

Dear Minnesota Senators and Representatives,

I had the pleasure of learning Earth and Space Science from a licensed Earth and Space Science teacher. Earth and Space Science, through its concrete and immersive nature, has the potential to engage students that traditionally do not participate with STEM. The world is changing. Climate change has increased environmental hazards such as drought, wildfires, and massive storms. Humanity is returning to the moon. Energy, water, and land managers face tough decisions. A licensed Earth and Space Science teacher is best situated to engage and teach students about these topics and set them upon career paths that can help solve society's problems. My licensed Earth and Space Science teacher put me on the path to a PhD in geology. Because of that initial engagement, I have applied my geological skills in several fields. As an environmental consultant, I helped to identify and remove environmental pollutants. As a geologist, I helped to develop energy resources. As a policy intern in Washington, D.C., I developed outreach resources. As an educator, I taught students to develop and engage critical thinking and integration skills. The path to all of these professions began in high school with an Earth and Space Science class.

Please commit to supporting students and preparing them for a dynamic world by funding Earth and Space Science professional development for teachers. Professional development will enable teachers to achieve licensure in Earth and Space Science and empower schools to meet the updated 2019 Minnesota Science Standards. I also urge you to help clarify these standards by requiring one credit of Earth and Space Science in high school. The standards currently require Earth and Space Science to be taught but do not require an Earth and Space Science course. Thank you for your commitment to student's education and enabling them to critically engage with their world and begin career paths that solve society's problems.

Sincerely,

Jeremiah Bernau
Geology PhD student



Minnesota Ground Water Association

10/23/2020

Dear Members of the Education Committee,

I am writing today on behalf of the Minnesota Groundwater Association to support an initiative to improve the quality and quantity of earth science education in Minnesota schools.

The Minnesota Groundwater Association supports amending the Minnesota high school graduation requirements to require one credit of a dedicated earth and space science course taught by a licensed ESS teacher, and to secure funding for both the 6th grade and high school ESTEM training programs for three years as a legislative budget item.

All Minnesota students need a foundational understanding of earth processes so future generations of Minnesotans can become leaders in geoscience-based industries, conservation, sustainable farming, water quality, engineering and other areas integral to Minnesota's (and the planet's) continued prosperity. Quality earth and space science education is good for all Minnesotans and Minnesota businesses. In order to teach this course effectively, the state needs to support professional development for science teachers who may not have taught this material before. Earth Science Teacher Education Matters (ESTEM) is a teacher professional development program specific to Minnesota, designed to train 6th grade teachers in their new, grade-level earth science subject matter and help current high school science teachers, especially in rural areas, obtain affordable additional ESS licensure. ESTEM will provide regional, cohort-based learning groups facilitated by Minnesota teachers and professors as well as needed online courses. Our ESTEM planning team has everything ready to begin professional development cohorts during the summer of 2021.

Please commit to strengthening Minnesota's graduation standards and professional development for science teachers by focusing on earth and space science courses.

Signed,

A handwritten signature in black ink, appearing to read "Anthony C. Runkel". The signature is written in a cursive style with some loops and flourishes.

Anthony C. Runkel
President-elect, Minnesota Groundwater Association

HF 1464 Testimony

Dear Members of the House Education Finance Committee,

I am writing to you in strong support of HF1464, which would provide Minnesota teachers with the resources to gain the skills and knowledge they need to meet the new state science standards in Earth sciences and related fields.

As head of the Department of Earth and Environmental Sciences at the University of Minnesota-Twin Cities, I know well the importance of geosciences to the health and security of the environment and the economy. The need for more people with geoscience training is more crucial than ever.

Minnesota has taken an extremely important step in increasing the Earth science component of K-12 education. The next, equally vital step is to support teachers as they work to gain expertise and credentials to teach this subject.

My colleagues in the Minnesota Science Teachers Association have presented a compelling case for the need for professional development for teachers. This professional development is crucial for supporting and maintaining the high quality science teaching for which Minnesota is nationally known.

There are myriad employment opportunities for geoscientists. Because there has historically not been much Earth science taught in grades K-12 in Minnesota, very few students who attend college/university consider geosciences as a major or career. Fortunately, some discover this interest during their college years, but there is still a mismatch between the number of graduates we can produce statewide and the jobs available. Increasing the geoscience component of pre-college education may solve this problem, providing more 'homegrown' talent to companies that hire people with knowledge of geology, geophysics, geochemistry, hydrogeology, and related fields.

My department has committed to supporting the Earth-science teacher training initiative in any way that we can by providing instructors, space, and materials. In order for this program to succeed, however, **the training opportunities need to be accessible to teachers throughout the state, regardless of their personal financial situation.** I hope we can all work together to support Minnesota teachers, who will then go on to inspire and educate students to become leaders in industry, mineral and water resources, conservation/ remediation, data science, soil science, geo and environmental engineering, and other areas of geosciences.

Please consider giving your support to this important bill.

Thank you,

Donna L. Whitney
Professor and Head, Earth & Environmental Sciences
University of Minnesota – Twin Cities

Hello House Education Finance Committee Members,
I am reaching out to you on behalf of the Minnesota Science Teachers Association to ask you as members of the House Education Finance Committee to hear HF1464 in committee. This professional development is vital to support and maintain the high quality teaching of science that makes Minnesota one of the best in the nation. A comprehensive and high quality earth and space science education is vital to our state's continued economic growth and sustainability. Our students need a foundational knowledge and understanding of basic earth processes and phenomena. They are the upcoming generations of Minnesota students that will become the new leaders in industry, conservation, sustainable farming, engineering and other areas of geoscience. They are absolutely integral to Minnesota's continued prosperity.

There is support for this initiative from some of Minnesota's leaders in industry and research, as well as education; for example, we have support from Aggregate and Ready Mix of Minnesota industry, the Minnesota Groundwater Association, Novel Energy Solutions, Minnesota Geological Society, Renewable Energy Alliance, Climate Generation, Education Minnesota, Minnesota Earth Science Teachers Association, SciMathMN, and professors of geosciences from MnSCU and the University of Minnesota. We have affidavits from former Minnesota students that have gone on to careers in the geosciences, who credit their paths and success to access to a quality earth science education. All Minnesota students should have access to the same opportunities. Please see the attached documents as evidence for wide support of our program. These organizations and individuals see the long term benefits of earth science education not only to their industries and economies, but also to their land and pride of place.

The request for funding for this program in HF 1464 goes beyond paying for teacher professional development. It is an investment in the future of Minnesota, and its place in the global community. It is an investment in preparing our students to be a conscientious and knowledgeable citizenry that can make informed decisions regarding how to navigate the crossroads of industry and economy, and sustainability and resource management, for the benefit of everyone. It is an investment in our future.

Please consider hearing this bill in committee, and lending your support. I am happy to be at your disposal to testify and/or answer questions.

Sincerely,
Dana Smith
Science Teacher, MnSTA Member, ESTEP Coordinator

Members of the House Education Finance Committee:

I am reaching out to you as an earth science educator and a citizen concerned about STEM education. I am asking you to hear HF1464 in committee. HF1464 will provide the support needed to prepare existing Minnesota Earth Science Educators to teach the revised Earth Science Standards. This professional development is vital to support and maintain the high quality teaching of science that makes Minnesota one of the best in the nation. This professional development will address the needs of educators across the rural, suburban, and urban communities, and in doing so will not only better prepare our educators, it will also better prepare students across a wide demographic spectrum to be better informed about use and management of our natural resources, and for careers in earth sciences.

A comprehensive and high quality earth and space science education is vital to our state's continued economic growth and sustainability. Our students need a foundational knowledge and understanding of basic earth processes and phenomena. They are the upcoming generations of Minnesota students that will become the new leaders in industry, conservation, sustainable farming, engineering and other areas of geoscience. They are absolutely integral to Minnesota's continued prosperity.

The Minnesota Science Teachers Association has obtained statements of support for this initiative from some of Minnesota's leaders in industry and research as well as education; it has support from Aggregate and Ready Mix of Minnesota industry, the Minnesota Groundwater Association, Novel Energy Solutions, Minnesota Geological Society, Renewable Energy Alliance, Climate Generation, Education Minnesota, Minnesota Earth Science Teachers Association, SciMathMN, and professors of geosciences from MnSCU and the University of Minnesota. We have affidavits from former Minnesota students that have gone on to careers in the geosciences, who credit their paths and success to access to a quality earth science education. All Minnesota students should have access to the same opportunities. These organizations and individuals see the long term benefits of earth science education not only to their industries and economies, but also to their land and pride of place.

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Please consider hearing this bill in committee, and lending your support. I am happy to be at your disposal to testify and/or answer questions.

Thank you,

Kate Pound
Former President, Minnesota Groundwater Association

Kate Pound PhD, PG, she/her/hers
Professor, Geology & Science Education
Atmospheric & Hydrologic Sciences
College of Science and Engineering
WSB-155
St. Cloud State University



March 23, 2021

Dear Legislators,

First, we want to thank you for your support of continued STEM education in Minnesota. SciMathMN brings together a statewide STEM community to promote equitable and accessible STEM learning and workforce participation, empower lifelong learning, and inspire informed community action.

SciMathMn is fully supportive of HF 1464 (Bliss) which will provide a grant to the Minnesota Science Teachers Association to provide professional development training for science teachers. With the recently revised science standards there is a need to provide assistance to teachers who may now need to get licensed in earth sciences; especially for those teaching in smaller districts in Greater Minnesota. These funds will assist teachers and districts that are needing to make adjustments as a result of the revised science standards and allow them to continue their work with our students.

Please support this legislation and include this funding request in the K-12 Omnibus bill. Please contact our policy chair Cap O'Rourke cap@ourkesc.com with any additional questions.

A handwritten signature in cursive script that reads "Jerry Sosinske".

Jerry Sosinske
Board Chair



Amherst College

12/03/2020

To the members of the MN State Legislature;

I am writing, first and foremost, to express my excitement that earth science is being adopted in high school curricula across the state! I am a graduate of Minnesota Public Schools (Moorhead High School, class of 2007), and thanks to a supportive middle school earth science teacher and a passion for STEM, I pursued a career in earth science myself. My work has taken me to the ends of the Earth, and through my role on the scientific advisory board for NASA's ICESat-2 mission, to space, to look back at our planet and watch it change beneath us. I have loved every second of my journey from Moorhead, MN.

Now, working with students of my own, I see the role earth science can play in bringing students into STEM. The next generation is intensely socially engaged – they want to do good in the world, and coursework in pure chemistry, physics, and math, can seem removed from real world problems. But when applying those same concepts to climate dynamics, natural hazards, environmental protection, you can see their eyes light up. Earth science can be an on-ramp that catches the most unsuspecting students, helping them to find their place in science and creating a diverse set of problem solvers that bring their insights and ingenuity to problems across a range of disciplines.

Earth science, however, suffers from a generation of academic mistreatment that still lingers in the minds of some educators – the idea that geology was “rocks for jocks”, a course in vocabulary rather than process, one that has no practical value. This is simply not true; the Earth and climate system controls the clothes we wear, the way we build our homes and businesses, the crops we grow, the industries of our state, and much much more. For earth science classes to be effective, high school teachers need to see the depth of the discipline, and bring the contagious enthusiasm required in every great class.

While I still brag about my experience in Moorhead Public Schools, it really came down to the engagement of my teachers. It is worth investing in the teacher experience as you build up a new earth science curriculum, so they can pass that investment on to the students. Their knowledge can't just come from a textbook – the more you can do to help the teachers develop as earth science educators, the more students will come out of Minnesota Public Schools with stories like mine.

I'm excited to see the next generation of earth science problem solvers represent Minnesota to the world,

A handwritten signature in black ink that reads "Nick Holschuh". The signature is fluid and cursive, with a long horizontal stroke at the end.

Nick Holschuh
Moorhead High School Alumnus, 2007
Assistant Professor of Geology
Amherst College, Amherst, MA