Dennis-Yarmouth RSD

Instruction Office Newsletter

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Revised Draft of MA Science & Technology Standards

Where we are? The current standards, dating back to 2001/2006 are content focused on four primary domains: Earth & Space, Life Science, Physical Science, and Technology/Engineering. There are no inquiry skills except a quick mention at the high school level, and generic cognitive verbs are used throughout. The topics are presented by grade spans: PreK-2, 3-5, 6-8, HS "introductory" courses.

Why revise? It was time to update the science, since the last full set of standards was developed back in 2001. STE (Science & Technology Engineering standards) contribute to CCR (college and career readiness) by preparing students for STEM-focused jobs and postsecondary opportunities. There was a need for an integration of practices with concepts, which are necessary skills for CCR, This also increases the rigor of student expectations and reinforces the mathematics and literacy standards. Finally, it was important to present PreK-8 grade-by-grade standards.

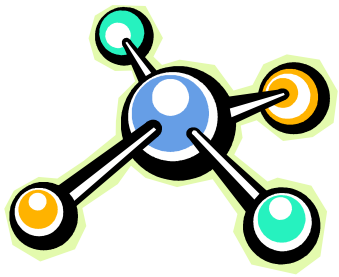
What does it mean to be College and Career Ready in Science & Technology/Engineering?

Students will demonstrate the academic knowledge, skills, and practices necessary to enter into and succeed in entry-level, credit-bearing science, engineering or technical courses; certificate or workplace training programs requiring an equivalent of science; or a comparable entry-level science or technical course at the institution. Students who are college and career ready will be prepared to:

- Analyze scientific phenomena and solve technical problems in real-world contexts using relevant science and engineering practices and disciplinary core ideas. (Science)
- Use appropriate scientific and technical reasoning to support, critique, and communicate scientific and technical claims and decisions. (ELA)
- Appropriately apply relevant mathematics in scientific and technical contexts. (Math)

Dates and Deadlines:

- **Grs. 1-7 Report Cards 4/2/14**
- **Mentor Meetings: 4/14, 6/2**
- **Spring Break 4/21-25**



What are science and engineering practices?

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

What do the new STE standards look like?

5-PS1 Matter and Its Interactions
5-PS1-1. Use a model of matter as made of particles too small to be seen to explain common phenomena involving gasses, phase changes between gas and liquid, and dissolving. [Clarification Statement: Examples of common phenomena the model should be able to describe include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.] **5-PS1-2. Measure and graph the weights of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating, cooling or combining substances, the total weight of matter is conserved.** [Clarification Statement: Assume that reactions with any gas production are conducted in a closed system.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.] **5-PS1-3. Make observations and measurements to identify substances based on their unique properties, including color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.** [Clarification Statement: Examples of substances to be identified could include baking soda and other powders, metals, minerals, and liquids.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.] **5-PS1-4. Conduct an experiment to determine whether the mixing of two or more substances results in new substances with new properties.**

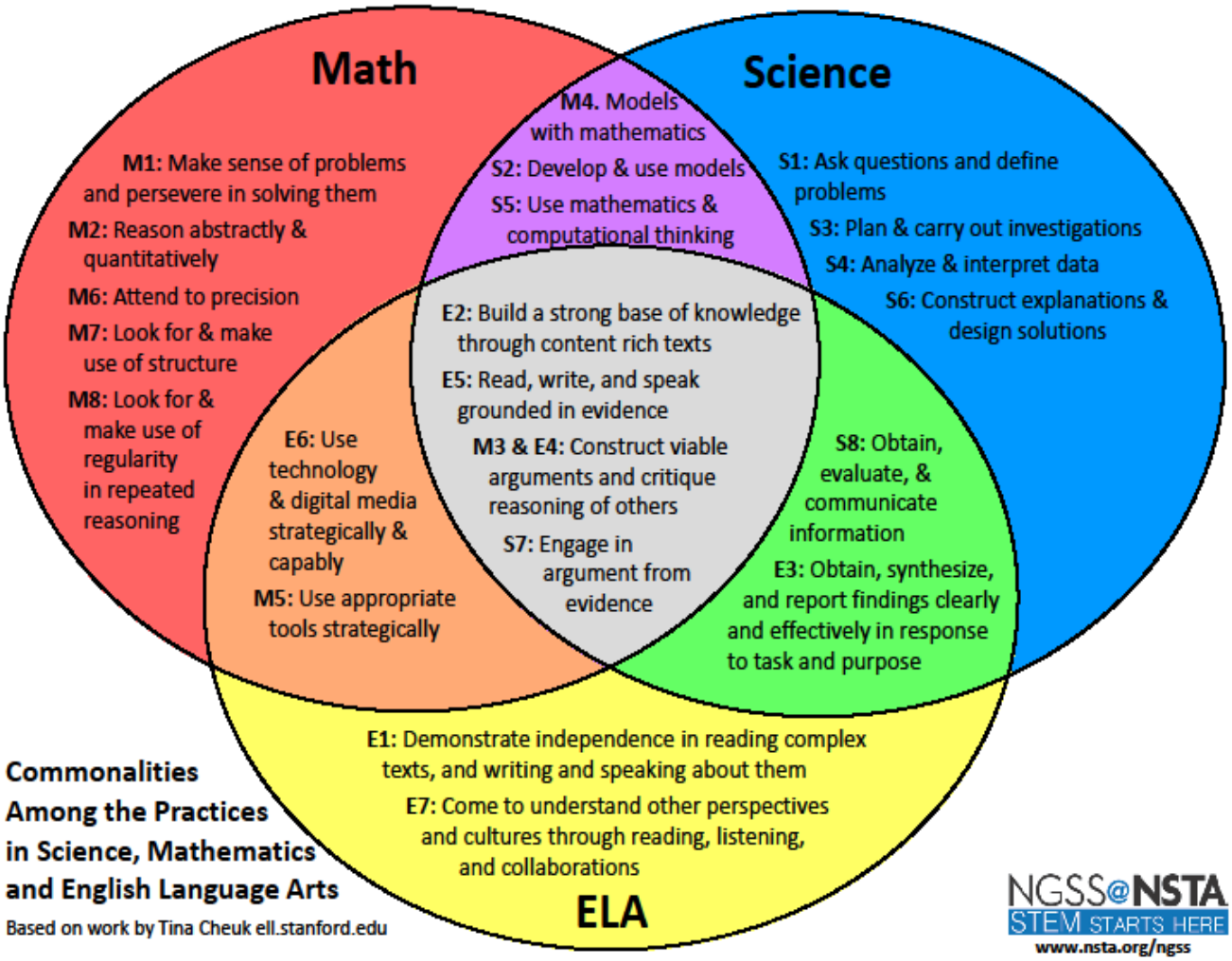
What are the implications for curriculum and instruction?

Shifts in Revised Standards	Shifts in curriculum & instructions
Organized around core explanatory ideas	The goal of teaching needs to shift from facts and concepts to using knowledge and skills to analyze and explain natural phenomena and design systems
Central role for science and engineering practices	Inquiry- and design-based learning is not a separate activity; all STE learning should involve rigorous and purposeful engagement with practices and concepts
Coherence: ideas and practices build across time and between disciplines	Teaching involves building a coherent storyline across time toward more sophisticated scientific and technical models.

What are the next steps?

The STE standards are in public draft through the 2014-2015 school year. During this time, ESE will edit based on input, develop framework resources, and post model curriculum units. Districts are encouraged to try out the standards in curriculum & instruction and use them to inform educator goals and DDMs.

In 2015-16, the STE standards will move to official public comment and adoption. Following this, there will be a multi-year implementation and transition period. ESE will provide support for the transition and adjust the MCAS. Districts will be expected to transition to the revised standards.



Check out these sites for more information:

Online course: Moving Towards NGSS: Connecting Science to Common Core with Picture-Perfect Science Lessons; April 21-May 9; $199; K-5 teachers.
http://learningcenter.nsta.org/products/online_courses/NGSS4.aspx

STEM Curriculum, Assessment and Policy Guidance
http://www.doe.mass.edu/STEM/ca.html

STEM Review of the Science and Technology/Engineering Framework, 2009-2016
http://www.doe.mass.edu/STEM/review.html

The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' but 'That's funny...'

— Isaac Asimov