

## Science Update

May 2020



Science learning at home

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. Frequent updates and new events are posted on the MnSTA Facebook page and Twitter feed @mnsta1.

**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

**This edition of the Science Update focuses on Minnesota** events that are still scheduled either in person or virtual. It also highlights Minnesota resources that could be helpful in the distance learning environment. A continuously updated listing of events that were previously scheduled and have now been cancelled, rescheduled or gone virtual are at this [Science Update Changes](#) site.

## News

***Promising Practices for Science Distance Learning, Webinar, Tuesday May 12, 3:00 pm CDT***

The MN Science Teachers Association (MnSTA) and MDE Science are collaborating to have Minnesota teachers and educators present examples of how they are adapting instruction to the distance learning environment. Here is the tentative agenda:

- Equity Considerations – Angela Osuji
- Guidance for science distance learning – John Olson
- [MnSTA Resources for Teaching Remotely](#) – Eric Koser
- Using outdoor observations – Megan Earnest
- Adapting instruction for phenomena-based distance learning – Mary Colson
- Designing analog distance learning – Dana Smith

[Register at this link.](#)

### **Guidance for Science Distance Learning**

The Minnesota Department of Education had developed several guidance documents for the [Student Instruction COVID-19 Resources](#) webpage. Of particular interest to science educators is [Science Standards Support for Distance Learning](#). This document draws heavily from the work done by state science leaders across the country through the Council of State Science Supervisors (“CS-cubed”) to support science learning during closures, including advice for science leaders, teachers, families and students. In addition CS<sup>3</sup> has produce several briefs with practical suggestions and resources:

- Supporting Equitable Home-Based Science Teaching and Learning during Extended School Closures (for educators)
- Phenomena: Not just for the Classroom (for families)
- Continuing Science at How with Science Notebooks (for families)
- Pass the Science Please: Science Talk Moves (for families)
- Teachers Guide: Phenomena, Science Notebooks and Science Talk Moves (for educators)

These are available at this [STEM Teaching Tools website](#).

### **MnSTA collection of distance learning resources and lesson plans**

At the urging of Education Commissioner Mary Cathryn Ricker, professional teaching organizations have collected examples of distance learning lesson plans. These are intended to be examples of how lesson plans can be designed, especially for students without internet technology devices. MnSTA has developed a site where teachers can upload lesson plans to share and can access those that are posted. To view the lessons and to contribute go to the [MnSTA Resources for Teaching Remotely](#) webpage. You will also find other resources posted there, including suggestions for elementary teachers and links for remote learning resources.

## **Teacher Events and Workshops**

**Note:** Check the websites and contact organizers to be certain that the events are still scheduled. Some organizations are waiting to see what changes happen for gathering of people during the pandemic.

### **MnSTA: Instructional Strategies for the New MN Science Standards, June 12 or Aug. 17, Staples**

Learn the pedagogy associated with the 2019 K-12 Minnesota Science Standards and ways to prepare to teach the standards. In this workshop, we will explore some of the significant changes between the 2009 and 2019 Minnesota science standards. Among the changes is the instructional shift from students learning about science content to students engaging in the practices of science to figure out something puzzling, either regarding the natural or the designed world.



The workshop will conclude with a look at some of the resources that are available to support Minnesota teachers as they tackle the shift to 3-dimensional teaching and learning. This MnSTA sponsored workshop is led by Mary Colson, NGSS writer and co-chair of the Minnesota Science Standards Committee. [More Information and Registration](#).

### **Teaching in the Outdoor Classroom Workshop, June 22 – 25, 2020, Fergus Falls**

This pre K – 12th grade workshop is for all who teach children. Explore innovative ways to use the outdoors as a classroom with integrated curriculum. Strengthen your outdoor teaching and reflection skills, and apply them to your indoor curriculum. Benefit from the immediate opportunity to apply workshop content with a small group of motivated youth. Gain knowledge and real-world experience in the prairie pothole ecosystem with direct carry-over to any geographic location, any age, and any season. Each participant receives certificate for 28 clock hours, hands-on practice using field equipment, printed copy of The Compass to Nature booklet, and much more. Free lodging available in the PWLC dormitory. For more info and to register, visit the [Friends of the PWLC web site](#).

### **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. Some of these may go on-line. Contact [Marta Stoeckel](#) for the latest information and registration.

- Physics introduction workshop, Winona State Univ. July 6 – 10
- Chemistry workshop Tartan High School, Oakdale, July 13 – 17
- Biology workshop, Tartan High School, Oakdale, July 13 – 17

### **River Institute featuring Waters to the Sea, July 20 – 22, Ft. Snelling State Park**

Join us this summer as Hamline University's Center for Global Environmental Education (CGEE) presents its acclaimed Mississippi River Institute, a free, three-day, field-based professional development opportunity for educators.

The Mississippi River Institute is designed to increase teachers' science content knowledge and investigation skills, and help area educators translate their professional experiences into meaningful, engaging classroom investigations. The focus for the institute is on elementary and middle school classroom teachers. This workshop will especially be helpful for teachers preparing to teach the new science standards for middle school earth and life science. [More Information.](#)

### **Stay-In-stitute for Climate Change Education, July 22-24, Online**



This three-day experience will take you beyond your computer screen, and into your backyard and neighborhood to do authentic scientific and social data collection, move your body, and make observations of the world around you.

Join a network of teachers from across the country dedicated to teaching climate change as an interdisciplinary issue!

- Prepare your students to be global citizens
- Use phenomena and place-based learning to ignite curiosity
- Support student engagement in climate solutions
- Network with educators in climate change education

[More Information](#) Scholarships are available.

### **Computer Science Professional Learning, July 27-31 (new dates), St. Paul**

Code.org is offering [Computer Science Discoveries and Principles workshop](#) at no cost to most teachers accepted into the program. The professional learning program prepares teachers to offer the CS Discoveries courses for grades 6-10 or the CS Principles course for grades 9 – 12. Twin Cities PBS is partnering with this program which begins with the summer workshop and provides year round support.

### **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](#)

### **MN State Centers of Excellence Teacher Training Institute, Aug 12, White Bear Lake**

This program is a professional development opportunity for all types of educators teaching Science, Technology, Engineering, and Mathematics (STEM) related courses or out-of-school programs. The curriculum and programs on which we offer training are designed to inspire students and put them on track to pursue career pathways to rewarding careers in Minnesota. The workshop is for any STEM educator that seeks to inspire their students through hands-on, experiential-based STEM activities that connect directly with career pathways in Minnesota agricultural, healthcare, engineering, and manufacturing industries. [More information](#)

### **Exploring Environmental STEM at Blaine Wetland Sanctuary, August 29 (new date), Blaine**

Adventure in nature play and hands-on teaching strategies at a unique wetland site with this workshop 9 am – noon. Practice environmental STEM teaching strategies including: the 5E model; nature play; science activities for your site; and how to do field trips. Participants experience the 5E's...engage, explore, explain, elaborate, and evaluate...all at Blaine Wetland Sanctuary! We act out seasons, build different nests, create art connecting natural systems, investigate insulators, identify plants, and more. The [Blaine Wetland Sanctuary](#) is an open space park that holds a special wetland called a fen, some of the rarest plants in Minnesota, and a unique mile-long boardwalk. The BWS park and the online curriculum are free to visitors. [Registration.](#)

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

### **Green Ribbon Schools Award**

The School of Engineering and Arts (SEA) in Golden Valley was selected at a U. S. Department of Education Green Ribbon Schools Award recipient for 2020. SEA is a kindergarten to 5<sup>th</sup> grade school that is rooted in a STEAM (Science-technology-engineering-arts-math) philosophy. Since their program opened in 2012 they have been working to reestablish native plants, orchards and gardens. They have reduced water consumption and their solid waste diversion rate is 56%. The school does not use irrigation and focuses on native plantings. 75% of the property is devoted to ecologically beneficial use.



**Students test the air speed measurer they designed**

At least 50% of the school's 201 minutes per week of physical education time is spent outdoors. Teachers are frequently found outdoors teaching required core content in math, language arts, music, art, physical education and science combined with outdoor experiences. The students tend to butterfly gardens, a pumpkin patch, a fruit orchard, a vegetable garden and the school forest. During their time at SEA, students learn from multiple environmental professionals and attend environmentally focused field trips several times each of their school years. For more information about SEA's program read the [Green Ribbon School Award Highlights](#), page 89.

## Minnesota GreenSteps Schools program

This new FREE and voluntary program provides support to schools desiring to make improvements in their sustainability practices. It helps schools make goals and realize accomplishments “one step at a time” by connecting with a supportive community of volunteers, businesses, non-profits, and local and state government agencies.

The program is modeled after the proven MN GreenSteps Cities program and utilizes the pillars of the US Dept. of Education Green Ribbon Schools program. Schools may select the practice they want to work on and receive resources for addressing that practice. They can build up to the Green Ribbon School award and continue beyond. [Learn more](#)



## School Programs and Resources

This listing features Minnesota organizations offering resources for distance learning.

### \*3M Science at Home

3M has launched a new, free-to-use digital program for teachers called [Science at Home](#), where 3M scientists and engineers will produce simple, at-home experiments that reinforce core scientific principles using commonly found household items. It is fully accessible now. The content is geared toward students ages 6-12.



### \*Bakken Museum Digital Workshops

Some of The Bakken Museum’s most popular education programs are now available as digital interactives! These online versions of shows and workshops are perfectly tailored to various distance learning formats. Workshops feature a Hyperdoc—an online worksheet that follows the videos so students can make predictions, answer questions, and try experiments in our Virtual Laboratory. Programs can be watched as one continuous program or in smaller segments, as a whole class or by students individually. [More Information.](#)

### \*Bell Museum Resources

Today more than ever before the Bell is a [museum without boundaries](#), sharing virtual experiences, activities, and ways to dive deeper into the world around you, whether you’re exploring online, from your window, out in nature, or looking up at the stars.

### \*Big River Journey Online!

Students can explore the Mississippi River from home. They will

- peer into the tiny world of aquatic invertebrates; investigate a ‘river crime’ spree and learn how to reduce runoff pollution;
- play fun learning games and dive into engaging interactives;
- get a captain’s view of the river from the pilothouse;
- explore dozens of videos, 360-landscape panoramas, and more!

These interactive learning stations are available free for schools. [All Aboard!](#)

## \*Minnesota Zoo Distance Learning Teacher Resources

**Elementary grades:** “Operation: Curiosity and Wonder” are sets of lessons and activities that can be used by schools and families at home. , These daily lessons involve exploring natural phenomena and can be used for the rest of the school year. Activities support learners with a range of technology needs, from no or limited technology (pdfs) to those working on digital platforms daily (digital). Students explore their outside environment and make connections about the natural world. The lessons were developed with input from MDE, the MN Education Equity Partnership and MnSTA. The website is also updated weekly with topics ranging from nature play to backyard science and conservation activities (website). [Kindergarten to Second Grade Resources](#) [Third, Fourth and Fifth Grade Resources](#)

**Middle School:** [The 6-8 ZOOMS Mini-Engineering Design Challenges](#) offer opportunities for students to be inspired by nature and use this to engineer a solution to a problem, much like our zookeepers do at the Minnesota Zoo. Show Us Your Mussels lessons are designed to support middle school teachers in teaching students about water quality and how to save endangered native freshwater mussels in Minnesota. These stand-alone lessons integrate English Language Arts, Humanities, and science content to meet state standards.

**High School:** [The 9-12 ZOOMS Mini-Engineering Design Challenges](#) offer opportunities for students to be inspired by nature and use this to engineer a solution to a problem, much like our zookeepers do at the Minnesota Zoo. More lessons are being developed in this age range and will be updated weekly!  
High School

## \*Physics Force Videos

The University of Minnesota Physics Force has been offering large scale demonstration shows for many years. They now have made video clips of their show and have posted them on the [Physics Force YouTube Channel](#).



## Project Hero: Ecology Quests



Project Hero is a free online platform that offers standards-oriented and authentic project-based learning experience for empowering and engaging students to take action for their local endangered species and ecosystems.

Each Quest students undertake is a unique learning and activation journey that focuses on locally-relevant environmental issues. We present multi-media content, lessons, and activities for exploring and understanding the threats to local species and ecosystems. Every quest culminates in a hands-on project to empower your students to make a meaningful impact in their

environment. Current Quests include the Minnesota Freshwater Quest. [Information](#)

## \*Raptor Lab

The Raptor Center at the University of Minnesota’s [Raptor Lab](#) is an online learning environment focused on providing students with an authentic learning experience in science and environmental education. Using role play, inquiry-based learning, and technology the Raptor Lab aims to put students in the shoes of real-world scientists, applying the process of scientific investigation to solve real-world problems. The Raptor Center also has additional resources to [Learn about Raptors](#).

### \*Team Teaching with Mother Nature – at Home!



The Jeffers Foundation fosters environmental stewardship through education. Normally Jeffers educates teachers through in-person workshops on Team Teaching with Mother Nature. Given the current shelter-in-place guidelines, we are seeking ways to connect with teachers, students, and families through short videos encouraging children to get outdoors as part of their learning at home. Some example topic of the video are *A Listening Walk*, *Recycling in Nature*, and *Seeds are Smart*. Access them at [Jeffers@Home](#): Fun with Mother Nature at home.

### \*Three Rivers Digital Learning

The [Three Rivers Park District digital programming](#) brings the outdoors to you via Facebook. Tune in to explore nature, meet farm animals, try new art projects, and more.

### \*Waters to the Sea Mississippi River Adventure

A free learning adventure, offering dozens of multimedia activities, map-based explorations, and short videos on a variety of science, engineering and social studies topics. [More Information.](#)

### P\*WolfLink Video Conferencing

The International Wolf Center is offering two-way [videoconferences](#) for free via Zoom. They include live wolves in the naturalize habitat and programs adapted to your grade level.



### \*Works Museum At Home Engineering Resources

[The resources](#) include home engineering activities, a document of the engineering design process and links to other resources

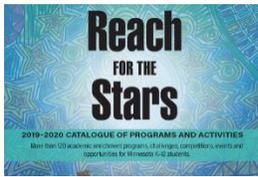
## Student Programs, Awards and Competitions

### 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](#).

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### MDE Science Contacts:

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[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](#) a.k.a. STEM Teacher Center

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

[EE Portal @MAEE](#) 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