

Common Core and Mathematics: Grades 9 – 12

Welcome to *Common Core and Mathematics: Grades 9–12*. In this course, you not only learn what the Common Core Standards for Mathematics (CCSSM) are; you will also go beyond these basics to take a detailed look at the standards for content and for practice. You will investigate each of the six conceptual categories and review relevant strategies, tools, and resources.

By the end of this course, you will have an understanding of these topics, along with some ideas and tools on how to implement the CCSSM in your classroom.

Course Objectives

After completing this course, you should be able to

Module 1

- Recognize the rationale and the advantages of having a common set of standards across the states.
- Examine the sequence of standards and the rationale behind it.

Module 2

- Understand the structure and organization of the Common Core State Standards for Mathematics, including the conceptual categories, domains, clusters, and standards.
- Connect the five building blocks of mathematics with the conceptual categories.
- Recognize the appropriate usage of the various types of representation.

Module 3

- Recognize the eight standards of mathematical practice and how including all standards in the curriculum increases the chance that students will be successful in math.
- Adapt strategies to develop the eight standards for mathematical practice in your classroom.

Module 4

- Interpret the intended outcomes for the conceptual category number and quantity in the Common Core.
- Develop instructional strategies to encourage mathematical reasoning, to make math more meaningful to students, and to encourage deeper understanding of number and quantity.

Module 5

- Interpret the intended outcomes for the conceptual categories of algebra and functions in the Common Core.
- Develop instructional strategies to encourage mathematical reasoning, to make math more meaningful to students, and to encourage deeper understanding of algebra and functions.

Module 6

- Interpret the intended outcomes for the conceptual categories geometry, statistics, and probability in the Common Core.
- Develop instructional strategies using manipulatives and technology to encourage mathematical reasoning, to make math more meaningful to students, and to encourage deeper understanding of geometry and statistics and probability.

Course Syllabus

Module 1	Introducing the Common Core State Standards for Mathematics Module Welcome <ul style="list-style-type: none">• Media: Common Core 101• Reading: The Common Core State Standards for Mathematics• Video: Writing the Math Standards• Extend Your Learning: Creating a Common Core for High School Math Check for Understanding <ul style="list-style-type: none">• Application: CCSSM—A First Look Module Journal
Module 2	Standards for Mathematical Content Module Welcome <ul style="list-style-type: none">• Reading: Standards for Mathematical Content• Video: Promoting Creativity and Innovation in the Classroom• Reading: Visual Representation• Video: Common Core State Standards – High School Check for Understanding <ul style="list-style-type: none">• Application: Visual Representation Module Journal

Module 3	Eight Standards for Mathematical Practice Module Welcome <ul style="list-style-type: none">• Reading: Standards for Mathematical Practice – An Overview• Video: The Importance of Mathematical Practices• Reading: Standards for Mathematical Practice: Standards 1 – 4 Check for Understanding <ul style="list-style-type: none">• Reading: Standards for Mathematical Practice: Standards 5 – 8• Video: 21st Century Skills• Application: The Eight Standards for Mathematical Practice Module Journal
Module 4	Number and Quantity Module Welcome <ul style="list-style-type: none">• Video: Math Curriculum Makeover• Reading: Number and Quantity• Video: The Power of Formative Assessment to Advance Learning• Reading: <i>Educational Leadership</i> — A Process - Not a Test• Extend Your Learning: One State’s Approach Check for Understanding <ul style="list-style-type: none">• Application: Practice Standards 1 and 2 in Your Classroom Module Journal

Module 5	Algebra and Functions Module Welcome <ul style="list-style-type: none">• Video: Dan Meyer on Real-World Math• Reading: Algebra and Functions• Video: Gathering Momentum for Algebra• Reading: <i>Educational Leadership</i> – Teaching the iGeneration• Video: Enhancing Learning with Technology• Extend Your Learning: <i>Educational Leadership</i> – How Mathematics Counts Check for Understanding <ul style="list-style-type: none">• Application: Practice Standards 4 and 5 in Your Classroom Module Journal
Module 6	Geometry and Statistics & Probability Module Welcome <ul style="list-style-type: none">• Reading: Geometry• Video: Arthur Benjamin’s Formula for Changing Math Education• Reading: Statistics and Probability• Video: Actively Involving Students• Reading: <i>Educational Leadership</i> – Numeracy: The New Literacy for a Data-Drenched Society• Extend Your Learning: <i>Educational Leadership</i> – Adventures with Cell Phones Check for Understanding <ul style="list-style-type: none">• Application: Practice Standards 3 and 6 in Your Classroom Module Journal

Resources

- Bamberger, Honi J., Oberdorf, C., and Schultz-Ferrell, K. (2010). *Math misconceptions: From misunderstanding to deep understanding*. Portsmouth, NH: Heinemann
- Bamberger, H. and Schultz-Ferrell, K. (2010). *Activities to undo math misconceptions prek – grade 2*. Portsmouth, NH: Heinemann.
- Bamberger, H. and Oberdorf, C. (2010). *Activities to undo math misconceptions grades 3-5*. Portsmouth, NH: Heinemann.
- Cardell, Shay. (2007). Digging for delusions: Misconceptions in mathematics and diagnostic teaching. Presentation at AMATYC Southwest Regional Conference, 6/15/2007. From <http://www.mathmisconceptions.cardells.net/>
- Common Core State Standards Initiative (2010). Common core state standards for english/language arts, literacy in history, social studies, science, and technical subjects. From http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf
- Common Core State Standards Initiative (2010). Myths vs facts. From <http://www.corestandards.org/about-the-standards/myths-vs-facts>
- Common Core State Standards Initiative (2010). Key points about mathematics. From <http://www.corestandards.org/about-the-standards/key-points-in-mathematics>
- Confrey, J., Maloney, A., Nguyen, K. (2010). Learning trajectory display of the common core state standards in mathematics, grades k-5 From (http://www.wirelessgeneration.com/posters?utm_source=e-newsletter&utm_medium=cpc&utm_campaign=NCTM%%20%202BWebsite)
- Goldsby, D. (2009). Research summary: *Manipulatives in middle grades mathematics*. Retrieved 11/7/11, from <http://www.nmsa.org/Research/ResearchSummaries/Mathematics/tabid/1832/Default.aspx>
- Daro, P., Mosher, F., and Corcoran, T. (2011). The consortium for policy research in education (CPRE). Learning trajectories in mathematics: A foundation for standards, curriculum, assessment, and instruction. *January 2011*. pp. 21, 25, 41-47
- Hands-on standards, deluxe edition: The first source for introducing math manipulatives, pk-k, 1-2, 3-4, 5-6 [Computer Software]. (2011). ETA. Author.
- Hands-on standards, deluxe edition: The first source for introducing math manipulatives, Algebra 1 [Computer Software]. (2011). ETA. Author.
- Hoven, J., & Garelick, B. (2007). Singapore Math: Simple or Complex? *Educational Leadership*, 65(3), pp. 28-31.
- Inside Mathematics (2010). Common Core Math Introduction. From Multimedia: <http://www.insidemathematics.org/index.php/commmon-core-math-intro>

Inside the School (2011). No reason to fear the common core standards. From http://www.insidetheschool.com/articles/no-reason-to-fear-the-common-core-standards/?utm_source=MagnetMail&utm_medium=email&utm_term=jenhayesmarketing@gmail.com&utm_content=Update%20-%203/16/11&utm_campaign=ItS%3A%20No%20Reason%20to%20Fear%20the%20Common%20Core%20Standards

Kendall, J. (2011). Understanding common core state standards. Alexandria, VA: ASCD; and Denver, CO: McREL.

Kolb, L. (2011). Adventures with cell phones. *Educational Leadership*, 68(5), pp.39-43.

Leinwand, S., & Fleischman, S. (2004, September). Research matters: Teaching mathematics right the first time. *Educational Leadership*, 62(1), p. 88-89.

Mirra, A.J. (2003). Administrator's guide: How to support and improve mathematics education in your school. Reston, VA: The National Council of Teachers of Mathematics.

Rosen, L. D. (2011). Teaching the iGeneration. *Educational Leadership*, 68(5), pp. 10-15.

Scholastic. (2011). How to make the most of math manipulatives. From <http://teacher.scholastic.com/lessonrepro/lessonplans/instructor/burns.htm>

Shaughnessy, J. Michael. (2011) Let's not forget geometry! *NCTM Summing Up*, October 2011.

Sherman, H.J., Richardson, L.I., & yard, G.J. (2005). Teaching children who struggle with mathematics: A systematic approach to analysis and correction. Upper Saddle River, NJ: Prentice Hall.

Steady, K., Dragoo, K., Arefeh, S., and Luke, S. (2008). Effective mathematics instruction. *Evidence for Education*, 3(1), p. 8.

Tankersley, K. (2007). *Tests that teach*. Alexandria, VA: ASCD.

Tankersley, K. (1993). Teaching math their way. *Educational Leadership*, 50(8), p. 12.

Virtual Manipulatives (2009). Learning about algebra tiles. From <http://plato.acadiau.ca/courses/educ/reid/Virtual-manipulatives/tiles/tiles.html>

Willis, J. (2010). *Learning to love math*. Alexandria, VA: ASCD.

Wilson, W. (2011). In defense of mathematical foundations. *Educational Leadership*, 68(6), pp. 70-73.

CITed Research Center (2010). Learning mathematics with virtual manipulatives. From http://www.cited.org/index.aspx?page_id=151

Mathdepartment (Poster). (FMSS_CASS) solving equations using a balance [Video]. (2011). Retrieved from

http://www.youtube.com/watch?v=GL58rQpI5dk&feature=mfu_in_order&list=UL

Math Vids. (2011). Concrete – representational – abstract sequence of instruction.

From

<http://www.coedu.usf.edu/main/departments/sped/mathvids/strategies/cra.html>

Michael De Villers (Poster). Misconceptions in math & diagnostic teaching [Video].

(2010) Retrieved from <http://www.scribd.com/doc/29780579/Misconceptions-in-Math-Diagnostic-Teaching>

TED (Poster). *Math class needs a makeover*. [Video]. (2010). From

http://www.ted.com/talks/lang/eng/dan_meyer_math_curriculum_makeover.html

TED (Poster). Arthur Benjamin's formula for changing math education. [Video]

(2009). From

http://www.ted.com/talks/arthur_benjamin_s_formula_for_changing_math_education.html

TheHuntInstitute (Poster). *Mathematics fluency* [Video]. (2011). Retrieved from

<http://www.youtube.com/user/TheHuntInstitute#p/u/25/ZFUAV00bTwA>

TheHuntInstitute (Poster). *The mathematics standards: How They Were Developed and who was Involved. Writing to inform and make arguments* [Video].

(2011). Retrieved from

<http://www.youtube.com/user/TheHuntInstitute#p/u/3/dnijwJdcPjE>

TheHuntInstitute (Poster). *The importance of mathematics practices* [Video]. (2011).

<http://www.youtube.com/user/TheHuntInstitute#p/u/17/m1rxkW8ucAl>

TheHuntInstitute (Poster). *The importance of mathematics progressions* [Video].

(2011). <http://www.youtube.com/user/TheHuntInstitute#p/u/22/a-P9KQdhE0U>

TheHuntInstitute (Poster). *The importance of mathematics progressions from the student perspective* [Video]. (2011).

http://www.youtube.com/user/TheHuntInstitute#p/u/23/L0wXHkiWj_A