# *CaCCSS-M and Implications for CaMSP*

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CaMSP Learning Network Meeting

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http://www.cmpso.org/download.html
http://www.cmc-math.org/resources/main.html

# Description

- Very brief comment on *CaCCSS-M*
- New content for teachers
- *Standards for Mathematical Practice*
- Implications for CaMSP
- Acquiring the knowledge

# Comment on *CaCCCS-M*

There was an overview session of the *CaCCSS-M* this morning, and some of you may have been at that session. Others of you many of you have seen or heard about different aspects of the *CaCCSS-M*. This session will not go in depth of what is contained in the *CaCCSS-M* but will focus on specific aspects of it.

# “New” Content and Approaches

- Fractions from a number line approach
- Transformational geometry
- Mathematical modeling (includes model with mathematics)

# *Standards for Mathematical Practice*

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

# Make sense of problems and persevere in solving them.

DO STUDENTS:

- Explain a problem to themselves, determine what it means, and seek possible entry points?
- Analyze what's given, constraints, relationships, and goals?
- Make conjectures about what the solution might look like?
- Plan a solution pathway instead of jumping into a solution?

# Make sense of problems and persevere in solving them.

- Use multiple representations (verbal descriptions, symbolic, tables, graphs, diagrams, etc.)?
- Check their answers using different methods?
- Continually ask “Does this make sense?”
- Understand the approaches of others and identify correspondences between different approaches?

# Reason abstractly and quantitatively.

DO STUDENTS:

- Make sense of quantities and their relationships in problem situations?
- Decontextualize a problem?
- Contextualize a problem?
- Create a coherent representation of the problem, consider the units involved, and attend to the meaning of quantities?

# Construct viable arguments and critique the reasoning of others.

DO STUDENTS:

- Understand and use stated assumptions, definitions, and previous results?
- Make conjectures and build a logical progression of statements to explore the truth of their conjectures?
- Analyze situations and recognize and use counterexamples?
- Justify their conclusions, communicate them to others, and respond to arguments of others?

# Construct viable arguments and critique the reasoning of others.

- Compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and articulate the flaw?
- Hear or read arguments of others and decide whether they make sense, and ask useful questions to clarify or improve the argument?
- Use mathematical induction as a technique for proof?
- Write geometric proofs, including proofs by contradiction?

# Model with mathematics.

DO STUDENTS:

- Apply the mathematics they know to solve problems in everyday life?
- Apply what they know and make assumptions and approximations to simplify a complicated situation as an initial approach?
- Identify important quantities in a practical situation?
- Analyze relationships mathematically to draw conclusions?
- Interpret their mathematical results in the context of the situation and reflect on whether the results make sense?

# Use appropriate tools strategically.

DO STUDENTS:

- Consider the available tools when solving mathematical problems?
- Know the tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful?
- Identify relevant external mathematical resources and use them to pose or solve problems?
- Use technological tools to explore and deepen their understanding of concepts?

# Attend to precision.

DO STUDENTS:

- Communicate precisely to others?
- Use clear definitions?
- Use the equal sign consistently and appropriately?
- Calculate accurately and efficiently?

# Look for and make use of structure.

DO STUDENTS:

- Look closely to determine a pattern or structure?
- Utilize properties?
- Decompose and recombine numbers and expressions?
- Have the facility to shift perspectives?

# Look for and express regularity in repeated reasoning.

DO STUDENTS:

- Notice if calculations are repeated, and look both for general methods and for shortcuts?
- Maintain oversight of the process, while attending to the details?
- Continually evaluate the reasonableness of their intermediate results?

# Dan Meyer: Math Class Needs a Makeover

- Today's math curriculum is teaching students to expect—and excel at—paint-by-numbers classwork, robbing kids of a skill more important than solving problems: formulating them.
- As you watch this video, think about how similar or different the activities in this classroom are compared to your classroom or those that you have observed.
- What practices do you see in the video that support the first standard in the Standards for Mathematical Practice?

- Dan Meyer video

# Reflecting on the Video

DISCUSS THE FOLLOWING:

- What similarities or differences did you see in the video compared to your classroom or those that you have observed?
- What were students doing in the video (evidence) that supported the following: Make sense of problems and persevere in solving them.

# Implications for CaMSP

QUESTIONS TO CONSIDER:

- How will we become familiar with the aspects of *CaCCSS-M* that impact our project?
- How can we provide content in the areas that are "new" to our teachers, content that hasn't been included in current curricula?
- How will we begin to provide that bridge from today's curriculum to the *CaCCSS-M*?

# Implications for CaMSP

- How can we begin implementation of the *Standards for Mathematical Practice*?
- What type of professional development can we design to increase teacher's knowledge of how to teach for understanding?
- How do we provide access to the *CaCCSS-M* for ALL students, particularly English learners?

# Acquiring the Knowledge

- Become familiar with the *CaCCSS-M*, particularly the *Standards for Mathematical Practice.*
- Focus on one or two of the *Standards for Mathematical Practice* at any given time.
- Determine what it might look like to teach for understanding.
- Provide high cognitive level tasks to ALL students.

# Acquiring the Knowledge

- Use problems that focus on mathematical understanding.
- Collaborate with other teachers in your school or district.
- Assess what students are learning.
- Be sensitive to student needs.

# Equity and Quality

How do we provide access to ALL students? We want students to make sense of rigorous, high quality, and cognitively demanding mathematics. We want to approach the zone of proximal development, not the zone of minimal effort (e.g., assigning only lower level problems, not requiring homework, expecting less). We want equity and quality. Equity without quality is meaningless. Quality without equity is unjust. We must always ask ourselves, what can we do to incorporate both?

# Final Thoughts

It is up to us to provide greater access and opportunity to high cognitive level mathematics by incorporating the *Standards for Mathematical Practice*, by enhancing and enriching the language, and by using instruction that supports the learning needs of ALL students and teachers. What will you do to acquire the knowledge so that the integration/infusion of the *CaCCSS-M*, particularly the *Standards for Mathematical Practice*, in the curriculum becomes second nature to you?

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CMP: http://www.cmpso.org

MARS: http://www.noycefdn.org/resources.php

Video: http:///www.ted.com

CMC: http://www.cmc-math.org/resources/main.html