

Science Update

February 2020

This periodic e-newsletter 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. Archived editions are at [this MnSTA site](#). See MDE contacts at the end of this document.



**Winter phenomenon:
What is black ice?**

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

*MCA IV Test Specifications – Draft 1 Feedback

As a result of the 2019 revisions to the [Minnesota K-12 Academic Standards in Science](#), the Science Minnesota Comprehensive Assessment - Series IV (Science MCA-IV) will begin assessing these standards in the spring of 2024. In collaboration with a committee of Minnesota educators, MDE has drafted the Science MCA-IV Test Specifications to assist with the development of the new assessments.

Teachers and members of the public are encouraged to review the proposed [MCA-IV Draft Test Specifications](#) for Science and provide feedback through the [Science MCA-IV Test Specifications Feedback Survey](#). The survey will be open until February 17, 2020. Your feedback is important in creating the best assessment possible for all Minnesota students. A [copy of the survey questions](#) is available to review and discuss with colleagues before entering your individual or group survey responses.

Science Licensure

Department of Education science staff have been meeting with staff of the Professional Educators License and Standards Board to clarify the current science licenses and lay the groundwork for potential changes. They prepared a joint fact sheet on the current licenses and opportunities for science teachers to add licenses. This statement is posted on the [MDE Science webpage](#). It will be updated with new developments. Any changes in licensure will have to wait until the science standards have been completed the Minnesota Rulemaking process.

Teacher Events and Workshops

Earn credits for online professional development: *Science and Engineering Practices in Action*

Teachers can now get graduate credit for working with the SEPA online professional development modules! Complete all of the modules in their entirety and develop an action plan for implementation of the new science standards. 4 graduate credits available through Hamline University. Please contact [Continuing Studies](#) at Hamline University for a registration form. For questions contact [Patty Born-Selly](#). For more information about

and access to Minnesota's online professional development modules, open the [MDE Online Science Courses](#) document.

Lake Superior as a Learning Tool, Feb 12, Duluth

The Environmental Protection Agency (EPA) laboratory in Duluth is recognized as a leader in advancing scientific knowledge surrounding the impacts of stressors on the water resources of the Great Lakes – such as pesticides, bacteria and changes in land use – on the water quality and quality of life for people in the region. Join the Great Lakes Aquarium at the EPA lab 4:30 – 7 pm to explore with local scientists, learn about current research in the region and how to adapt and incorporate place-based research into your curriculum. [More Information and Registration.](#)



Citizen Science – Minnesota Pollinator Protection, Feb 19, online training: 10am-11:30AM

Citizen Science projects empower students to have an impact on the world. Learn how to plan and get involved in authentic, purposeful scientific research on pollinators that enhances students' knowledge and 21st century skills. Explore real life examples and online resources to implement Citizen Science in your program. The Minnesota Department of Education is providing this training as part of its commitment to achieving the goals of the state's Interagency Pollinator Protection Team. [Registration.](#)

***Sustainability Education Summit, Feb 28, In-person at UM campuses and online**

The third annual Sustainability Education Summit is a free online and in-person event that shares tools and stories on teaching sustainability. Participants will have the chance to participate online and in-person, and will go home with an understanding of common struggles, tools, and successes in teaching sustainability topics.

This year we are focusing on growing sustainability education. The summit will feature University of Minnesota educators who share how they root in sustainability, tools for teaching and persevering, and a harvest of student successes. They come from fields of international development, media libraries, Veterinary Medicine, and campus sustainability. [More information.](#)

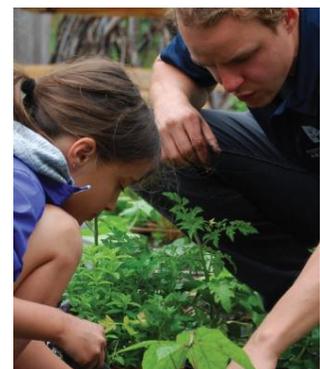
***Science Standards through Environmental Education Workshop, March 5, Duluth**

Learn about the pedagogy associated with the new science standards and ways to support teachers in the implementation of these new standards through EE. This workshop is targeted for environmental educators to aid in the transition into this new era of science education. The workshop is led by John Olson of MDE at the UMD library 4th floor rotunda, 9:30 – noon. RSVP to dahs@d.umn.edu.

Schoolyard Gardens Conference, March 6, Chaska

Schoolyard gardens are a successful, growing part of Minnesota schools, and provide an incomparable, hands-on opportunity for educators and students. Join us for this [annual conference](#) at the Minnesota Arboretum to:

- Learn how to meet academic standards through gardening
- Discover ways to engage with community partners and the school board to sustain your project
- Explore the latest research and best practices in agriculture, healthy eating, cultural competency, natural systems and more
- Apply innovative strategies for building, sustaining, and engaging diverse learners in a thriving schoolyard garden



There is also a Garden-to-Plate Workshop on Saturday, March 7 which expands on those ideas.

Exploring the Deep Ocean with NOAA, April 4, Duluth

Join NOAA's Office of Ocean Exploration and Research to learn the importance of ocean exploration and current technologies for exploring the deep ocean. Engage with standards-based, hands-on activities and online resources to guide classroom learning around ocean science literacy. Focus on ocean health, underwater mapping, remotely operated vehicles and unique underwater habitats. Tour Large Lakes Observatory's R/V Blue Heron to explore current and future research taking place on the Great Lakes.

Participants will receive the books NOAA Ship Okeanos Explorer Education Materials Collection Volume 1: Why Do We Explore?, Volume 2: How Do We Explore?, and additional resources. Lessons are designed for grades 6-12, but many activities can be scaled to suit educator needs. Breakfast, lunch and a \$75 stipend included. [More Information and Registration](#)

*Teaching Weather for 6th Grade Earth Science, April 18, Chanhassen

Teachers who will teach 6th grade earth science under the new science standards can get a head start with this FREE event at the National Weather Service (NWS) on Saturday, April 18, 2:30 – 6 p.m. Tour the NWS facilities, and launch a weather balloon with a "radiosondes" to collect real-time weather data at altitudes. Learn how to obtain real-time radiosonde data and how to analyze it, including making EXCEL plots. The visualization of the data will enable students to identify days on which "atmospheric inversions" exist. These are common in the Twin Cities and can be correlated with students' perceptions of air pollution, including the exacerbation of asthma.



There will be presentations by Ms. Emily Kalkbrenner who taught 8th grade Earth Science at Global Arts Plus in St. Paul for four years -- and now teaches 6th grade Physical Science-- where she recently had a weather station installed at her school – and by Dr. Amy Lilienfeld, Founder and President of Circle of Illumination Science Education. A certificate of participation will be given worth 3 clock-hours of participation/CEUs. For more details and updates go to: <http://circleofillumination.com>. To sign up, email: amy@circleofillumination.com.

*Physics/Physical Science Workshops, June, River Falls

These are two continuing education opportunities for Physics and Physical Science teachers to be offered at the University of Wisconsin - River Falls in June 2020. [More information](#)

- Calculus for Mechanics and E&M in High School Physics, June 15-19
- Astronomy Inquiry Methods and Activities for High School Science, June 22 - 26

*Addressing Disparities in STEM Education: District Leadership Program, June 22-26, St. Paul

The IDEAL Center at the Science Museum of Minnesota invites school and district leadership teams to apply for the [2020–2021 PAGE District Leadership Program](#). PAGE is dedicated to addressing achievement disparities in STEM education on the basis of gender, race, class, ethnicity, disability, language, and sexual orientation at a systems level. PAGE is an 11-day program with a five-day institute during the summer of 2020, and three two-day Colloquia during the 2020–2021 school year. For more information and to apply, go to <https://www.smm.org/page/register>. Application due April 1.

Modeling Instruction Workshops, July

The Modeling Method has been intentionally developed to correct many weaknesses of the lecture-demonstration method of instruction typically seen in STEM classrooms. These weaknesses include the fragmentation of knowledge, student passivity, and the persistence of naive beliefs about the physical world. Instruction is organized into *modeling cycles* which move students through all phases of model development,

evaluation and application in concrete situations — thus promoting an integrated understanding of modeling processes and acquisition of coordinated modeling skills.

- Physics introduction workshop, Winona State Univ. July 6 – 10, [Information and Registration](#)
- Chemistry workshop Tartan High School, Oakdale, July 13 – 17, [Information and Registration](#)
- Biology workshop, Tartan High School, Oakdale, July 13 – 17, [Information and Registration](#)

VisChem Institute, July 2 – 12, Ohio

Learn the research foundation and pedagogical moves for the VisChem Approach. The VisChem Approach uses carefully produced dynamic visualizations with teaching strategies informed by a cognitive learning model. Key to VisChem is communication of internal visualizations using storyboards (drawings with explanation) of chemical and physical changes. Apply by Feb. 28 for this 4-day, residential, all-expenses paid High School Chemistry Institute at Miami University in Oxford, Ohio. [Information](#)

Green and Sustainable Chemistry Workshop, July 13-15, Minneapolis

The NSF Center for Sustainable Polymers (CSP) in partnership with the [Minnesota Corn Growers Association](#) (MCGA) will be offering a FREE three-day workshop at the University of Minnesota to high school chemistry teachers on green and sustainable chemistry.

Participating teachers will receive instruction on 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. Participants will gain hands-on experience with safer, cost-effective labs that minimize waste and are drop-in replacements for traditional secondary chemistry labs. Participants 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 [More Information](#). Applications due April 1.

***Summer Institute for Climate Change Education, July 22-24, St. Paul**



Join together with educators from across the country for an impactful training on climate change education presented by Climate Generation. Educators from all backgrounds and subjects are invited to attend and learn new ways to teach climate change. Scholarships are available. [More Information](#)

- Get hands-on experience with climate change activities for the classroom
- Use phenomena-based learning to ignite curiosity about climate change causes, impacts, and solutions
- Discover your personal climate story and learn how to incorporate it into a lesson with your students
- See how art brings data to life, and use climate fiction literature to teach concepts and guide discussions about the future
- Special strand for Minnesota science teachers: Featuring the new Minnesota Science Standards and climate change

***Project GUTS Computer Science in Science workshop, July 27-31, Milwaukee**

The course is designed to integrate Computer Science (CS) concepts into existing middle school science classes, especially in contexts in which a standalone CS course is not available. Help students from all different backgrounds to engage in scientific inquiry by investigating topics of interest to their local communities and sharing their experiments and findings. Scholarships plus more dates and locations are available. [Information](#).

***MN Zoo STEM Teacher Workshop, Aug 3-6, Apple Valley**

See the Zoo in a whole new way! This four day workshop will engage teachers in utilizing animals and the Zoo as a tool to integrate engineering concepts into



their curriculum. Sessions focus on Engineering BY Animals, Engineering FROM Animals (biomimicry), and Engineering FOR Animals. Through hands on activities, expert talks and behind the scenes experiences, see how STEM is being used by aquarists, conservationists, and zoo staff to help care for and conserve wildlife both in the zoo and in the wild. [Information and Registration](#)

American Meteorological Society Summer Institutes, Various dates and locations

Enhance your knowledge of Earth system science and earn graduate credit through AMS Education's teacher professional development programs. K-12 courses include *Project Atmosphere*, *Project Ocean*, *DataStreme Atmosphere*; *DataStreme Ocean*, and *DataStreme Earth's Climate System*. [Information](#).

Teacher and School Awards and Opportunities

Presidential Awards for Science and Math Teaching

Celebrate great teaching! Nominate a colleague or yourself for the Presidential Award, which brings state and national leadership opportunities and \$10,000. It is also a great professional growth experience to reflect on your teaching. Mentor support is available. Two teachers from each state receive this award from the White House. This year applications are sought from K-6 teachers with a deadline of May 1. [Information and nomination site](#).

***NABT Outstanding Biology Teacher Award**

The National Association of Biology Teachers (NABT) recognizes an outstanding biology teacher from each state. Nominees do not have to be members NABT. In addition to an application form, nominees will be asked to submit a video of their classroom teaching, an essay, and four letters of recommendation. For more information, go to the [NABT Awards website](#), download an [application form](#), download [video suggestions](#), or contact Jim Lane (jim.lane@isd832.net), Life Science Instructor at Mahtomedi High School.

National Board Certification

National Board Certification is designed to develop, retain and recognize accomplished teachers and to generate ongoing improvement in schools nationwide. It is the most respected professional certification available in K-12 education.

The certification process requires that teachers demonstrate standards-based evidence of the positive effect they have on student learning. They must exhibit a deep understanding of their students, content knowledge, use of data and assessments and teaching practice. They must also show that they participate in learning communities and provide evidence of ongoing reflection and continuous learning. [More information](#).

***Minnesota Green Steps Schools program**

Check out this free new program of support to schools who want to improve sustainability in their facilities and their student learning – one step at a time!

Teams of Schools, Districts, Students, Parents, and a supporting community of volunteers, non-profits, businesses, and local and state government agencies all work together to help schools and their community take actions and build capacity to meet the challenges and opportunities of their future: preparing children for a changing economy, protecting our environment and community health, and harvesting the benefits of a clean energy future—all with guidance, assistance, and recognition from [MN GreenStep Schools](#).



School Programs and Resources

*Physics Force demo shows, May 13-14, Rochester



If you've never seen a physicist drop 20 feet through thin air while a friend shoots a ball at him from a cannon, or grown men and women shooting streams of toilet paper over an audience with a leaf blower, then the University of Minnesota Physics Force has a show for you!

The show is a unique mix of physics demonstrations and slapstick humor suitable for adults and children of all ages. Join us to experience how physics is interesting, understandable and fun! [Information.](#)

Environment Impacts of Food Curriculum

Download "Exploring the Environmental Impacts of Our Food," a free curriculum for middle & high school teachers that explores animal agriculture's effects on our planet and builds scientific literacy on environmental phenomena related to our food system. [Information](#)

Free High School Aviation Curriculum

The Aircraft Owners and Pilots Association (AOPA), is offering free curriculum for high schools across America. Both of the career pathways — pilot and unmanned aircraft systems (UAS) — will help students build career-ready skills while they learn more about opportunities in aviation.

Schools can choose to implement one or more of the ninth, tenth, and eleventh grade courses for the 2020-2021 school year. The courses provide everything a teacher needs including lesson plans, student assessments, student activities, teacher notes, presentations, and more. There are two-day workshops in March for teachers and administrators that want to implement the courses. They can be attended in person in Maryland or virtually. [Information.](#)

Environment Impacts of Food Curriculum

Download "Exploring the Environmental Impacts of Our Food," a free curriculum for middle & high school teachers that explores animal agriculture's effects on our planet and builds scientific literacy on environmental phenomena related to our food system. [Information](#)

Student Programs, Awards and Competitions

Minnesota Online Map Competition

The Minnesota ArcGIS Online student competition is launching in January. All interested Minnesota schools - public, private and home schools - are invited to participate in the competition. Students learn how to use Esri's ArcGIS Online tools to create digital maps and story maps. There are two divisions - grades 4 to 8 compete in the middle school division, and grades 9 to 12 in the high school division. There are two levels of competition in each division. The first is a simple map-making competition where students make maps based on topics selected by their teachers. The second is a Minnesota researched-based competition where students compete state-wide to be one of the top five entries in their division. For complete details go to the competition [website](#). Register by April 3.

National Youth Science Camp for graduating seniors, June 22 – July 15, West Virginia

Teachers of seniors, encourage your students to apply for this FREE life changing experience. We often get very few Minnesota applicants!

Two graduating seniors from Minnesota will be chosen for this prestigious FREE science camp in the mountains of West Virginia. The [NYSCamp](#) is a residential STEM program designed to honor and challenge some of the nation's rising STEM leaders. At the NYSCamp, STEM professionals present lectures and lead small-group directed studies on a broad array of STEM topics; some delegates are able to conduct research at the nearby Green Bank Observatory. The NYSCamp experience also features excursions into the Monongahela National Forest including backpacking, rock-climbing, caving, kayaking and mountain biking.



Delegates are required to participate in the NYSCamp program for its entirety. The NYSCamp is offered to selected participants at **NO COST** so that talented students may attend regardless of their financial ability – transportation included. Minnesota uses the NYSCamp's [online application system](#). For more information contact john.c.olson@state.mn.us, Minnesota coordinator. The application deadline is February 28.

*Drinking Water Poster Contest

This year's Minnesota Drinking Water competition from H2O for Life is "Tap into Safe Drinking Water." Learn, engage, and advocate! Design a poster, no larger than 9×12, about how or why all Minnesotans should conserve and protect our drinking water. Safe drinking water is everyone's responsibility. It's up to all of us to keep it clean and safe, now and for the future. [More information](#). Deadline is March 6

*Minnesota Engineering Machine Design Contest: Space Exploration!



The Engineering Machine Design Contest is an opportunity for teams of 3-10 students to design and build a complex machine using everyday objects with the guidance of a coach. The completed machine will use multiple steps to complete a simple task. Teams showcase and exhibit their machine at a regional contest in Mankato with the opportunity to advance to the

Midwest Engineering Machine Design Championship.

Each year a competition theme is chosen to guide the machine build and allow for whimsical creativity to flourish. Students are able to explore STEM principles while having fun in a collaborative environment. Divisions for middle school and high school. [Information](#). Register by March 1.

Genes in Space

[Genes in Space](#) is a science contest that challenges students in grades 7 – 12 to design original DNA experiments that address real-life challenges and opportunities of space exploration. The contest is free and does not require equipment. Proposals will be judged solely on their creative and scientific merit. The winning experiment is conducted on the International Space Station, and samples are returned to Earth for you to analyze! Submission deadline is April 17th, 2020. Learn more about the contest [HERE](#).



Turn Genes in Space into a class assignment! Check out the free tools for bringing modern genetic analysis and space biology into your classroom [HERE](#). Resources include interactive videos, lesson plans, classroom activities and worksheets, and more.

*Materials Camp at the U of M, June 16 – 19, Minneapolis

The Minnesota Materials Science Camp provides a hands-on experience into the world of materials science and engineering. Students entering their junior or senior year are eligible.

- A unique science experience under the direction of industry and education based “Materials Mentors”
- Combination of mini-demonstrations and field trips with extensive involvement in laboratory facilities to actively explore materials science & engineering principles

[Information](#). Applications due March 31.

*Summer Student Internship at Seagate, Bloomington

To help students prepare for future technician and engineering positions, Seagate is offering a summer internship program at its Bloomington office. Recent high school grads or freshmen can apply for an \$18 per hour paid internship. Positions are in production engineering and development engineering. Contact Katie.I.strub@seagate.com for information

More Science and Engineering Competitions

Check out the follow program for your classes and individual students.

- [Science Bowl](#) – middle and high school
- [Minnesota Science Olympiad](#) – middle and high school
- [Science and Engineering Fair](#) – middle and high school
- [FIRST Lego League](#), [FIRST Tech Challenge](#), [FIRST Robotics](#)- All grades
- [Supermileage Challenge](#) - High school
- [Real World Design Challenge](#) - High school
- [Toshiba/NSTA ExploraVision](#) - Classroom based for all grades
- [NSTA Angela Award](#) – girls grades 5 – 8
- [MN Scholars of Distinction](#) – high school
- [National Youth Science Camp](#) – two high school seniors are selected as Minnesota Delegates



Minnesota Programs and Competitions

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](#).

MDE Science Contacts:

[John Olson](#), Science Content Specialist, @JohnCasperOlson

[Jim Wood](#), Science Assessment Specialist

[Judi Iverson](#), Science Assessment Specialist

[Sarah Carter](#), STEM and Computer Science 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.
[Youth Eco Solutions](#) (YES!) – Statewide, youth-led program for hands-on eco related projects