What Friends of Teachers Should Know About The Common Core State Standards for Mathematics

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Gathering Your Thoughts

Please think about the following questions:

1. What do you know about the Common Core State Standards for Mathematics (CCSSM)?
2. How does your mentor teacher feel about the Common Core?
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Please discuss your answers to these questions at your table.
My Background

What I have to do with the Common Core:

- Local and national professional development on the CCSSM
- Preservice teacher education
- Evaluation of curriculum and professional development
- Consulting for assessment consortia

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My Background

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What I don’t have to do with the Common Core:

- Teaching K-12 students
Teacher Feedback on the CCSSM

Some teacher feelings about the CCSSM:

- Upset
- Worried
- Overwhelmed
- Hopeful
- Excited
What Is the Common Core?

The **Common Core State Standards** are a set of academic expectations for students in Grades K-12, developed by a consortium of 48 states.

The Common Core contains standards for both Mathematics and English Language Arts.

The standards were adopted by 45 states. Most states are in the process of implementing the standards now and will be implementing assessments aligned to the CCSS in 2014-15.
What Is the Common Core?

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High School Concepts Categories

- High School
  - Algebra
  - Functions
  - Number and Quantity
  - Statistics and Probability
  - Geometry
  - Modeling
Some Sample Standards

3.NF.1. Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts; understand a fraction $a/b$ as the quantity formed by $a$ parts of size $1/b$.

3.NF.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
Some Sample Standards

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A Nationwide Effort to Improve Education

Implications for: instruction, curriculum, professional development, assessment, policy, ...
Why Are We Doing This?

A Fundamental Disconnect

Solving Quadratic Equations: Completing the Square

Solve for the unknown variable. Complete the square where needed.

1) $x^2 + 6x = 16$

6) $x^2 + 2x = 3$

2) $x^2 - 10x - 39 = 0$

7) $x^2 + 6x + 8 = 0$

from EdBoost.org
A problem from a college algebra class:

A ball is thrown upward. The ball’s height (in feet) $t$ seconds after it is thrown is given by the function $h(t) = 4 + 24t - 16t^2$.

What is the maximum height attained by the ball?
A problem from a calculus class:

Evaluate the indefinite integral

\[ \int \frac{dx}{x^2 + 6x + 10}. \]
Why Are We Doing This?

25 What is the graph of the equation?

\[ y = x^2 - 4x + 4 \]

\[ y \]

A

B

C

D

Why Are We Doing This?

We need standards that better link the machinery of algebra – skills and procedures – to the meanings of algebraic concepts, and to possible uses of these skills.
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We need standards that better link the *machinery* of algebra – skills and procedures – to the *meanings* of algebraic concepts, and to possible *uses* of these skills.

**A-SSE.3.** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

**A-SSE.3.b.** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
As a group, solve the equation

\[ x^2 = (2x - 9)^2 \]

using as many different methods as you can. Justify each solution approach, as you might to a student unfamiliar with the method you are using.

Record these methods on a sheet of paper (one for each group), and number each method.
A Math Problem

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As you do this, take mental note of the mathematical skills and competencies you are drawing upon.
A Math Problem

Sharing of Solution Methods
The Common Core Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express generality in repeated reasoning.
The Algebra Standards

Question

Why might teachers find it difficult to teach to a set of standards like the Common Core high school Algebra standards?
Some Dos and Don’ts

Some Common Core Dos and Don’ts for Friends of Teachers
Some Dos and Don’ts

Don’t try to persuade teachers that they should be happy/optimistic about the Common Core
Some Dos and Don’ts

**Do** what you can (within your role as a “teacher helper”) to introduce activities and tasks that are mathematically rich and CCSSM-aligned.
Some Dos and Don’ts

Don’t introduce all of the complexity of the Common Core all at once
Some Dos and Don’ts

**Do** look for opportunities to ratchet up the level of discourse and reasoning in your math class

- Contextualize problems
- Pose problems in which there is more than one possible solution method, and ask students to justify their choice of method
- Ask “Why?”, “When does . . . ?”, and “What if . . . ?”
Some Dos and Don’ts

Don’t expect every standard to be mastered in a day

Today, SWBAT make sense of problems and persevere in solving them.
**Do** try to integrate standards that are far-reaching into the everyday business of math class

**Example:** How could I weave the following standard into a lesson on exponential functions?

**F-IF.4.** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
Some Dos and Don’ts

**Do** have fun. Know that you are making a difference.

Thank you for supporting mathematics (and science, and other) teachers!
Please use one of the green index cards at your table to write down any questions (or thoughts, or concerns) you have about the Common Core.