

The mathematics of CCSS

A developer's perspective on teacher preparation
and professional development

MSRI Critical Issues Conference, May, 2011 — E. Paul Goldenberg



Education Development Center

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Science is at least two things

- A body of knowledge:
 - rocks, quarks, baboons, stars, light, proteins...
- A way of thinking and investigating
 - the “scientific method”

Mathematics is at least two things

- A body of knowledge
 - facts, procedures, theorems...
- A way of thinking and investigating
 - Mathematical habits of mind

Mathematical Habits of Mind

- <http://www2.edc.org/cme/hom/index.html>
- <http://www2.edc.org/cme/MPI>
- <http://thinkmath.edc.org>
- Organizer for curriculum with two purposes
 - *some* need all content detail; *all* need the thinking
 - students *can* learn to think like mathematicians (though, with suitable content)

A two-dimensional CCSS

- Content:

A body of knowledge

- Mathematical Practices:

A way of thinking and investigating

Educational challenge

- Content: differ in detail, but familiar in form
- Mathematical Practices: new, with vague hints
- Common agreement/testing gives them teeth

Teeth hurt

- Reward/punishment for measured results guarantees that what is *unmeasured* is ignored
- Mathematical Practices will be taken seriously only if measured
- Hope they're measured well (fidelity to ideas, correctness of mathematics, appropriateness for students)

Distinct section $\neq$ distinct learning

- Content: *vehicle for Mathematical Practices*
 - MPs *can't* be learned apart from content
to paraphrase Papert, “can’t think mathematically without thinking mathematically about something”
 - Neither can content appear out of the blue
as if the book, rather than good thinking, is the authority
- Mathematical Practices: *organizer for content*
- Students cannot recapitulate math history and re-invent everything, but *can* experience all content through mathematical habits of mind

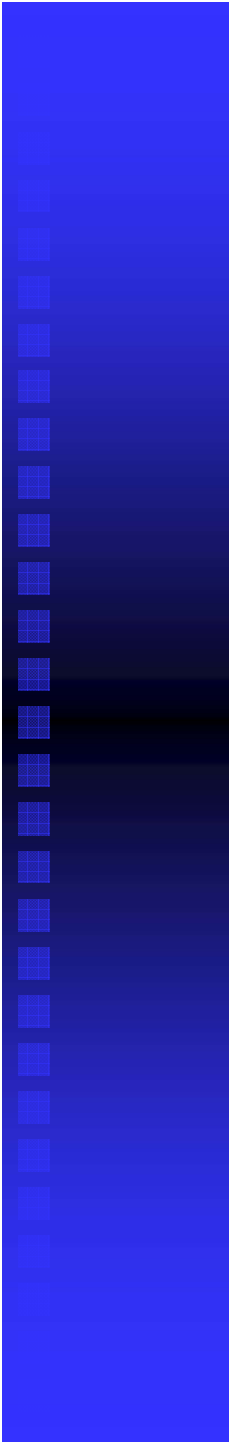
Standards $\neq$ curriculum $\neq$ teaching

- Much thinking, went into the standards
- Can't all be captured in list form

[illegible]

Interpreting the CCSS

- Living Constitutionalism
- Over time, by all
- In the short run, for MPs at K-5,
see <http://thinkmath.edc.org>



Thank you!