

## Science Update January 2017



Talkin' weather  
phenomena

This periodic update from the [Minn. Dept. of Education](#) (MDE) is sent to a few email lists, including the [Minn. Science Teachers Assn.](#) (MnSTA) and district/organization contacts. We encourage you to forward this to other teachers and science leaders. See MDE contacts at the end of this document.

**Note: MDE does not endorse any resource or event that is not conducted by MDE.**

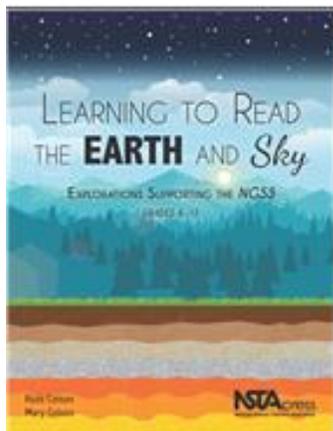
\* indicates an item that was not in the previous edition

### News

#### **\*Teaching Tip: Use weather phenomena to prompt student thinking**

In Minnesota everyone talks about the weather, especially in the winter. Using phenomena is an engaging way to help students learn science concepts and skills. As students investigate phenomena, we learn the concepts they already have in their heads and we can guide them to new explanations that include more scientifically accurate ideas. We can start by asking their ideas about when they see sundogs and what their ideas are for the cause. Then we can have them explore other phenomena where light spreads out such as squinting at a candle light or seeing a rainbow. By using a laser pointer students can explore how light travels in drops of water (or beakers as models) and then we can move to the hexagonal shape of ice crystals. Through their study of light behavior, they are developing the practices of model development and constructing explanations. For more on using phenomena for science lessons go to this [STEM Teaching Tool](#). Good starting points for Minnesota's weather phenomena are Paul Huttner's [Updraft](#) blog and Mark Seeley's [WeatherTalk](#).

#### **\*Learning to Read the Earth and Sky**



Mary Colson, earth science teacher in Moorhead and past MnSTA president, and Russ Colson, professor of geology at Minnesota State University Moorhead, recently published a book on earth science for secondary science teachers and others interested in the nature of science and the nature of science teaching.

The book, "Learning to Read the Earth and Sky," tells stories from the classroom, stories from real research, and offers example classroom investigations. It examines how classroom science and real research can be alike, with reference to the practices of science recommended by the Framework for K-12 Science Education. You can find out more, examine a sample chapter, or buy the book at the [NSTA Press bookstore](#)

## Teacher Events and Workshops

### **Earth Science Teacher Conference, February 5, Plymouth**

The conference is a great way to see your earth science colleagues from throughout the state and bring back fresh approaches and materials to use in your classroom. Thursday night features a tour of the brand new Minnesota Geological Survey facility and dinner at Urban Growler.

Friday includes a keynote on planetary geology as well as breakout sessions. Concurrent sessions include topics such as watersheds, geologic maps, groundwater, and the 2017 solar eclipse. Breakfast, lunch, door prizes, and classroom resources are included with your registration.

Take this opportunity to connect and reconnect with your colleagues from across the state and enjoy spending the day learning with other Earth science enthusiasts. Register and view the brochure at [this site](#).

### **\* Teaching with Lake Superior Conference, Feb. 11, Duluth**

[This full day conference](#) at the Great Lakes Aquarium is designed to offer sessions for pre-K – 12th-grade educators in formal and non-formal settings. During our February conference, we want to help you make the most of natural phenomena and draw resources of the North Woods into meaningful teaching moments. Sessions will include:

Will we Have a Snow Day? How Does Solar Power Work? What Kind of Rock is This? Why do Forest Fires Happen? What Happens to the Animals that Live There? How does a forest help people? What Will Climate Change Mean for Me?

Cost: \$20 (includes Aquarium admission, parking, coffee, snacks and lunch).

### **\*Schoolyard Gardens Conference, March 3, Chaska**



Over 370 teachers, school administrators, school food service professionals, Master Gardeners, parents, and other school garden supporters attend this annual conference at the Minnesota Landscape Arboretum to share ideas and resources for building and sustaining school gardens. From nutrition programming to building valuable community partnerships, the conference agenda highlights practical and inspirational tools from the leading experts and educators in Minnesota. [Conference Web Page & Agenda](#)

### **\*Institute for Non-formal Climate Change Education, March 13–15, Sandstone, MN**

Are you a naturalist, museum educator, or after school youth program leader? Do you work with community members and the public? This Institute is geared toward anyone interested in learning skills on how to communicate about climate change in non-formal educational settings. Join us for a 3-day Institute at the Audubon Center of the Northwoods, where you will gain comfort in communicating on climate change, engage in climate change activities and workshops, and get a chance to explore the beautiful Minnesota northwoods. One full day will be presented by the National Network for Ocean and Climate Change Interpretation. They are highly skilled in communicating about climate science and want you to gain that confidence, too!

[Register Today!](#) Registration \$180, Includes: Room and board! 2 Graduate Credits optional (fee)  
Contact [education@climategen.org](mailto:education@climategen.org) with any questions!

**\*Summer Institute for Climate Change Education, June 26-28, St. Paul**

This 10<sup>th</sup> annual workshop from Climate Generation: A Will Steger Legacy will provide you the opportunity to:

-Hear from leading experts from the University of Minnesota on their research and experience on climate science and climate change solutions

-Engage with hands on activities that help bring climate change concepts into the classroom

-Learn about how Climate Generation curriculum supports language arts, social studies, and science standards, including the Next Generation Science Standards



The location is the University of Minnesota's Institute on the Environment, with the opportunity for a field trip to the Cedar Creek Ecosystem Reserve on the 29<sup>th</sup> (extra fee).

Registration: \$150 (includes breakfast and lunch each day!) Lodging is available (\$48/night single, double/shared \$36) 2 Graduate Credits optional (fee). Click [here](#) for information and registration

**\*Green & Sustainable Chemistry Workshop for High School Teachers, June 20 – 22, Minneapolis**

The Center for Sustainable Polymers in partnership with the Minnesota Corn Growers Association is offering a FREE three-day workshop at the University of Minnesota to high school chemistry teachers.

Participating teachers will receive instruction on the principles of green chemistry, industrial applications, and potential impacts to human health and the environment. Shared lesson plans will illustrate how green and sustainable practices apply to secondary chemistry classrooms with education standards in mind. Participants will gain hands-on experience with safer, cost-effective labs that minimize waste and are drop-in replacements for traditional secondary chemistry labs.

Participating teachers will receive a \$300.00 stipend and the option to earn 2 graduate level credits from the Colorado School of Mines. They will also receive resources for lab implementation in their classrooms. Accommodations and parking will be provided for traveling participants. Lunch will be provided each day to all participants. To apply go to [this link](#). Applications due: March 1, 2017.

**\*McDonald Observatory 2017 Summer Teacher Workshops, Texas**

McDonald Observatory in west Texas is pleased to announce that they are now accepting applications for our 2017 Summer Teacher Professional Development Workshops for K-12 educators. Tours of the telescopes, discussions with the research astrophysicists in residence, and nighttime observing are all an integral part of every workshop experience. K-12 educators will do inquiry-based activities aligned with state and national standards, and will practice their new astronomy skills under the Observatory's dark skies, weather permitting. Teachers will partner with trained and nationally recognized astronomy educators.



All workshops are fully funded. More details for each of the five workshops and the online application form can be found at [this link](#): Deadline for applications is February 6, 2017.

### **\*LiftOff Aerospace Workshops, Texas**

This aerospace workshop emphasizes STEM learning experiences by incorporating a space science theme supported by NASA missions. Teacher participants are provided with information and experiences through speakers, hands-on activities and field investigations that promote space science and enrichment activities for themselves and others.

Multiple NASA missions are studying our sun and the solar system, unraveling mysteries about their origin and evolution. In August 2017, a total eclipse of the Sun is visible from a narrow corridor that traverses the U.S. Educators will receive background information on the Sun while analyzing the characteristics of objects in the solar system that allow life to exist. The deadline for receiving applications is April 14 and should be submitted through the [online system](#):

### **Playdates for Educators (of all sorts)! With Annmarie Thomas**

One of their favorite things about leading UST's Playful Learning Lab and teaching in the Center for Engineering Education is the opportunity to meet and collaborate with incredible people, many of who are educators in a formal, or informal sense. Each month they bring together a diverse group of people in the Twin Cities who are interested in Playful Learning and STEAM/iSTEM. This month's playdate will take place on WEDNESDAY, January 18 from 7-9 pm. Theme: MaKey MaKey! (Bring a laptop if you can) Place: The Makerspace in Anderson Student Center. [Click here for more info.](#)

### **\*Scholarships for graduate environmental education programs, St. Paul**

Hamline's Natural Science and Environmental Education graduate program has several scholarships available for new students. Students earn a master's degree in environmental education and may elect to have a concentration in an area such as STEM, early childhood, and climate change education. Apply now for spring admission. Contact Patty Born, [pselly01@hamline.edu](mailto:pselly01@hamline.edu) for details.

## **Teacher and School Awards and Opportunities**

### **Presidential Award nominations and applications are now available.**



Nominate exemplary science teachers (including yourself) for the Presidential Award for Excellence in Mathematics and Science Teaching. This is the most prestigious award in this field and includes recognition activities in Washington DC and a \$10,000 award. This year, teachers of grades 7-12 are eligible submit an application that describes content understanding, instructional strategies, assessment practices, professional development and leadership. Just completing the application provides professional growth. The application is due May 1. For information go to the [PAEMST website](#).

### **\*CDC Science Ambassador Fellowships, Georgia**

The competitive fellowship is for teachers and educational leaders interested in bringing public health into current middle- and high- school classrooms. It includes a 5-day summer course (July 10-14, 2017) at CDC headquarters in Atlanta, GA and a 1-year distance-based professional development opportunity. Applications are due February 15, 2017.

For more information, please see the attachments or visit the [website](#). We look forward to your application. Please share these materials with other teachers and educational leaders in your network who may be interested.

## School Programs and Grants

### Physics Force Shows, Minneapolis and Rochester



The University of Minnesota's Physics Force will perform an educational and entertaining public shows in January. Join us to experience how physics is interesting, understandable and fun! Be sure to share information with your teaching colleagues and announce the show to your students, January 9-13, 2017, Northrop Carlson Family Stage at the University of Minnesota and May 10 - 11 in Rochester. The show is free, but reservations are required. These public shows fill up quickly so we wanted to give you the first opportunity to register and get it on your calendar. [For information, click here](#). There is also an evening public show on Jan. 12.

### \*Mississippi River Learning Opportunities 6th – 12th Grade

Want to keep your students engaged with the Mississippi River through the winter? Host a Plant Nursery at your school. Partner with the National Park Service to grow native plants from seed for the park's habitat restoration events, a perfect hands-on learning opportunity in your school.

What's included in the plant nursery program? Students will learn about native plants, stewardship, and be able to exercise their green thumb. Park staff will give a presentation on the Mississippi National River and Recreation Area, habitat restoration activities, and why native prairies are important for the river. Students will then set up growing stations and plant native prairie seeds. You'll watch your seeds grow into young plants, and in May or early June restoration planting field trip at a park along the Mississippi River.

Classroom planting dates available: February 2, 3, 8 and 13. Contact Melissa at [melissa\\_clark@partner.nps.gov](mailto:melissa_clark@partner.nps.gov) (651) 293-8468 or Regan at [regan\\_baker@partner.nps.gov](mailto:regan_baker@partner.nps.gov) (651) 293-8478 with preferred dates and number of students.

What does the school provide? Tabletop or windowsill space for plant light, or space for shelves with plant lights.

What does NPS provide? The Park provides soil and native prairie seeds. A limited number of growing supplies are available. These supplies include plant trays, plant lights, capillary mats, heating mats, timers, power strips, and plant shelves. Teachers will be provided a School Nursey Teachers Guide, which offers a variety of classroom activities.

Field Trip (optional but recommended!) Restoration field trip can generally host 20-70. Dates available: May 30 and 31, June 1 and 2. Please give your interest and preferred dates to Mary at [mhammes@parkconnection.org](mailto:mhammes@parkconnection.org) or call (651) 291-9119.

### \*School Garden Grant Opportunities

The Jeffers Foundation will be offering \$500 School Garden Grants to schools wishing to "start" a school garden project. The will be available at [this link](#) beginning January 15. Several other garden grants are also listed on the same page.

### **\*Mississippi River Climate Change Field Trips**

Sign-ups are now being accepted for FREE climate change field trips offered by the National Park Service and partners for students in grades 5-8. The field trip features three activities to support climate literacy. Bus stipends are available, and two classrooms can be accommodated on one trip. Spring dates available: April 13, 14, 20, 21, 26, and 27. Trips take place at Fort Snelling State Park. Contact Mary Hammes to schedule field trips: 651-291-9119 and email: [mhammes@parkconnection.org](mailto:mhammes@parkconnection.org). [Additional information is available on the park's website.](#)

## **Student Awards and Competitions**

### **\*National Youth Science Camp – Inform your Juniors**

Two Minnesota students completing their junior year will spend three weeks in June in the mountains of West Virginia with **all expenses paid**. They will interact with students selected from all states and several countries as they explore many science topics, meet prominent scientists and collect field data. In addition they will have selections of canoeing, horseback riding, camping and other recreational activities. Teachers should encourage students with an interest in science, leadership qualities, and a love of the outdoors to apply. There are often few applicants. This award is coordinated by MDE. For information go to [this site](#) or contact [john.c.olson@state.mn.us](mailto:john.c.olson@state.mn.us). The deadline is March 1.

### **\*Tech Savvy STEM Careers to Girls, January 28, St. Cloud**

*Tech Savvy* is a daylong conference for Central Minnesota girls in grades 6-9 and their parents. Women in STEM careers will energize and inspire the girls! At the same time, parents will learn about academic and financial college preparation so they can encourage their daughters to explore careers in science, technology, engineering and math. Experts will tell parents how to support their girls on the path to higher education and to a STEM career



For information go to [this link](#)

### **\*GIS Mapping Contest: My Hometown on the Map**

Minnesota students are challenged to create a map that tells a story about their hometown using free Geographic Information System (GIS) online resources. All students are eligible and schools can submit up to five entries. The competition is open until April 21. The competition website is at [this link](#). Information about the free GIS license for schools is at [this MDE website](#).

### **\*Minnesota High School STEM Communicator Awards**

The goal of these awards is to identify and encourage high school students who show exceptional potential in performing scientific and mathematical research, in communicating their research through writing, and in understanding the societal context of their research and results.

The Minnesota High School STEM Communicator Awards is a statewide competition. The selection process will identify students having:

- A substantive base of scientific knowledge exceeding usual high school science requirements,

- A record of effective use of scientific methods to advance research in a chosen area of science or mathematics, with demonstrated skills of clear and concise data analysis,
- An ability to think critically, to synthesize information, and to argue the merits of conclusions, and
- A record of personal growth as well as recognition of how their research has an impact upon others.

Candidates must submit a paper that explores a current issue relating to science, mathematics, technology and society, a transcript, and an assessment by the student's educational advisor(s). The Minnesota Academy of Science will recruit scientists and educators of appropriate expertise and stature to evaluate the applicants. The top 10 papers will be recognized with a cash awards and medallions and potential publication in the [Minnesota Academy of Science Journal of Student Research](#).

**The deadline to submit an Intent to Apply is March 15, 2017.** To declare your intent to apply for the awards, email [Karen Newell](#). Full information is at [this link](#).

### **\*ExploraVision Competition**



The ExploraVision competition for K-12 students engages the next generation in real world problem solving with a strong emphasis on STEM. ExploraVision challenges students to envision and communicate new technology 20 years in the future through collaborative brainstorming and research of current science and technology.

ExploraVision is a science competition that goes beyond the typical student science competition and into what it takes to bring ideas to reality. A teacher will sponsor and lead his/her students as they work in groups of 2 – 4 to simulate real research and development. A teacher will guide his or her students as they pick a current technology, research it, envision what it might look like in 20 years, and describe the development steps, pros & cons, and obstacles. Past winners have envisioned technologies ranging from a hand-held food allergen detector to a new device to help people who have lost limbs regain movement in real time. More information at [this link](#).

### **\*World of 7 Billion Student Video Contest**

Students in grades 6 – 12 will create a short video about human population growth that highlights one of the following global challenges: climate change, ocean health, or rapid urbanization. Students can win up to \$1,000 and their teachers will receive free curriculum resources. The contest deadline is February 23, 2017. Contest guidelines, resources, past winners, and more can be found at [this link](#).

### **\*Research Science Institute for High School Students**

The Center for Excellence in Education and Massachusetts Institute of Technology co-sponsor the Research Science Institute (RSI) and are looking for talented 11th Grade or equivalent STEM Students! Do you have an interest in Science, Technology, Engineering or Mathematics and a desire to complete a research program with other very talented young scholars?

Apply to the (RSI) program to be held on the MIT campus June 25 - August 5, 2017. RSI is free of cost to students except for travel to and from MIT. Visit the CEE website for RSI application materials. See application information at [this link](#). Please contact Maite Ballestero, Executive Vice President, Programs & Administration, [maite@cee.org](mailto:maite@cee.org) if you have questions.

## Science and STEM Competitions

This is the time of the year to organize your teams and inform your students.

- [Science Bowl](#),
- [Science and Engineering Fair](#),
- [Science Olympiad](#),
- [FIRST Robotics](#)
- [FIRST Tech Challenge, FIRST LEGO League, and Renewable Energy Challenge](#)
- [NSTA student competitions](#): Bright Schools, eCybermission, ExploraVision

## Minnesota Competitions and Programs

Many competitions, out-of-school programs and field trip opportunities are posted at [the Mn-STEM website](#) and listed in the [Reach for the Stars Catalog of Programs and Activities](#).

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### MDE Contacts:

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[Jim Wood](#), Science Assessment Specialist

Send submissions for the Science Update to John Olson

### Other Minnesota Links:

[Minn. Dept. of Education Science Page](#)

[Minn. Science Teachers Association](#)

[Frameworks for MN Science and Mathematics Standards](#)

[Get – STEM](#) Connections between schools and businesses

[Mn-STEM](#) STEM programs and resources for families, schools and community

[Sharing Environmental Education Knowledge](#) environmental education resources

[Minnesota Academy of Science](#): Science Fair, Science Bowl and other competitions

[Mn DNR Education website](#): Curriculum, professional development, posters, etc.