



# SDSTA

South Dakota Science Teachers Association

Summer Issue | Date: July 9, 2019

Dear Members,

I hope you are enjoying the summer weather that finally showed up and the much needed break from the demands of the classroom!

As we begin ramping up for another year, take some time to browse through the professional development and networking opportunities in this newsletter. There are some great programs this summer to make this year your best ever. If you are looking for something a little more informal look to some book studies or just lounge at the pool with a good book!

As you are finding fun and new ideas to try in your classrooms be sure to share them out through our social media outlets. We've got @SDSTA on Twitter or SDSci on Facebook. There you will find a wealth of resources and others willing to help. We would love to see the great ideas you've found!

Registration and speaker proposals are now live on the website. Make sure and get your requests in while the budget is fresh! Online registrations can still be paid by check after an invoice has been sent to you. Feel free to email any of the board members with questions.

Enjoy the rest of your summer and take some time to relax and recharge! Enjoy the molten metals flying through the air over the Fourth! Less than 50 days until school starts!!

Best Regards,  
Mark Iverson  
SDSTA President



## TABLE OF CONTENTS

|                                       |           |
|---------------------------------------|-----------|
| <b>NASA.....</b>                      | <b>18</b> |
| <b>Officer Offerings.....</b>         | <b>4</b>  |
| <b>Professional Development.....</b>  | <b>7</b>  |
| <b>Resources.....</b>                 | <b>8</b>  |
| <b>SD DOE Science Specialist.....</b> | <b>2</b>  |
| <b>SD STEM Ed Conference.....</b>     | <b>6</b>  |
| <b>SDSTA Science Fair Awards.....</b> | <b>14</b> |
| <b>SDSTA Officers .....</b>           | <b>19</b> |
| <b>Student Competitions.....</b>      | <b>15</b> |
| <b>Teachers in the News.....</b>      | <b>3</b>  |

## Greetings from Jen Fowler SD DOE Science Specialist

Hello, my science friends!

I have exciting news to share regarding science education in South Dakota. As of June 10th, I am the newest SD Department of Education Standards & Instruction Specialist (aka Science Specialist) and I am looking forward to representing teachers across our state. Many of my ideas and dream projects will now be possible to implement and I hope you will join me on this journey. I will retain my K12 email so I can easily be found when you have questions or ideas to share. I will be working remotely from my home in the Black Hills while regularly traveling to Pierre, around SD, and beyond. My pup, Raven, has agreed to be my secretary in my home office so be sure to say hello to her!

Packing up my classroom after twenty years of teaching middle school science was certainly an odd feeling, but I am certainly ready for changes, new opportunities, and challenges. My husband would tell you that I kept too much of my classroom "stuff" but that is where things accumulated when there was no place at home. I will have my "nature shelf" items to inspire learning activities during our workshops in the future! I will bring other items to our SD STEM Ed conference in February to be placed in the "Sharing Room" for you to claim as your own. Maybe you could start thinking of your own items to give away as well!

Are you signed up on the DOEScience listserv? It is accessible from the K12 portal at <https://www.k12.sd.us/> under K-12 Mailing Lists. At this time, the listserv will be my main method of communication for dispersing newsletters, professional development opportunities, and much more. Stay tuned, and please let me know how I can assist you in my role as the liaison between you and the SD DOE. The future is bright and I am excited about our new adventures!

*"The listserv will be my main method of communication for dispersing newsletters, professional development opportunities, and much more."*



## Join DOE Science

Send an email message in the following form:

- Address the message to:  
**ListManager@k12.sd.us**
- Leave the subject line blank.
- In the body of the message type:  
**Subscribe DOEScience**

When you join the list, then you will be sent a welcome message informing you that you are subscribed.



**SD Science Standards & Effective Instruction**

**Sanford**  
Underground  
Research  
Facility



In partnership with the South Dakota Department of Education, the Education and Outreach team at the Sanford Underground Research Facility will be offering 3 opportunities to dive into the SD Science Standards, the supporting standards documents (translations) and effective 3-dimensional science instruction.

The professional development will be offered 3 times: July 16-18 in Rapid City, July 23-25 in Pierre, and July 30-Aug 1 in Sioux Falls.

See page 7 for more details.

# Science Teachers in the News

## USPTO TEACHER INSTITUTUTE

**Julie Olson** will be attending the US Patent and Trademark Office Teacher Institute in Charlotte, NC at the end of July. NSTI combines experiential training tools, practices, and project-based learning models to support elementary, middle, and high school teachers in increasing their knowledge of making, inventing, and innovation.



## Michelle Bartels goes to Germany with TOP Program



## 2019 South Dakota Outstanding Biology Teacher of the Year



Congratulations  
**Cherrie Martinson**  
of Douglas High School!

**Cherrie** is a Life Science teacher from Douglas High School where she teaches Biology and Anatomy/ Physiology. She has been there since 2004 (previously in Rapid City). She supervises the science club, takes her students on numerous field trips, and has participated in teacher research experiences as well as an exchange that took her to Germany to collaborate with teachers there. She strives to give her students hands-on experiences and to be environmentally conscious.

## Congratulations to our 2019 PAEMST State Finalists for South Dakota 7-12 Science!

- **Denise Clemens** teaches High School Sciences at Northwestern Area School District
- **Tiffany Kroeger** teaches Middle and High School Sciences at Montrose School District

Curious about the PAEMST process? The South Dakota State Science Selection Committee met in June to review all the 2019 SD applications. Denise and Tiffany's applications were forwarded to the PAEMST National Selection Committees representing excellent science teaching in SD! The National Selection Committee's recommendation for a State Awardee are made to the PAEMST Team by the end of August. We know the official announcement of Awardees by The White House takes a long time for various reasons. Hopefully, the 2017 and 2018 National Awardees will be announced by the time this newsletter is released!

The application process for the PAEMST 2020 cycle will begin this fall for K-6 teachers of science and math. Stay tuned for more information!

**Please contact me with any questions you may have!**

Jennifer Fowler  
SD PAEMST Science Coordinator  
jennifer.fowler@k12.sd.us



# Officer Offerings

## 5 Ways to Ensure All Voices Are Heard in Your Classroom

Submitted by Ally Bowers  
SDSTA Liason

For students to effectively learn in a science classroom, they need to be able to talk through their own ideas, as well as to listen to and respond to their peers' ideas. However, many teachers have experienced this scenario: you spend time analyzing your students. You attempt to group them in a way that will ensure that one person doesn't dominate the conversation, the students won't be sidetracked, and the discussion leads to valuable learning. You set them up with materials to use, an interesting article to read, or a debatable question to discuss, and then, it flops. As teachers, we may see this as a problem with our students, but there are many strategies to ensure that not only are your students on-task, but they are also having equitable, engaging science experiences. Here are a few that you may like to try in your classroom:

- 1. Classroom norms:** Norms are expectations for the way that people will interact with each other. Having specific norms that are referenced often and that students are held accountable for helps maintain the overarching expectation that all students are here to learn. Here are a few that promote a positive classroom culture:
  - i. Everyone here has expertise to offer; everyone here has something to learn.
  - ii. Speak with the possibility of being heard and listen with the possibility of being changed.
  - iii. Ensure all voices are heard.
  - iv. When speaking, monitor your airtime. When listening, be an active listener.
- 2. A talking stick.** A talking stick is any object that students use to ensure that not only are all voices heard, but that each person can expect to share their ideas without being interrupted or having their ideas discounted immediately. A simple large Popsicle stick does the trick, but it could be any symbolic object that a group can use. Talking sticks are often used to "whip" around a group, where each person in a group is allowed to share their ideas before opening the conversation to everyone.
- 3. Talking chips.** Talking chips are a great way for students to begin to monitor their airtime, but it also allows them to engage in their own wait-time as they think about what they want to say. Each time they wish to contribute to a discussion, they must place one of their talking chips into the pile. Once they are out of chips, they must either wait until everyone else has run out of chips OR they are only allowed to be an active listener. Talking chips can be anything from math manipulatives to poker chips, as long as there are a finite amount for each group and individual to use.
- 4. Status disruptor.** Status comes into play in the classroom more often than we would like to admit. Often, when a group has the smartest student, the most popular student, or the most authoritative student in their group, the rest of the group accepts their "lower" status and lets that person voice their ideas the most, which inevitably leads to their ideas being seen as the best ideas. In order to disrupt this, there are a few things you can do.  
*Continued on following page...*



<http://clipart-library.com/clipart/781234.htm>

# Officer Offerings

## 5 Ways to Ensure All Voices Are Heard in Your Classroom

Continued from previous page.

- I. Assign group roles. Something as simple as assigning group roles can ensure that not only does the group stay on task, but each member of the group is expected and allowed to be heard. Group roles could include a manager or facilitator, who monitors the discussion and keeps the conversation focused, a time keeper to monitor time and aid the facilitator, a recorder, who is keeping notes of important ideas, and an equity manager, who makes sure that everyone gets a chance to share. There are many others, but those are frequently used.
- II. If you randomly assign groups and you notice that there is a student who might be the person to be pushed out of a conversation, something as simple as having them distribute materials or act as the facilitator can allow them to gain a slightly higher status in the group than they might have normally had.

If we as educators intend for all students to learn, we must create and cultivate a classroom culture that promotes equity and curiosity. This takes intentional planning and explicit instruction, especially when these strategies are new to students. The results, however, are worth it. If you would like to learn more on the topic of status in group work, the book *Designing Groupwork: Strategies for the Heterogenous Classroom* is a great resource.

## A First-hand Account of the First Moon Landing

Submitted by James Stearns  
SDSTA Treasurer

As a youngster, about fifty years ago, I can remember the events starting July 16, 1969 around 8:30 AM. The Apollo 11 rocket was launched from Florida at the J. F. Kennedy Space Center. A few days later we watched a grainy b/w TV as a man, Neil Armstrong, took that "giant leap for mankind" as he stepped off the lunar lander and stepped foot on the moon. Buzz Aldrin followed Neil down that ladder and also stepped foot from the Eagle to the moon. That caught my interest so much that when I entered high school and the English teacher required us to write reports, my topic would be to write about space and the Apollo missions. The next quote I remember is when the third man stepped foot on the moon - Conrad, who was only 5'6" said "That may have been a small step for Neil, but that's a long one for me!" as he stepped from their lunar lander to the moon's surface.

I now hear that an app is being put together so that users re-live the Apollo 11 mission. You'll be able to hear actual recordings as they took place fifty years ago. Also in the planning stages is travel to Mars and beyond. I just haven't seen the excitement for this venture as there was for moon travel. Maybe it's because no one has put forth a challenge for America to be the first to complete this mission.

For additional info and updates, check out [NASA.org](https://www.nasa.org)

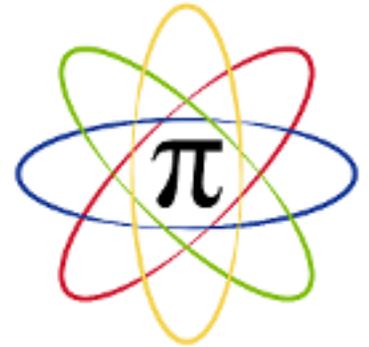


# SD STEM Ed Conference

THE JOINT CONFERENCE is now  
**SD STEM Ed Conference**

*Save the date!* **FEB. 6-8, 2020**

Over the past few years, the SDCTM/SDSTA Joint Professional Development Conference (JPDC) Executive Board has been moving toward paperless registration. We will only have on-line registration for the 2020 SD STEM Ed Conference (hosted by JPDC). This will be the same great conference we've had for the past 27 years – under a new name as of 2019!



Participants will register online at: <https://forms.gle/nB5bxikUExzZHDvP7>. You will receive an invoice at the email provided within 2 business days. The invoice can be paid online via credit card or PayPal or participants/school districts can mail a copy of the invoice with a check to:

SDCTM/SDSTA JPDC  
 Sheila McQuade, Treasurer  
 c/o O’Gorman High School  
 3201 S. Kiwanis Ave  
 Sioux Falls, SD 57105

**On-line Registration only**

**SD STEM Ed**

**Early Bird Discounts!**

| Early Bird Jun 1 – Dec 15 |                    |                    | Pre-Registration Dec 16 – Jan 24 <i>Payment must be postmarked 1/20 or online payment COMPLETED by paying with Paypal or credit card by 1/24.</i> |                    | On-Site After Jan 24 |                    |
|---------------------------|--------------------|--------------------|---|--------------------|----------------------|--------------------|
|                           | 2 day registration | 1 day registration | 2 day registration  | 1 day registration | 2 day registration   | 1 day registration |
| Member                    | \$85.00            | \$60.00            | \$10.00   | \$75.00            | \$120.00             | \$95.00            |
| Student                   | \$30.00            | \$20.00            | \$35.00   | \$25.00            | \$65.00              | \$55.00            |
| Non-member                | \$135.00           | \$110.00           | \$150.00  | \$125.00           | \$170.00             | \$145.00           |

## 2020 SD STEM Ed Conference Session Proposals

Consider putting together a session to share with other educators from around the state.

- Submit as many sessions as you want but you may not get acceptance of all.
- Both workshop or presentation style welcomed.
- Presenters must be registered or exhibiting at conference
- You will receive confirmation of acceptance by December 1.



Projectors will be supplied as needed. Other materials or technology is the responsibility of the presenter.

**"Life Begins at the End of Your Comfort Zone."**

**Neale Donald Walsch**

## Dive Into the South Dakota Science Standards

In partnership with the South Dakota Department of Education, the Education and Outreach team at the Sanford Underground Research Facility will be offering 3 opportunities to dive into the SD Science Standards, the supporting standards documents (translations) and effective 3-dimensional science instruction.

Participants in this training may sign up for 1 graduate credit through Black Hills State University.

The professional development will be offered 3 times: July 16-18 in Rapid City, July 23-25 in Pierre, and July 30-Aug 1 in Sioux Falls.

Participation is limited to 30 participants and is open until filled.

For additional information and to sign up, select the appropriate link below:

### July 16-18, Rapid City:

<https://southdakota.gosignmeup.com/public/Course/browse?courseid=12658>

### July 23-25, Pierre:

<https://southdakota.gosignmeup.com/public/Course/browse?courseid=12659>

**July 30 – Aug 1, Sioux Falls:** <https://southdakota.gosignmeup.com/public/Course/browse?courseid=12660>

If you have questions, please contact Deb Wolf either by phone (605.571.2418) or email ([debra.wolf@bhsu.edu](mailto:debra.wolf@bhsu.edu)).



## 3D Printed Devices and Micro-controllers for the Science Classroom

The Augustana Chemistry Department is hosting a free, continuing education event for middle and high school teachers focused around the development and use of 3D printed devices and microcontrollers in the science classroom. Specifically, we will introduce an inexpensive colorimeter that can be used for light absorption or fluorescence measurements. We will go over example experiments and exercises and will provide handouts of these ready-to-use activities.

The first 30 educators signed up for the event will get a free, fully working setup to take back to their classroom to use. Additionally, we will introduce basic use of Arduino microcontrollers that can be used to control many sensors including light detection, temperature, and pressure. The open-architecture of these microcontrollers will allow for the development of other inexpensive sensors (total cost of \$30- \$50, depending on the exact components).

### Key Features:

- FREE event – no registration fee
- 3 Hours of CE Credit
- FREE stuff to take back to your classroom! – including 3D printed cuvette holder, and Arduino microcontroller
- Ready-to-use experiments and demonstrations to take back to your classroom
- Instruction on how to use the setup, and guidance on how to adapt to your needs
- Flexibility to design new activities
- Teachers in the fields of Chemistry, Physics, Biology, Physical Science, Life Science, Engineering, and Computer Science may be interested.

**Where:** Froiland Science Complex, Augustana University  
2407 S. Summit Ave, Sioux Falls, SD 57197

**When:** Saturday, October 26, 2019, 1-4 pm

If Interested, contact: **Andrew Klose, Augustana University** [andrew.klose@augie.edu](mailto:andrew.klose@augie.edu)  
(free materials for the first 30 teachers signed up)

## AMERICAN METEOROLOGICAL SOCIETY ONLINE

The **American Meteorological Society** (AMS) is committed to providing educators with accurate and engaging resources that enhance teachers' knowledge of Earth system science while also earning graduate credit. In alignment with grant funding and values, AMS incorporates a special AMS/NOAA initiative into their professional development workshops to promote minority participation in science.

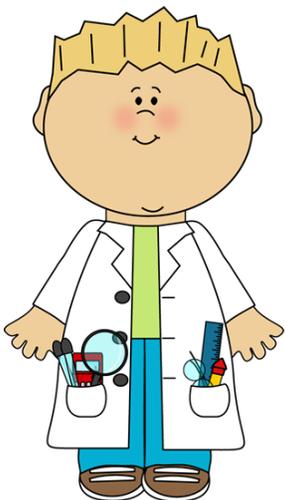


[Project Atmosphere](#) provides educators with comprehensive training and studies in atmospheric sciences.

The [Maury Project](#) develops a foundation of oceanography and understanding hydrological processes.

The DataStreme Program offers three specialties: [DataStreme Atmosphere](#), [DataStreme Ocean](#), and [DataStreme Earth's Climate System](#). These online courses teach Earth system science fundamentals through real-world information that is widely applicable across various curriculums.

## Free Elementary Science Lessons at Education.com



Want to facilitate elementary science learning beyond traditional textbooks? You can with the interactive lesson plans and printable worksheets for grades PreK–5 from Education.com. The database has more than 100 science lesson plans addressing everyday science topics such as the weather, five senses, landforms, color spectrum, solar system, water cycle, animal adaptations, human body, and more. The lessons are simply designed so that teachers (and parents) can easily conduct activities in the classroom or at home, and they encompass a wide variety of learning experiences from Identifying Living and Nonliving Things with preschoolers to the participating in the Wacky Windmill Challenge, an engineering design activity for fifth-grade students. At the site, users can scroll over a title (without clicking) to view a lesson synopsis and grade level, or filter search results by grade level or subject. (Free registration is required to download the lessons.)

 **Using the KLEWS chart for translating the NGSS**

Kate Soriono

Driving/Lesson Question:

| <b>K</b><br>What we think we know about the phenomenon | <b>L</b><br>What we are learning | <b>E</b><br>Evidence (from our data) | <b>W</b><br>Wonderings | <b>S</b><br>Scientific Concepts and Words |
|--|----------------------------------|--------------------------------------|------------------------|---|
|  |                                  |                                      |                        |   |

# Resources

## Teaching Students How to Legally Use Images On-Line

Jennifer Gonzalez  
Cult of Pedagogy



This is a great resource to look at this summer to go over copyright rules and how to teach students what is right and wrong as well as how they are better off creating their own materials. Even though most projects are for school, and not public dissemination, there is no guarantee that it will remain so. In SD, there was a high school that paid a fine for using a song clip in a student project. This project was done several years ago and recently was "found" by an industry lawyer.

A science teacher tells his class, "Oxygen is a must for breathing and life. It was discovered in 1773." A student responds, "Thank God I was born after 1773! Otherwise I would have died without it."



## 27 Tech Tools to Inspire Creativity - from Ozobot



- **EVO Classroom Kit** - with 12 EVO's that can be programmed.
- **Nearpod** - for multimedia displays. This includes over 450 VR tutorials.
- **Learn Around the World** - use technology to connect students and teachers globally. There are events and collaborative projects as well as virtual field trips to explore foreign lands.
- **Buncee** - student presentation tool - students can add their own voices. Easier to use than PowerPoint.
- **Glogster** - Create multimedia presentations as well as access over 40,000 glogs.
- **Flipgrid** - keep class discussions going after class ends. Students can create video recordings.
- **Today's Meet** - teachers can monitor and respond to classroom chats. Quiet students can participate.
- **Microduino** - small electronic building blocks that can stack with Legos.
- **TinyTap** - access over 10000 games or have students create their own.
- **Labster** - Access a university caliber lab through simulations.
- **PhET Sims** - engaging interactive simulations.
- **ZeeMaps** - create maps and add color as well as labels
- **Tiki Toki** - create time lines
- **Popplet** - brainstorming and mind-mapping
- **Venngage** - create infographics
- **Sutori** - multimedia-rich story that looks like a timeline
- **LiveBinders** - save articles and videos, take notes, and post other forms of content in one place.
- **Science360 Video Library** - videos related to science, technology, and engineering
- **Teachers TryScience** - lesson plans and tutorials to make content more engaging

More tech tools found here.



# Resources

## TEACHING with PHENOMENA

"Science instruction has often been centered on learning general knowledge rather than exploring and explaining specific phenomena, such as directly teaching Newton's Laws of Motion rather than learning about them through an engineering design challenge. By exploring phenomena, students have opportunities to apply science and engineering practices and to build their own larger scientific conceptions and identities."

~ *STEM teaching tools Practice Brief 42*



Phenomena for NGSS



## NGSS Chats

NGSS Chat - Twitter chats every 1st and 3rd Thursdays at 9:00 EST.

#NGSSchat is an on-line forum to learn and share around the Next Generation Science Standards and great science teaching that happens on the 1st and 3rd Thursdays of the month.



## #NSTAchat Schedule

**June 27** – NSTA Summer Congress on Science Conference

**July 11** – 50<sup>th</sup> Anniversary- Lunar Landing

**July 25** – Teaching Science and the English Language Learner

**September 12** – Making Science Learning Lifewide and Lifedep - NSTA President Dennis Schatz

**September 28** – Technology-enhanced assessment in STEM education.

**October 10** – Science Education in Rural Communities

## Free Classroom Subscription Science in the News

**High school science teachers:**  
**Would you like a tool that helps your students:**



SOCIETY FOR  
SCIENCE & THE PUBLIC

- Practice reading comprehension and develop vocabulary?
- Learn how curricular topics relate to real life?
- Explore the world of science and develop research concepts?
- Learn how to interpret data and graphs?

**Each high school participating in the *Science News* in High School program gets:**

- **Ten print copies of each biweekly issue of *Science News* magazine** during the 2019 - 2020 academic year, delivering a comprehensive source of science journalism on the latest scientific discoveries.
- **Digital Educator Guides** full of interdisciplinary content for **each issue** and access to the **archive of guides**, providing ready-to-use material with questions, activities and experiments for many high school grade levels and science curricula.
- **Access to *Science News*'** online resources and **full archives**, allowing students to research science topics reported on **since 1924**.
- Access to an **online community** of *Science News* and other Society for Science & the Public Educators for **sharing ideas and best practices** for using *Science News* in High Schools.

*I've used Science in the News for 3 years now. The articles are always timely and engaging. The reading level is appropriate. You can search back issues.*

*Julie Olson*

Yes - I'm Interested in *Science News* in High Schools Program.

**click here to register**

# Resources

## NATIONAL AGRICULTURE IN THE CLASSROOM



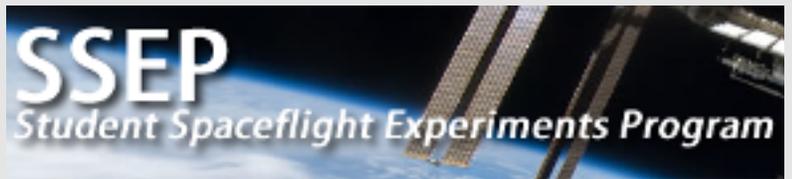
K-12 students and teachers alike can develop agricultural literacy with the resources at this website. Visit the Teacher Center to explore agriculture and farm life in 360 degrees through Virtual Reality experiences and virtual field trips; search for K-12 ag lessons in the National Agricultural Literacy Curriculum Matrix; learn about agricultural production in all 50 states; or subscribe to AgroWorld, an E-zine for grades 9-12 packed with news bits, classroom resources, and other student-friendly science, technology, and society connections to agriculture. The Student Center features resources highlighting careers in the industry, including video interviews with agriculture professionals from different fields and interactive websites (e.g., AgCareers.com and AgExplorer.com) for middle level and high school students to investigate careers matched to their interests. In addition, the Student Center has games and quizzes for K-12 audiences to test their Ag Smarts.

## Student Experiments on the ISS

Your school and district have an opportunity to truly be part of America's Space Program, with one of your student designed experiments selected for launch from NASA's Kennedy Space Center aboard a SpaceX rocket, transported to the International Space Station, and operated by the astronauts. It's about inspiring our next generation of America's scientists and engineers.

If you'd like to explore SSEP Mission 14 to the International Space Station for your community, please contact me directly, and quickly, at:

**Dr. Jeff Goldstein - [jeffgoldstein@ncesse.org](mailto:jeffgoldstein@ncesse.org)**



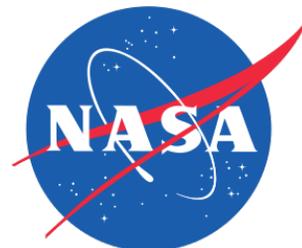
## STEPS TO A SCHOOL GARDEN

This on-line guide covers six topics in managing school garden programs - Why School Gardens" State your Case: Plan and Fund Your Gardens; Plant an Edible Garden; Teach in the Garden; Teach Nutritious Food; and Promote, Network, and Assess - with links for each area. From the Collective School Garden Network.



## Citizen Science NASA

Educators can participate in authentic science research and connect students with working scientists through citizen science projects from NASA. The projects feature research areas such as the universe, solar system, Sun, and Earth, and involve participants in activities from validating NASA air quality data to studying images from the Spitzer Space Telescope and the Wide-field Infrared Survey Explorer (WISE) satellite observatory to help Measure and Map Our Galaxy.



# NGSS Vetted Resources

## K-2 - The Needs of Living Things

Students watch video clips of animals and plants in their natural environments to determine what living things need to survive. They will then complete an illustration of their own real or imagined plant or animal fulfilling one or more of their needs for survival, within their natural environment. While this lesson does a good job explaining how animals meet their needs through their environments, additional lessons and experiences with plants would need to be provided in order to meet the full standard.

## 3-5 - Energy Encounters: Green Engineers

This article provides suggestions for implementing the Engineering is Elementary (EiE) solar oven curriculum in the context of the Next Generation Science Standards. The authors share one teacher's experience as she guides her class through the process of creating a solar oven using the EiE curriculum created by the Museum of Science, Boston.

Students are introduced to the real-world problems created when cooking with wood: it is labor intensive and has a significant impact on the environment. Students then discuss these issues in the context of green engineering practices. Students investigate how engineers go about solving problems while assessing environmental impacts. This is followed by an investigation of insulators. The final portion of the lesson challenges students to develop solutions to the problem of how to insulate solar ovens, using the results from their insulation investigation.

## 6-8 - Energy of Motion

Mechanical energy--kinetic and potential energy--are illustrated with pendulums and roller coasters. Students learn about energy transfer, and are introduced to the equations for kinetic and gravitational potential energy. They explore the difference between work (an energy transfer) and power (the rate at which energy is transferred) and perform simple calculations of these quantities. Conservation of momentum and collisions are explored in the context of billiards, baseball, golf. The dissipation of energy as heat by means through friction is presented. Students learn about static friction, kinetic friction and drag, and learn to calculate frictional force.

## 9-12 - Natural Selection

This interactive simulation (does not work on Chromebooks) allows students to explore natural selection in bunnies by controlling factors in the environment (equator or arctic environment), selection factors (wolves, food), and characteristics of the bunnies (fur color, tail length and teeth length). The bunnies in the default setting in the simulation have white fur, short tail, and short teeth. There is an option to introduce mutations, which causes bunnies with brown fur, long tail, or long teeth to appear. The user can also edit genes (select whether the mutation for fur color, tail length and teeth length is dominant or recessive). The simulation output includes a chart with the population of bunnies (number of bunnies) on the y-axis, plotted against time on the x-axis. There is an option to see a pedigree when the user clicks on an individual bunny moving within the environment (equator or arctic). Students can make predictions and/or ask questions prior to running the simulation. They can run the simulation, controlling and changing variables, and analyze the data generated by the simulation (output graph). The simulation itself does not come with instructions or a lesson plan. However, there are several lesson plans posted on the website. These lesson plans are from authors independent of the authors of the simulation. This review is limited to reviewing the PHET natural selection simulation, and not any of the lesson plans from outside authors.

**NSTA Vetted Resources** These classroom resources—over 800 lesson plans, book chapters, videos, simulations, and more—are vetted by **NSTA curators** who recommend ways to adapt them to be more in line with the vision of the NGSS.

While these resources are not yet considered to be “fully aligned” to the NGSS, the curators provide expert guidance on how to adapt them. Resources that are “fully aligned” should meet the rigorous criteria of the **EQulP rubric**, which means they are three-dimensional in nature, have coherence across lessons and units, provide a number of important instructional supports, and provide methods to monitor student progress. Work is underway by Achieve to identify **exemplar lessons and resources** that meet this vision.

# SD EPSCoR Education Portal



The SD EPSCoR Education Portal offers free curriculum enhancement resources for STEM (Science, Technology, Engineering, and Math) teachers to help educators implement inquiry based learning experiences and spark interest in K-12 students to pursue STEM careers.

## For Educators:

The portal houses free curriculum modules for middle-and high-school teachers that are based on scientific research occurring in South Dakota. All curriculum modules are aligned with the new South Dakota Science Standards.

## STEM Teacher Leaders

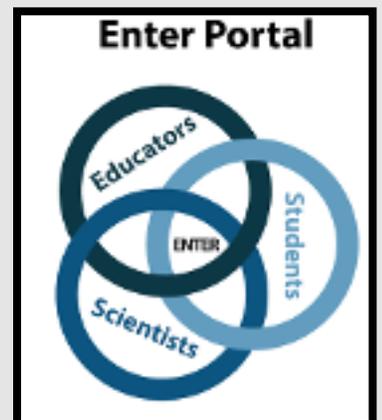
The curriculum modules were developed by a team of South Dakota STEM teacher leaders and have been tested in their classrooms. The modules provide lesson plans, activities, multi-media content, and the opportunity for you and your students to connect to the research scientists, companies, or organizations who are doing this work for in-person or virtual visits.

We are always looking for teacher leaders to join our development team. If you are interested, please contact Rhea Waldman.

[rheawaldman@sd-discovery.org](mailto:rheawaldman@sd-discovery.org)

Examples of Lessons:

- Nanotechnology
- Proteins - More than Just Meat



# SDSTA Science Fair Awards

The following middle school students received a cash award from SDSTA for their research

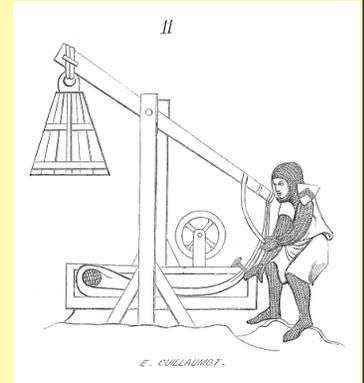
## "Medieval vs Modern" - Tanner Ewalt - Northwestern Area School, Melette, SD

This project is about what weight and trebuchet will launch the golf ball further. I think that the 20 lbs weight will make it throw the farthest because it will have more fore that will push the ball to fly further. Also, I thing that the Modern Trebuchet will be better because it has more of the mass above the pivot point of the throwing arm.

First, you have to cock the arm back and put on one of the weights. Next, you had to let go of the arm to release it. After than, you have to record the data and take off the weight and put on a different weight. Then you repeat for the 10 lbs, 15 lbs, and 20 lbs foer the Modern. Also repeat for the 10 lbs, 15 lbs, and 20 lbs for the Medieval.

In my data results, I found that both trebuchets had a constant length and didn't alternate.

Overall, I found that the Modern was the best and the Medieval was the worst. The 20 lbs weight on both of the trebuchets made the length increase and the 10 lbs weight made the length decrease. The Modern Trebuchet had the ability to have the weight higher above the pivot point which resulted in the golf ball flying farther. In battle, these two trebuchets would be pretty powerful, but I would choose the Modern Trebuchet because it could throw farther than the Medeval Tebuchet.



### Cool Down

**Madison Reece**

**Spearfish Middle School**

Every day, there are over 50,000 ambulances ready to be called to emergencies in the U.S. All of the ambulances are equipped with portable cold packs which are used to try to help patients reduce their swelling. Portable cold packs are also made for us in clinical settings and homes.

I was testing to see which liquid, when mixed with calcium ammonium nitrate (found in portable cold packs), would create an endothermic reaction causing the greatest temperature change over a given time interval.

The way I approached testing was by pouring the liquids into a glass and then pouring the calcium ammonium nitrate pellets into the glass. Then, I recorded the temperature of each liquid at different time intervals. I found that out of the liquids I tested, water had the greatest amount of temperature decrease of 34.33°F in the intervals given (starting temp to one minute). Water was followed by (in the order greatest to least amount of temperature change) coffee, three-way tie with milk, apple juice, lemon juice, then rubbing alcohol and air which was the control.

My project worked as planned even though my hypothesis was incorrect. I believed the lemon juice would have had the most temperature change because of its citric values but instead water had the greatest temperature change. In the future, I would try replacing the calcium ammonium nitrate with different chemicals to produce a more optimal portable cold pack.

### Do Essential Oils Repel Ants?

**Kimberly Tolsma and Shalayne Nagel**

**Avon Middle School**

We wanted to find a more natural way to repel ants. Many people have this problem today with ants entering into their house in the kitchen or bathroom.

irst, we released 5 ants at one time and recorded where they went for one minute. We did this 3 times for each of our 5 essential oils which are peppermint, lemon grass, clove, tea tree, and eucalyptus. Then, we flipped 100 coins to find the probability of the ants going left or right. We made a probability chart and added all of the trials and averaged them to make an average chart.

We found out that the lemon grass essential oil worked the best out of the 5 oils. The next oil that worked the best was the clove oil. We predicted that the lemon grass essential oil worked because it was derived from a West Indies lemon plant which releases it strong smell so ants and other insects don't eat it. Our hypothesis was correct and lemon grass oil did work the best but was only marginal in their effectiveness at repelling ants. If we were to do our project again, we would try more essential oils and use them on different insects to see if they had any different effect.





**Google Science Fair**, This online science competition is open to students between the ages of 13 and 18 from anywhere in the world, working alone or in teams. Google is looking for extraordinary ideas, and they are eager to see what youth come up with. This is a great opportunity for teenagers to explore ideas they're passionate about, learn about science, and maybe produce a world-changing idea.

Who: high school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/google-science-fair/>

**Regeneron Science Talent Search**, The Regeneron Science Talent Search (formerly Intel STS) is the nation's most prestigious science research competition for high school seniors. Since 1942, the Science Talent Search has provided a national stage for the country's best and brightest young scientists to present original research to nationally recognized professional scientists.

Who: High school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/regeneron-science-talent-search-sts/>

**Broadcom MASTERS**, Targeted at middle school students in grades 6th-8th, the Broadcom MASTERS is a national science, technology, engineering, and math competition that encourages the nation's young scientists, engineers and innovators.

Who: Middle school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/broadcom-masters/>

**Junior Science and Humanities Symposium**, High school students may apply to compete for scholarships and recognition by presenting the results of their STEM projects before a panel of judges and an audience of their peers. Opportunities for hands-on workshops, panel discussions, career exploration, research lab visits and networking benefit participating students. JSHS regional symposia are held at 48 nationwide university campuses and serve students in the 50 states, Puerto Rico, and the DoD Dependents Schools, Europe and Pacific.

Who: High school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/junior-science-and-humanities-symposium/sw-region-junior-science-humanities-symposium-jshs/>

**Stockholm Junior Water Prize**, This international competition, modeled after the adult Stockholm Water Prize, encourages enthusiasm in today's youth about water issues and builds an international community of young scientists bonded together for the water environment. High school students who have conducted water-related science projects are encouraged to apply for the opportunity to share their research and win a \$10,000 scholarship. Projects should be aimed at enhancing the quality of life through improvement of water quality, water resource management, or water and wastewater treatment. The projects may explore water issues on a local, regional, national, or global level using a research-oriented approach.

Who: High school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/stockholm-junior-water-prize/>

**iGEM**, The iGEM competition is an annual, world-wide, synthetic biology event aimed at undergraduate university students, as well as high school and graduate students. Multidisciplinary teams work all summer long to build genetically engineered systems using standard biological parts called BioBricks. iGEM teams work inside and outside the lab, creating sophisticated projects that strive to create a positive contribution to their communities and the world.

Who: High School, Undergraduate, Graduate

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/igem-genetically-engineered-machines/>



**BioGENEius Challenges**, compete on an international stage with some of the brightest scientific minds in the world. Students are challenged to develop scientific research projects in three overarching areas, Global Healthcare, Global Sustainability, and Global Environment. Then students present their work to industry innovators currently transforming the scientific landscape.

Who: high school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/biogeneius-challenges/>

**Botball**, The Botball® Educational Robotics Program engages middle and high school aged students in a team-oriented robotics competition, and serves as a perfect way to meet today's new common core standards. In Botball, the robots are always autonomous! Botball gives students the tools to develop sophisticated strategies using artificial intelligence with embedded systems. Students will learn to program their robots in advance using C, C++, and Java and then compete in tournaments to see how their robots perform against others.

Who: Middle and high school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/botball/>

**Junior Solar Sprint**, JSS is an educational program for 5th through 8th grade students with the goal of creating the fastest, most interesting, and best crafted solar-vehicle possible. Students will design, build and race solar powered cars using hands-on engineering skills and principles of science and math, develop teamwork and problem solving abilities, investigate environmental issues, and gain hands-on STEM skills.

**Best Robotics Competition**, The Best Robotics Competition challenges students to design robots that perform on a specially designed field with obstacles and tasks in a tournament style setting. New educational theme/challenge and field each year. The challenge and field are kept secret until Kick Off Day.

Who: Middle and high school students

Learn more and follow this competition on your ICS account:

<https://www.competitionsscience.org/competitions/best-robotics-challenge/>

**Vex Robotics Competition**, the largest and fastest growing middle school and high school robotics program globally with more than 18,000 teams from 40 countries playing in over 1,350 competitions worldwide. Each year, an exciting engineering challenge is presented in the form of a game. Students, with guidance from their teachers and mentors, build innovative robots and compete year-round.

Who: high school students

Learn more and follow the Vex Competitions on your ICS account:

<https://www.competitionsscience.org/competitions/vex-robotics-competition/>

**Zero Robotics**, Zero Robotics is a robotics programming competition where the robots are SPHERES (Synchronized Position Hold Engage and Reorient Experimental Satellites) inside the International Space Station. The competition starts online, on this website, where teams program the SPHERES to solve an annual challenge. After several phases of virtual competition in a simulation environment that mimics the real SPHERES, finalists are selected to compete in a live championship aboard the ISS. An astronaut will conduct the championship competition in microgravity with a live broadcast!

Who: high school students

Learn more and follow Zero Robotics on your ICS account:

<https://www.competitionsscience.org/competitions/zero-robotics/>

# INSPIRING THE NEXT GENERATION OF SCIENTISTS

Sanford Research is committed to instilling passion for science in students and training and mentoring the next generation of scientists. The Sanford PROMISE K-12 Science Exploration Program connects communities with new frontiers in biomedical and behavioral research by providing:

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- Equipment lending library
- Hands-on activities/inquiries
- Laboratory tours
- School presentations and demonstrations
- Summer camps
- Mentoring and job shadowing



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# Observe the Moon and Beyond: Apollo 11 at 50

Night Sky Network



By David Prosper

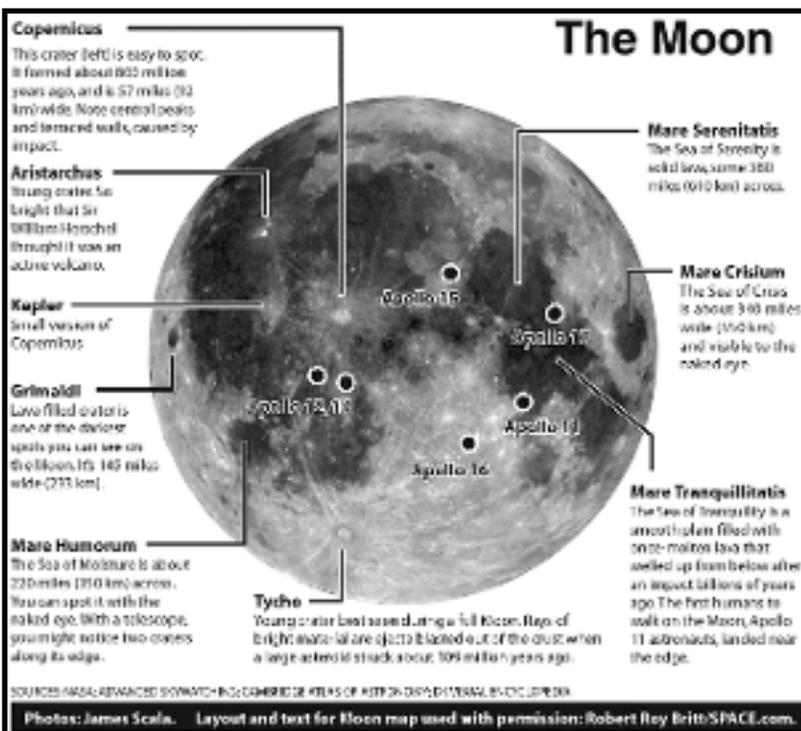
[https://nightsky.jpl.nasa.gov/download-view.cfm?Doc\\_ID=629](https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=629)

**Saturn** is at opposition this month, beckoning to future explorers with its beautiful rings and varied, mysterious moons. The **Moon** prominently passes Saturn mid-month, just in time for the 50th anniversary of **Apollo 11!**

**Saturn** is in opposition on July 9, rising in the east as the Sun sets in the west. It is visible all night, hovering right above the teapot of Sagittarius. Saturn is not nearly as bright as Jupiter, next door in Scorpius, but both giant planets are easily the brightest objects in their constellations, making them easy to identify. A full **Moon** scrapes by the ringed planet late in the evening of the 15th through the early morning of the 16th. Some observers in South America will even see the Moon occult, or pass in front of, Saturn. Observe how fast the Moon moves in relation to Saturn throughout the night by recording their positions every half hour or so via sketches or photos.

While observing the Saturn-Moon celestial dance the early morning of the 16th, you can also contemplate the 50th anniversary of the launch of the **Apollo 11** mission! On June 16, 1969, Apollo 11 blasted off from Cape Canaveral in Florida on a journey of almost a quarter million miles to our nearest celestial neighbor, a mission made possible by the tremendous power of the Saturn V rocket – still the most powerful rocket ever launched. Just a few days later, on July 20, 1969 at 10:56 pm EDT, Neil Armstrong and Buzz Aldrin set foot on the lunar surface and became the first people in history to walk on another world. The astronauts set up equipment including a solar wind sampler, laser ranging retroreflector, and seismometer, and gathered up almost 22 kilograms (48 pounds) of precious lunar rocks and soil samples. After spending less than a day on the Moon's surface, the duo blasted off and returned to the orbiting Columbia Command Module, piloted by Michael Collins. Just a few days later, on July 24, all three astronauts splashed down safely in the Pacific Ocean. You can follow the timeline of the Apollo 11 mission in greater detail at [bit.ly/TimelineApollo11](http://bit.ly/TimelineApollo11) and dig deep into mission history and science on **NASA's Apollo History Site**: [bit.ly/ApolloNASA](http://bit.ly/ApolloNASA).

Have you ever wanted to see the flag on the Moon left behind by the Apollo astronauts? While no telescope on Earth is powerful enough to see any items left behind the landing sites, you can discover how much you **can** observe with **the Flag on the Moon** handout: [bit.ly/MoonFlag](http://bit.ly/MoonFlag)



*The NASA Night Sky Network provides monthly articles on the latest stargazing and NASA news to share with your organization's readership. Check back here by the 20th of each month for the following month's article, or **sign up here** to be reminded each time a new article is released.*

## Spot the International Space Station

Choose your state, then click to see when the International Space Station can be seen crossing the sky.



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**UPCOMING EVENTS**

- July 16-18 SD Science Standards & Effective Instruction**  
Rapid City, SD
- July 23-25 SD Science Standards & Effective Instruction**  
Peirre, SD
- July 30-Aug 1 SD Science Standards & Effective Instruction**  
Sioux Falls, SD
- July 21-25 CHEMED Conference**  
Naperville, Illinois
- February 6-8 SD STEM Ed Conference**  
Huron, SD
- April 4 It's All About Science Festival**  
Sioux Falls, SD

The SDSTA Newsletter is published four times a year and is e-mailed to 130 paid members and several school science departments. The membership year in SDSTA starts with the February conference and ends the thirty-first of January. 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 paid conference registration 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 \$50 per page (or 3 to 4 quarter pages).



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