Common Core State Standards for Mathematics: *The Key Shifts (Focus)*

Professional Development Module

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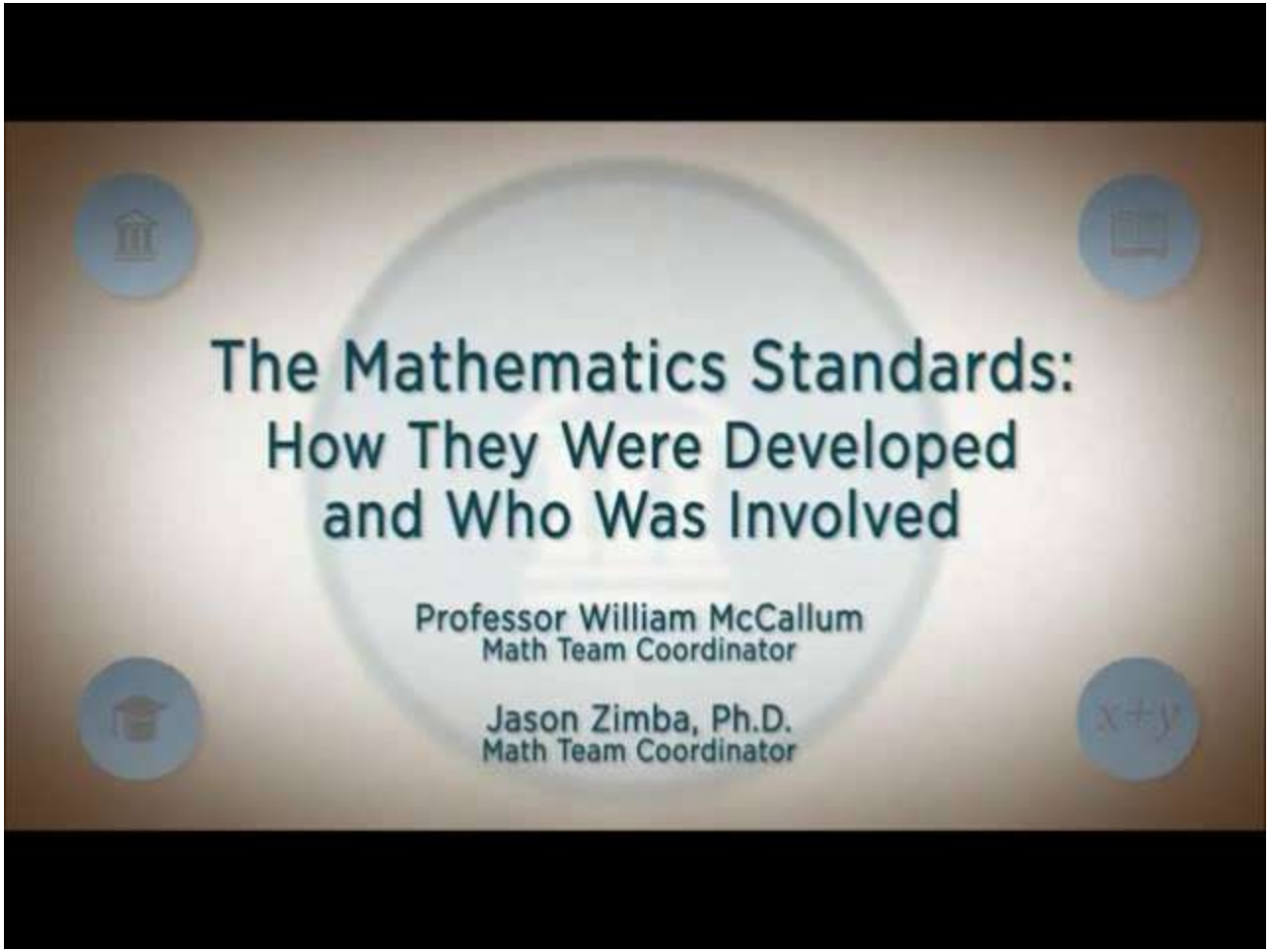

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The Background of the Common Core

Initiated by the National Governors Association (NGA) and Council of Chief State School Officers (CCSSO) with the following design principles:

- Result in College and Career Readiness
- Based on solid research and practice evidence
- Fewer, higher and clearer

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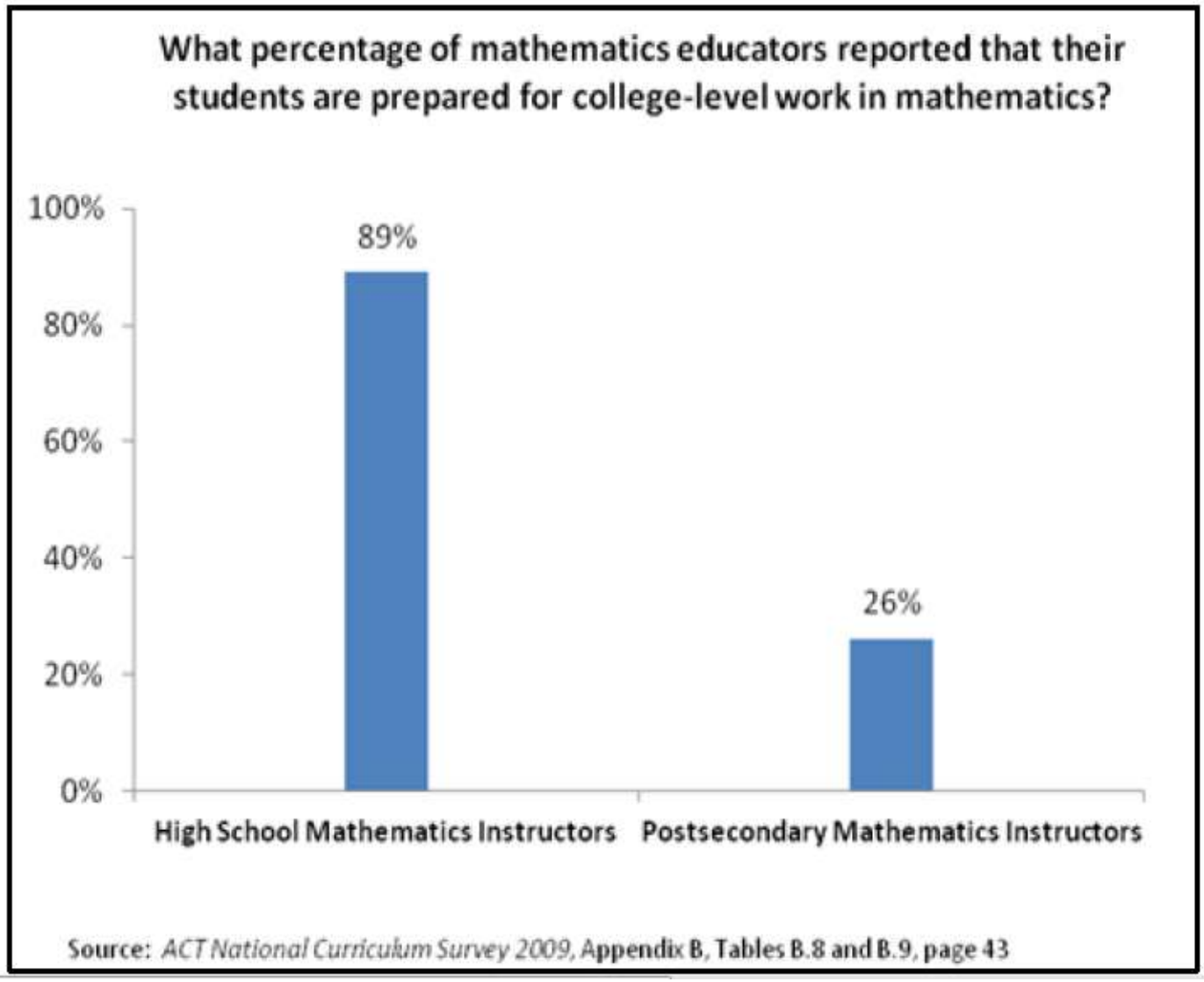
College Math Professors Feel HS students Today are Not Prepared for College Math



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What The Disconnect Means for Students

- Nationwide, many students in two-year and four-year colleges need remediation in math.
- Remedial classes lower the odds of finishing the degree or program.
- Need to set the agenda in high school math to prepare more students for postsecondary education and training.

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The CCSS Requires Three Shifts in Mathematics

1. **Focus:** Focus strongly where the standards focus.
2. **Coherence**: *Think* across grades, and *link* to major topics
3. **Rigor:** In major topics, pursue *conceptual* **understanding,** procedural skill and *fluency*, and *application*

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Shift #1: Focus Strongly where the Standards Focus

- Significantly narrow the scope of content and deepen how time and energy is spent in the math classroom.
- Focus deeply on what is emphasized in the standards, so that students gain strong foundations.

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Focus

- Move away from **"mile wide, inch deep"** curricula identified in TIMSS.

➓ Learn from international comparisons.

➓ Teach less, learn more.

- “Less topic coverage can be associated with higher scores on those topics covered because students have more time to master the content that is taught.”

– Ginsburg et al., 2005

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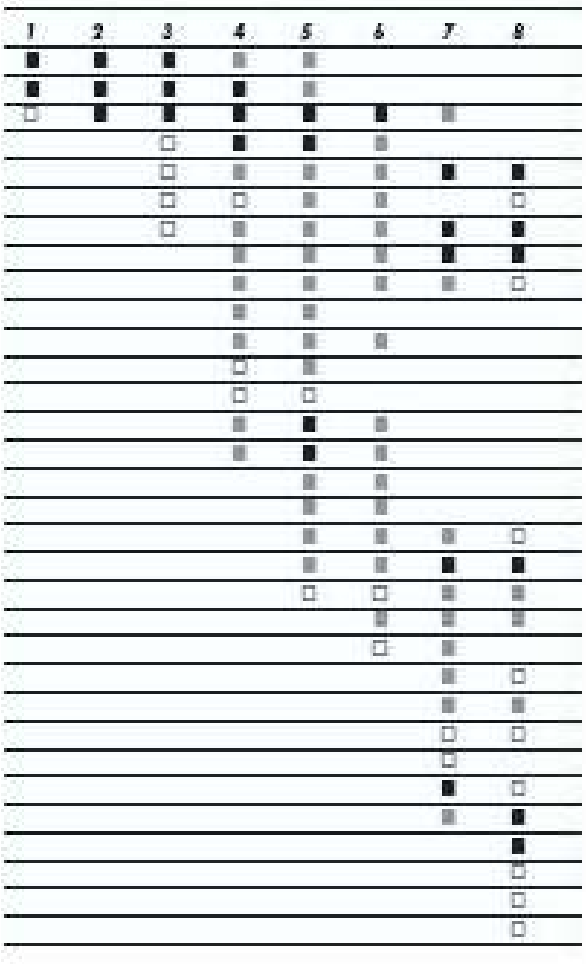
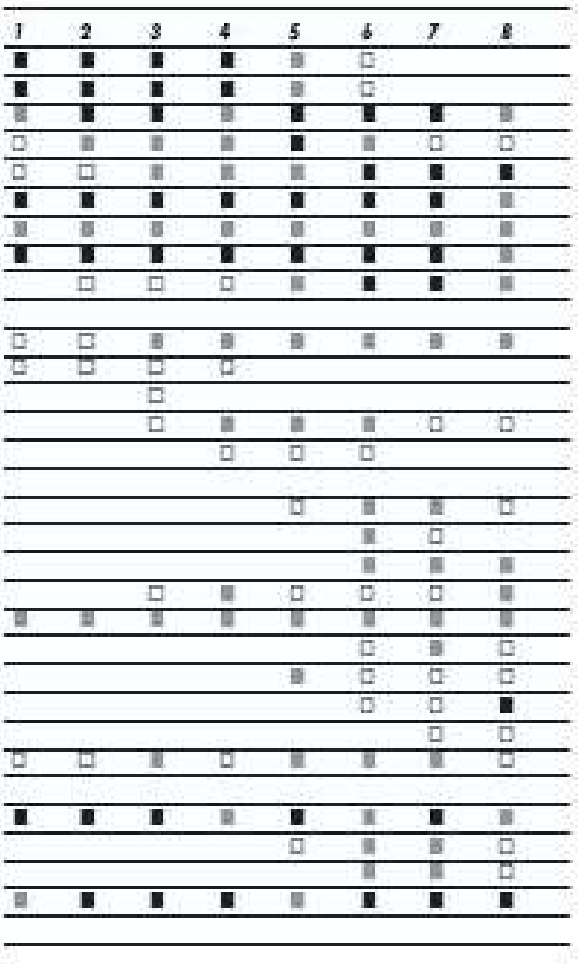
The shape of math in A+ countries

Mathematics topics intended at each grade by at least two-thirds of A+ countries





Mathematics topics intended at each grade by at least two-thirds of 21 U.S. states

[1] *Schmidt, Houang, & Cogan, "A Coherent Curriculum: The Case of Mathematics." (2002).*

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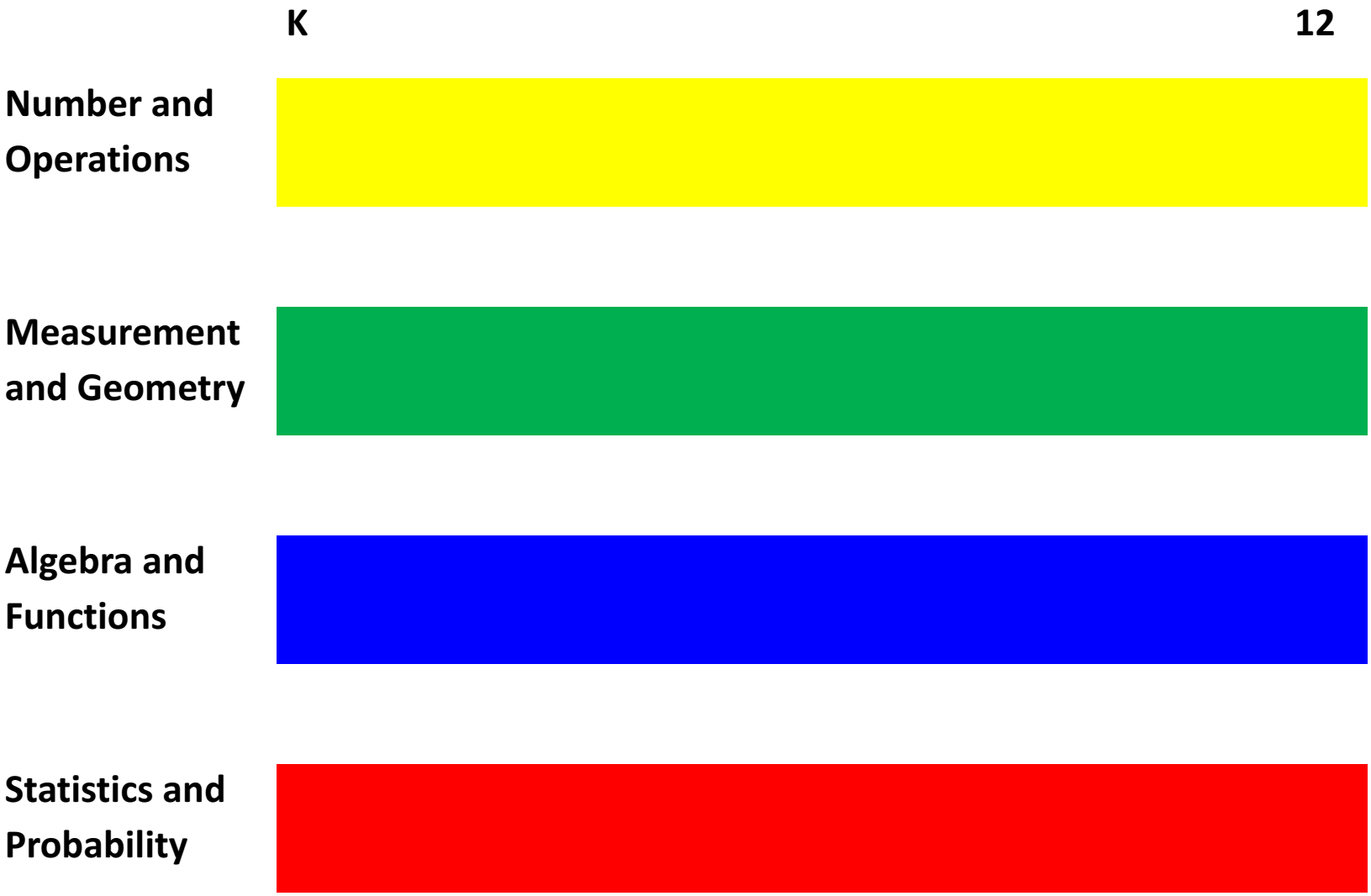
Traditional U.S. Approach



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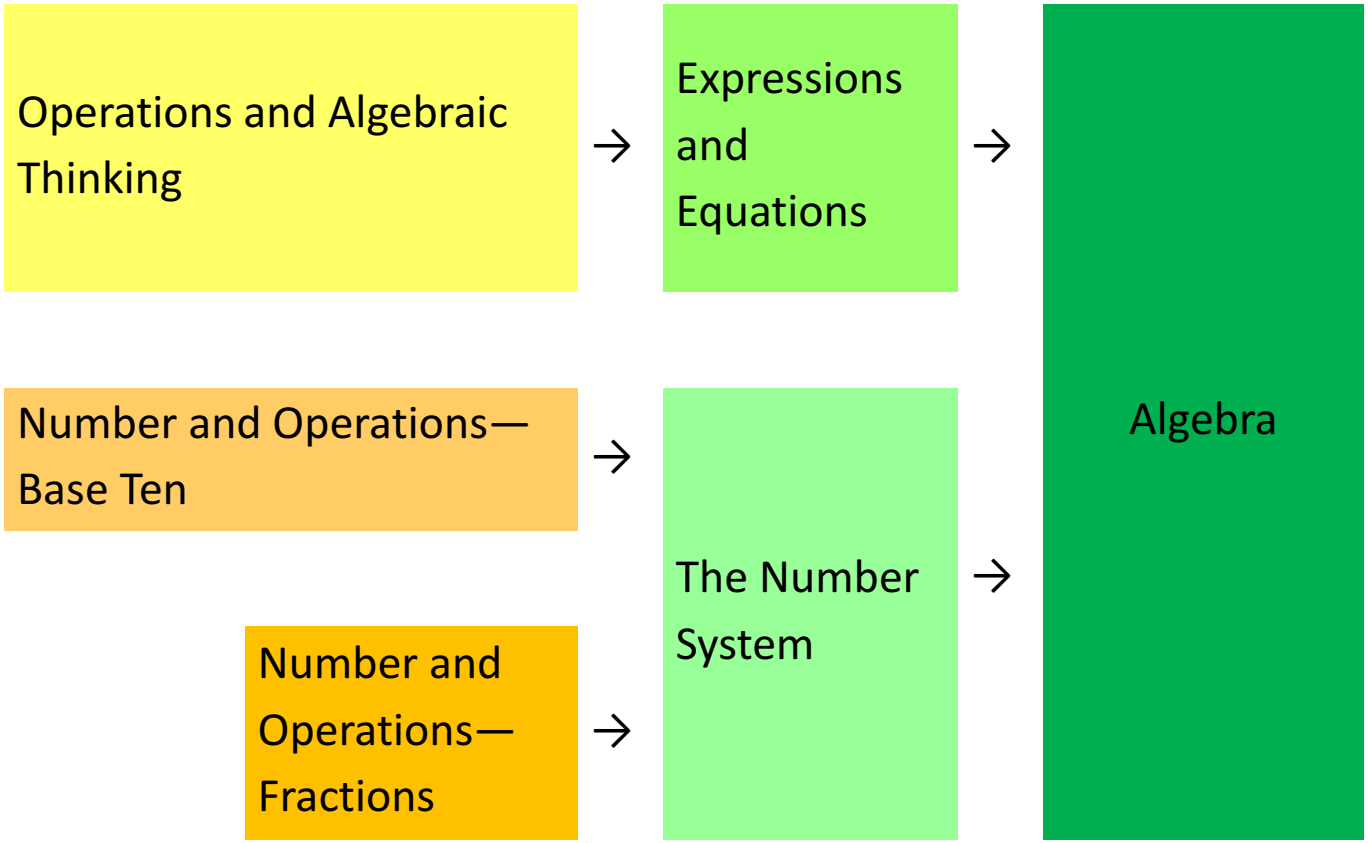
Focusing Attention Within Number and Operations



K 1 2 3 4 5 6 7 8 High School

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Key Areas of Focus in Mathematics

Grade	Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K–2	Addition and subtraction - concepts, skills, and problem solving and place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional reasoning; early expressions and equations
7	Ratios and proportional reasoning; arithmetic of rational numbers
8	Linear algebra

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The Standards

- Find the critical areas for your grade.
- Find the cluster headings for your grade.
- Find and read the standards that fall under each cluster heading.
- Write down two “first impressions” you have about the standards.
- Write down two questions you have about the standards.

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Reflection Journal

- How have the “cluster headings” helped clarify the important mathematical concepts in the critical areas?
- How will you use this information to guide your curriculum and instruction? What changes will you make?
- What questions do you still have about the standards?

Where Have We Been?

- 6th Grade Students –
  - Plot points in all four quadrants of the coordinate plane
  - Represent and analyze quantitative relationships between dependent and independent variables

- 7th Grade Students –
  - Decide whether two quantities are in a proportional relationship

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Where Are We Now?

- 8th Grade Students –
  - Begin to call relationships functions when each input is assigned to exactly one output
  - Proportional relationships can be part of a broader group of linear functions
  - Identify whether a relationship is linear, nonlinear functions are included for comparison

Where are They Headed?

- High school Students –
  - Use function notation and are able to identify types of nonlinear functions

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8th Grade Example

Sam wants to take his MP3 player and his video game player on a car trip. An hour before they plan to leave, he realized that he forgot to charge the batteries last night. At that point, he plugged in both devices so they can charge as long as possible before they leave. Sam knows that his MP3 player has 40% of its battery life left and that the battery charges by an additional 12 percentage points every 15 minutes. His video game player is new, so Sam doesn't know how fast it is charging but he recorded the battery charge for the first 30 minutes after he plugged it in.

Time Charging (minutes)	0	10	20	30
Video game player battery charge (%)	20	32	44	56

1.If Sam's family leaves as planned, what percent of the battery will be charged for each of the two devices when they leave?

2.How much time would Sam need to charge the battery 100% on both

Teacher Resources

- http://www.doe.k12.de.us/commoncore/
- http://educationnorthwest.org/common-core
- http://www.ccsso.org/Resources.html
- www.corestandards.org
- http://www.centeroninstruction.org/
- www.learningpt.org/greatlakeseast/
- http://www.youtube.com/playlist?list=PLD7F4C7DE7CB3D2E6

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- http://www.illustrativemathematics.org/
- http://math.arizona.edu/~ime/progressions/
- http://www.education.ohio.gov/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1907&ContentID=120301&Content=120301
- http://www.parcconline.org/parcc-content-frameworks
- http://www.p21.org/tools-and-resources/publications/p21-common-core-toolkit

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- https://www.teachingchannel.org/
- http://www.achievethecore.org/
- http://www.pta.org/4446.htm
- http://dww.ed.gov/
- http://balancedassessment.concord.org
- http://www.insidemathematics.org
- http://map.mathshell.org/materials/tasks.php
- http://illuminations.nctm.org
- www.OhioRC.org

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