activity: <http://spaceplace.nasa.gov/galactic-mobile/>

PHOTO CREDIT: Digital mosaic of infrared light (courtesy of Spitzer) and visible light (SDSS) of the Coma Cluster, the largest member of the Coma Supercluster. Image credit: NASA / JPL-Caltech / Goddard Space Flight Center / Sloan Digital Sky Survey.



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PAEMST Contact: Ramona Lundberg

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What is GAME:IT? <http://stemfuse.com/shop/gameit-10000-initiative>

100% COST FREE –let’s engage and attract students while teaching STEM. Full semester (18 week) game design course that encompasses ALL facets of STEM. Contains absolutely ALL needed materials and is ready to teach. Designed at an intro level this course assumes no previous technical experience by teacher or student – this is for ALL interested teachers and students. Content is 100% digital allowing the course to be delivered in a traditional room/lab setting or easily adaptable to any distance learning platforms. USE IT WITHIN YOUR SCHOOL WITHOUT RESTRICTION! Aligned with ALL applicable state and national CTE standards, ISTE.NETs, 21st Century Skills and Common Core technology, math & science. See what schools are saying about GAME:IT <http://stemfuse.com/testimonials/>

GAME:IT - HIGH SCHOOL REGISTRATION & PARTICIPATION PROCESS

Participating school AND ALL POTENTIAL TEACHERS within the school must register with STEM Fuse on the client-school registration page on our STEM Fuse website. A registered teacher will receive a login password that will allow them to access the entire GAME:IT course at any time – 24/7

- Go to <http://stemfuse.com/shop/gameit-10000-initiative> to learn everything you need to about GAME:IT and then complete the fast registration process – you will gain access to the complete course material IMMEDIATELY via email upon completion

The SDSTA Newsletter is published four times a year. The September issue (this one) is 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 is given away 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.

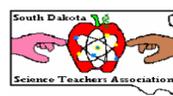
Members may also earn a 10% finders fee for any science related ads placed in the newsletter. Our rates are \$100 per page (or 3 to 4 quarter pages) or insert per issue or \$300 per page to place an ad in four consecutive issues.

Everything you need to about GAME:IT and then complete the fast registration process – you will gain access to the complete course material IMMEDIATELY via email upon completion

This is a FREE, no strings attached, STEM Initiative – please keep us in mind as this initiative will run through 6/30/2016.

Wanted: Speakers for the 2014 Joint Conference to be held in Huron in February. Application Form (& Registration Form) is found at www.SDSTA.org. The speaker proposal form should be sent to Jean Gomer by October 15, 2013.

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



\$ 5 Student
\$ 5 K - 6
\$ 5 Retired
\$ 20 All Others

Name _____ Home Phone _____ - _____
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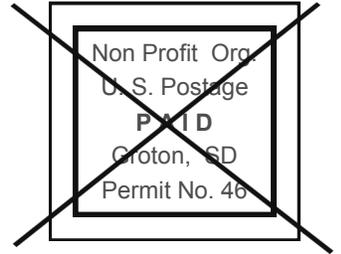
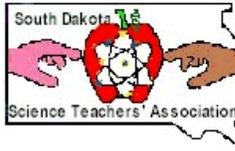
Your School _____ School Phone _____ - _____
School Address _____
City _____ State _____ Zip _____

Your area K - 6 7 - 8 9 - 12 College Other _____
(circle one)

Referred by _____

South Dakota Science Teachers' Association

Julie Olson and James Stearns
Editors, SDSTA Newsletter
15 North Fifth Street
Groton, SD 57445-2024



ADDRESS SERVICE REQUESTED



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Science**



Calendar of Events Calendar of Events

- Today - Nov 1 www.eCybermission.org is open for registrations.
(Early registrants will receive an educational STEM kit.)
- December 12-14 NSTA Area Conference—Denver, Colorado
- January 15, 2014 SD-AAPT Photo Contest deadline. SDAAPT.SDSTA.org
- January 15 Final registration for eCybermission
- February 6—8, 2014** 22nd Annual Joint Math & Science Conference - Huron, SD
- February 21 Contest deadline for www.Worldof7Billion.org.
- March 1 Project submissions are due to eCybermission
- March 22 South Dakota Science Olympiad—USD

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