

Does STEM mean what you think it means?

A discussion about

Building STEM Education on a Sound Mathematical
Foundation – NCSM/NCTM Joint Position Paper

What does it mean to you?

- Discuss with a partner or group what STEM in your context means
- Record some of your answers (40 characters max) on Answergarden:

<https://answergarden.ch/786088>



LiveSlides web content

To view

Download the add-in.

liveslides.com/download

Start the presentation.

The position paper

- <https://www.nctm.org/Standards-and-Positions/Position-Statements/Building-STEM-Education-on-a-Sound-Mathematical-Foundation/>

Importance

- “Mathematics is increasingly needed to understand the world today and fully engage in democratic society.” – NCTM (2018)



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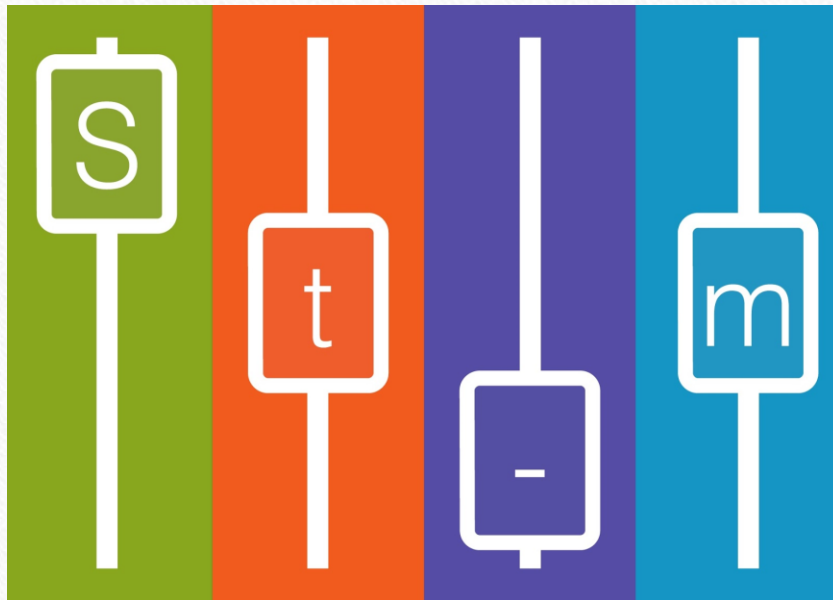
- “Underlying the confusion and inconsistency in school STEM programs is the lack of a clear vision of what STEM is and what STEM programs should include.”

Individual Disciplines?

- <https://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Matt-Larson/Math-Education-Is-STEM-Education!/>
- If we fail to support each and every student in developing a positive mathematics identity, a high sense of agency, and a deep understanding of mathematics, then we will have failed our students, denied them future opportunities, and ultimately failed to build the mathematical foundation necessary for the STEM outcomes that policy makers envision.

Integrated framework?

- <http://okmathteachers.com/stemframework/>



BOTH!

- Mathematics and science as disciplines, as well as integrative activities that cross the STEM fields should be part of a comprehensive STEM Program
- An essential feature of integrative STEM activities should be that they support the individual disciplines addressed with integrity – grade level standards, discipline appropriate pedagogies



Pitfalls of STEM in Schools

- Lack of attention to mathematics and science as disciplines
- Lack of attention to literacy, the Arts, social sciences
- Teachers with content knowledge, but lacking problem-based learning pedagogies

Math in STEM, Math beyond STEM

- The mathematics that students learn in school includes content and thinking that can be used as **tools** for tackling integrative STEM problems
- School math content might be connected to non-STEM disciplines (business, finance, art, etc.)

Recommended Actions for Leaders

- Commit to strong science and math programs
- Ensure students have access to deep, rich teaching when implementing STEM activities or programs
- Within STEM activities, ensure that the activity avoids trivializing the content and promoting misconceptions, inaccuracies, or misleading ideas about the discipline
- In assessment, use or develop authentic assessment tools that look at connections and address problems integrating the STEM disciplines.

Recommended Actions for Teachers

- Teach according to NCTM's teaching practices (Principles to Actions)
- When mathematics is included in a STEM activity, address grade level standards
- Teach in ways that support the development of mathematical thinking and quantitative reasoning
- Look for opportunities to integrate science, technology, and engineering in meaningful ways as students tackle problems involving mathematics in relevant settings
- Maintain the integrity of the primary discipline

Teaching Practices

- Establish mathematics goals to focus learning.
- Implement tasks that promote reasoning and problem solving.
- Use and connect mathematical representations.
- Facilitate meaningful mathematical discourse.
- Pose purposeful questions.
- Build procedural fluency from conceptual understanding.
- Support productive struggle in learning mathematics.
- Elicit and use evidence of student thinking.

Additional Observations

- Pair/Share
- What message/messages will you take to your district/school regarding implementation of STEM initiatives?

Thanks for engaging!

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