Engaging Students in Math Practices

The Standards for Mathematical Practice are an integral part of the Common Core State Standards (CCSS) and provide expertise that educators should try to develop in their learners at all grade levels. The overarching goal is to develop student practitioners of mathematics; the mathematics practice standards were developed to assist educators in this task.

This course provides an in-depth look at the eight mathematics practice standards and allows teachers to explore ways to implement each standard in the classroom while aligning their practice with the CCSS.

Course Objectives

By the end of this course, you will be able to

Module 1

- Understand the purpose of each of the eight mathematics practice standards.
- Compare and contrast the major differences between the mathematics practice standards and the Common Core grade level content standards.
- Demonstrate some changes in instruction of mathematics that are expected to occur with use of mathematics practice standards.

Module 2

- Identify the major components of MP2, reason abstractly and quantitatively, and MP3, construct viable arguments and critique the reasoning of others.
- Assess a specific mathematics learning context and provide evidence of how MP2 and MP3 are applied or not applied in the context.
- Summarize and reflect on why proficiency in mathematics requires students to be able to reason abstractly and quantitatively and to be able to construct viable arguments and critique the reasoning of others.

Module 3

- Understand the meaning of MP4, model with mathematics, and MP5, use appropriate tools strategically.
- Determine when to use appropriate tools strategically.
- Generate specific examples of mathematical modeling at the participants' grade level.

Module 4

- Understand the components MP7, look for and express regularity in repeated reasoning, and MP8, look for and make use of structure in mathematics.
- Generate specific examples of and strategies for generalizing and seeing structure in mathematics.
- Generate specific examples of and strategies for looking for and making use of structure in mathematics.

Module 5

- Understand the components of MP1, make sense of problems and persevere in solving them, and MP6, attend to precision.
- Generate specific examples and strategies of what is involved in making sense of problems and persevering in solving them.
- Generate specific examples of and strategies for attending to precision in mathematics.

Module 6

- Generate specific examples where more than two practice standards intersect in preparing proficient mathematics learners.
- Implement strategies from this course in your own classroom.

Course Syllabus

Module 1	**Introduction to the Mathematics Practice Standards** Module Welcome • Video 1: The Common Core Mathematics Classroom • Reading 1: What Are the Standards for Mathematical Practice? • Reading 2: ASCD Express—Content and Practice Standards Define New Roles in Math Classrooms • Video 2: The Importance of Mathematical Practices • Check for Understanding • Application: Mathematics Practice Standards Lesson Plan Module Journal
Module 2	**Reasoning and Explaining** Module Welcome • Reading 1: Higher-Order Thinking Is for Everyone • Video 1: Mathematical Practice #2 • Video 2: Mathematical Practice #3 • Reading 2: *EL*—Go Figure: Math and the Common Core • Check for Understanding • Application: Critique Reasoning and Explaining Module Journal
Module 3	**Using Tools and Modeling** Module Welcome • Reading 1: Use of Tools in the Context of Mathematical Modeling • Video 1: Mathematical Practice #4 • Video 2: Mathematical Practice #5 • Reading 2: A Dutch Primer: Calculators for Enrichment in the Early Years • Check for Understanding • Application: Using Tools and Modeling Module Journal

Module 4	**Generalizing and Seeing Structure** Module Welcome • Reading 1: Patterns, Patterns, Patterns • Video 1: Mathematical Practice #7 • Video 2: Mathematical Practice #8 • Reading 2: *EL*—From Arithmetic to Algebra • Check for Understanding • Application: Implementing Structure and Generalizations Module Journal
Module 5	**Developing Habits of Mind** Module Welcome • Reading 1: Problem Solving: The Essence of it All • Video 1: Mathematical Practice #1 • Video 2: Mathematical Practice #6 • Reading 2: *EL*—Problem-Solving Time • Check for Understanding • Application: Promoting Problem Solving Module Journal
Module 6	**Making the Practice Standards Intentional** Module Welcome • Video: Mathematical Practices, Focus, and Coherence in the Classroom • Reading 1: Implementing Math Practices into Instruction • Reading 2: *EL*—Instigating Thinking in Math Class • Check for Understanding • Application: Implementing Multiple Mathematics Practice Standards Module Journal

Resources

Module 1

Smith, N. (2012). Content and Practice Standards Define New Roles in Math Classrooms. *ASCD Express, 7*(21).

The Hunt Institute. (2011, August 19). *The Importance of Mathematical Practices.* Retrieved December 19, 2013, from YouTube: https://www.youtube.com/watch?v=m1rxkW8ucAI&feature=youtu.be

Thompson, J. (2012, June 28). *The Common Core Mathemetics Classroom.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=7E-EGbB3N_0

Module 2

Big Ideas Learning (2011, November). *Mathematical Practice #2.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=sp8r5hlGFsQ

Big Ideas Learning (2011, November). *Mathematical Practice #3.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=4Brp578YJrw

Burns, M. (December 2012/January 2013). Go figure: Math and the common core. *Educational Leadership, 70*(4), 42–46. Retrieved from http://www.ascd.org/publications/educational-leadership/dec12/vol70/num04/Go-Figure@-Math-and-the-Common-Core.aspx

Module 3

Big Ideas Learning (2011, November). *Mathematical Practice #4.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=lnTG8Bdq-ac

Big Ideas Learning (2011, November). *Mathematical Practice #5.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=Skocybk5zUg

van den Brink, J. (2004). A Dutch primer: Calculators for enrichment in the early years. *Curriculum•Technology Quarterly, 13*(3). Retrieved from http://www.ascd.org/publications/ctq/spring2004/A-Dutch-Primer@.aspx

Module 4

Big Ideas Learning (2011, November). *Mathematical Practice #7.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=iZTu_hSjF0g

Big Ideas Learning (2011, November). *Mathematical Practice #8.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=nDdYEBPZJSI

Ketterlin-Geller, L. R., Jungjohann, K., Chard, D.J., & Baker, S. (2007). From arithmetic to algebra. *Educational Leadership, 65*(3), 66–71.

Module 5

Big Ideas Learning (2011, November). *Mathematical Practice #1.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=A59NM4gK5rs&list=PLkCODEjk2FRH25fQhq_Wfsk-cKSB5OZVQ&index=1

Big Ideas Learning (2011, November). *Mathematical Practice #6.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=LlTEv64v7vw

Gurule, K. (2007). Problem-solving time. *Educational Leadership, 65*(3). Retrieved from http://www.ascd.org/publications/educational_leadership/nov07/vol65/num03/Problem-Solving_Time.aspx

Module 6

Hiltabidel, J. (December 2012/January 2013). Instigating thinking in math class. *Educational Leadership, 70*(4). Retrieved from http://www.ascd.org/publications/educational-leadership/dec12/vol70/num04/Instigating-Thinking-in-Math-Class.aspx

NCTM (2013, January). *Mathematical Practices, Focus and Coherence in the Classroom.* Retrieved December 19, 2013, from YouTube: http://www.youtube.com/watch?v=X1GwdACHdtY

