



**MMEW 2013 - Hibbing, Minnesota**

**By**

**Dean Moosavi**

**[smoosavi@charter.net](mailto:smoosavi@charter.net)**

**The Next Generation Science  
Education Standards -  
Implications for Earth Science  
Instruction in Minnesota:  
*The View in June 2013***



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**Rochester Community Technical College  
Past Chair - Geoscience Education Division  
Geological Society of America**

# Welcome Everyone

To Start...

Please Introduce Yourself & Indicate the Following:

- Your School's Location
- What Subject(s) You Teach
- What Grade Level(s) You Teach
- The Importance of Minnesota State Standards in Guiding Your Classroom Activities

# Next: Join with People Who Teach at the Same Grade Level and Work as a Group

**Elementary**, **Middle School**, **High School**

- Take ~ 10 minutes and make a list of the 7 most important topics that should be covered in Earth & Space Science at your level
- **If possible...try to rank these topics from most to least important**
- Indicate How much class time (days/hrs per day) would be required to teach this content

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How well does their content knowledge align with that of the students in your own district?

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## A More Realistic Assessment

- *Industry and government allege a greater demand for jobs requiring advanced science education or training—from one year post-secondary certificate programs to PhD's*
  - Many new jobs require very narrow technical skill sets that depend on STEM knowledge...but are inaccessible because industry no longer invests in training for its specific needs passing the blame onto educators
  - Many geoscience jobs are transient due to the boom & bust cycle of Industry
  - Industry seeks to outsource THEIR training costs for very specific skills onto the education system and students
- *Business leaders, teachers and the scientific community believe improving science education will keep the US workforce strong and competitive*
  - As with the ever imminent but ever elusive massive STEM teacher shortage, the business & scientific community like to sound the alarm about the crisis but fail to make changes in THEIR day to day operations that might actually address the problem

*What can/should teachers do?*

# Remember Who We Work For

- Our job as teachers is to prepare our **STUDENTS** to be scientifically literate with the skills needed to act as informed citizens in their own lives and careers regardless of whether they are in or outside of science
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## ***What do regular folks think about this?***

- A majority of voters give the quality of science education a grade of “C” or below - both nationally (67%) and in their local schools (50%).
- Most voters (56%), believe science education in the United States ranks behind most other countries. This includes majorities across all major sub-groups, including gender, education, region or political affiliation.

**Science Education is Failing to Meet  
the Expectations of Voters -  
We Have Work to Do!**

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- Strong push for development of NATIONAL standards that all states would adopt is modeled on the Common Core standards in English & Math
- MN is not obliged to enact these standards immediately...but the Dayton administration has indicated it will follow the Obama Education Department’s lead in this matter.

# General Content Areas by Level

## Elementary (By Grade)



- K - Weather & Climate
- 1 - Space Systems: Patterns & Cycles
- 2 - Earth Systems: Processes that Shape the Earth
- 3 - Weather & Climate
- 4 - Earth Systems: Processes that Shape the Earth
- 5 - Earth Systems, Space Systems: Stars & Solar System

## Middle & High School (Broken Up Along Themes)

- Earth's Place in the Universe
- Earth Systems
- Earth & Human Activity

# *Ready to see the New Standards?*



- Be warned...the graphics of the standards are very dense and bear a striking resemblance to the process of reading the directions to assemble Form 1040 for April 15!
- Note the full listing of the standards and their linkages across all of science can be downloaded from the **NSTA** web site at:

<http://www.nsta.org/about/standardsupdate/standards.aspx>

# The Nature of Science in New Standards

- *The basic understandings about the nature of science are:*
- § Scientific Investigations Use a Variety of Methods
- § Scientific Knowledge is Based on Empirical Evidence
- § Scientific Knowledge is Open to Revision in Light of New Evidence
- § Scientific Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- § Science is a Way of Knowing
- § Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- § Science is a Human Endeavor
- § Science Addresses Questions About the Natural and Material World

# The Standards in PDF Summary:

- Nature of Science
  - Appendix H pp. 5-6
- Elementary:
  - [ES-EarthAndSpaceScienceStandards.pdf](#)
- Middle School:
  - [MS-EarthAndSpaceScienceStandards.pdf](#)
- High School
  - [HS-EarthAndSpaceScienceStandards.pdf](#)



# Strengths of the New Standards?

- Uniform Standards help students who move frequently between districts and across state lines?
- Broad thematic understanding built across the curriculum and grade levels?
- Others?

# Weaknesses of the New Standards?

- One Size Fits All or No One?
- Would the state specific knowledge of geologic structures, mineral resources, industries, job opportunities such as what MMEW shares with teachers have a home in such a curriculum?
- Are there major content areas missing?
- How will the high school portion of the standards be met in states that don't offer courses at that level?
- How does one create the desired integration in schools that still have specialized teachers (K-6) or distinct science courses (7-12)?
- Are current teacher training/experience/licensure requirements in alignment with the skills needed to implement the curriculum implied by the new standards?

# Final Thoughts on the New Standards?



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**Note: For States, By States in the logo.**



**Are our schools designed and built to serve the state...  
or to meet the needs of students? Again...**

**Who do we work for?**

# Final Thoughts on the New Standards?

