**SMP #3: Arguably the Nine Most Important Words in the Math Common Core**

 Steve Leinwand, American Institutes for Research

I am increasingly convinced that “construct viable arguments and critique the reasoning of others” (Standard for Mathematical Practice #3) may be the nine most important words in the entire Common Core. Far more than an equal among eight practices, SMP #3 is actually an overarching principle under which lies the entire Common Core.

First, the practices of constructing arguments and critiquing reasoning represent a powerful cross-disciplinary approach that are as relevant in mathematics as they are in English language arts, science and  social studies.  As such, they help to break down the subject specific silos and support an understanding that communicating, justifying and critiquing are essential components of all learning.

Second, this practice is a joy to embrace because it represents a long-overdue shift in helping dig us all out of the multiple-choice, skill-based, remember how, rule-based focus that emerged, to the detriment of all students and teachers, from No Child Left Behind.  Test-prep memorize and regurgitate practices have little to do with thinking and reasoning and cheat students out of the opportunities consistently found in highly effective schools and gifted classrooms.

But the primary reason this practice strikes me as so important is its implications for teaching.  In order for students to construct viable arguments, they must be asked “why?” or expected to “explain your thinking” or directed to “convince the class.” In a class where the shared expectation is that all answers need to be justified, students are consistently constructing arguments.  They are communicating their understanding and demonstrating their thinking process. No longer will it be acceptable to stop at “83” or “9 square centimeters.” Instead, when students are constructing arguments, they are expected to individually and publically justify why it is 83 or 9, thereby giving the teacher and the entire class the opportunity to discuss a range of alternative explanations.

Similarly, in order for students to critique the reasoning of others, they must be in a classroom where reasoning is made public and open to review and comment.  Rather than the traditional and suboptimal focus on the one-right-way-to-get-the-one-right-answer, a classroom community where the culture values critique is a classroom where students are far more actively engaged in their learning. Again, in place of a single approach or justification, multiple approaches and justifications are surfaced thereby strengthening the learning of all.  In addition, given the learning power of mistakes and misconceptions, the practice of critiquing the reasoning of others also helps to surface and address common mistakes and misconceptions, also to the benefit of all.  It is a joy to observe a class where the entire class focuses on the mathematical reasoning of three different groups of students and then engages in a discussion of what among the approaches was the same, what was different, what was correct and what was flawed.  What better preparation for life and effective citizenship could we hope for?

Just imagine a world where teacher preparation, coaching, support and evaluation all focused on the degree to which any random lesson included both opportunities for, and effective implementation of, constructing viable arguments and critiquing the reasoning of others!
So when you read and reread and think about and then think even more about the following paragraph from the Common Core, consider its power to significantly enhance both the teaching and the learning of K-12 mathematics.

Mathematically proficient students understand and use stated assumptions,
definitions, and previously established results in constructing arguments. They
make conjectures and build a logical progression of statements to explore the
truth of their conjectures. They are able to analyze situations by breaking them into
cases, and can recognize and use counterexamples. They justify their conclusions,
communicate them to others, and respond to the arguments of others. They reason
inductively about data, making plausible arguments that take into account the
context from which the data arose. Mathematically proficient students are also able
to compare the effectiveness of two plausible arguments, distinguish correct logic or
reasoning from that which is flawed, and—if there is a flaw in an argument—explain
what it is.

Think about how schools and teachers are helping these students learn to think, learn to communicate their understanding, learn to listen to their peers and learn to respectfully critique the reasoning of others.  That’s why I can’t find any other set of words anywhere in the Common Core quite as important as these.