

Getting A Handle On The New Common Core

toolkits

Math Overview

What are the Key Features of the New Common Core State Standards?

The math Standards are broken down into two separate practices; those dedicated to creating students that are avid and participatory practitioners of math, and then those content standards used to guide the teacher in developing student fluency in procedural and content understanding. Where these two different styles of standards intersect is in the goal to improve the overall achievement in math instruction.

Grade-Level Standards	Standards for Mathematical Practice
<ul style="list-style-type: none">• K-8 grade-by-grade standards organized by domain• 9-12 high school standards organized by conceptual categories	<ul style="list-style-type: none">• Describe mathematical “habits of mind”• Connect with content standards in each grade 

“I think the biggest difference between Common Core versus previous state standards for all grade levels is that the focus is not on algorithms but on reasoning. True understanding of base 10 number system and what add, and subtract really mean vs. how to add single digit numerals, then double digit, etc. I actually recommend reading the K-2 standards and comparing that to previous state standards; it gives you a good idea of where the Common Core is going. At the high school level we will never be able to teach to the depth of the Common Core without bucking the traditional school schedule and teaching integration of math through science and the arts.”

—Sue Wilson (Math/Physics/ Engineering Teacher
Phoenix Union Bioscience High School, Phoenix, AZ)

The Shifts Taking Place in Math Instruction

The standards focus on key topics at each grade level so that teachers and students can delve deeper into the content. There is an emphasis on consistency at each level: forcing students and teachers to make connections across content, again to promote deeper meaning. When looking at mastery for each standard, the Common Core calls for fluency on performing calculations and solving problems, thus creating a math applications habit that fosters critical thinking, reasoning, problem solving and engagement.

How do I Tackle the Common Core?

Begin by focusing on what you will teach by grade level. Have departmental meetings where you talk about what is essential for your grade, while at the same time aiming for a “ban” of curricula for each grade level at your school, and then compare K-12. Be aware that there are a lot of non-essential math ideas and concepts that can creep their way into our curriculum and distract the focus of the Common Core approach. Collaboration is key, when it comes to Common Core, setting up department team meeting times are critical. The people within your school are the biggest and best resources for what is being taught in your school and your district. Use the resources that have already been made available to you via the Common Core initiative, become familiar with their website, as well as the free apps that have been

made available via MasteryConnect. Then, lastly, once you have a basic handle on what is happening locally, start branching out and forming a PLN online via the social media networks—predominately Twitter—for a wealth of new information and ideas surrounding the Common Core.

The K-8 Content Standards

The elementary K-5 standards discuss building mastery in whole numbers, addition, subtraction, multiplication, division, fractions and decimals. Moving from that in the mid-level 6-8 standards, you see a rigorous increase in mastery of geometry, algebra, probability and statistics. After exhaustive research into other high performing nations, the standards for grades 7-8 are heavy in algebra and geometry content.

The High School Content Standards

The high school standards ask students to apply mathematical ways of thinking to real world issues and challenges. In doing this they will become more college-ready as college students are regularly called to apply their understanding in math applications to new situations. High school students will also be asked to use math and statistics to analyze empirical situations and improve on their decisions. There are some standards, also listed with a (+), which are standards that go beyond college and career readiness but are needed for advanced math courses like calculus, etc.

The Eight Standards in Mathematical Practice Are:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

**Below is a condensed version from the Common Core Initiative website on these 8 math practice standards.*

Make Sense of Problems and Persevere in Solving Them

Similar to a scientist, proficient math students should be able to not only explain the meaning of a problem to themselves, but they should also be able to analyze it. According to the Standards, students should make theories and plan a reasonable solution or way to solve the problem. They need to be able to monitor their own progress and change their course if necessary. Proficient math students should be able to check their problems with other students that might have taken a different approach. The ability to analyze how a peer might have found the solution, but done so in a completely different way, and critically think about the way both those paths arrived at the same solution is meted out by the Standards.

Reason Abstractly and Quantitatively

Proficient students make sense of quantities and their relationships in problems. This involves creating habits in students that show comprehensible demonstration of problems the students might face. The students must consider the type of units involved, and not just think about how to compute the problem but be able to know and flexibly use the different properties of operations and objects.

Construct Viable Arguments and Critique the Reasoning of Others

In the lower grade levels, students must be able to construct arguments using concrete examples, such as objects, drawings, diagrams and actions. In the mid-level to high school grades, students should learn to determine the domain in which the argument actually applies. Students in all grade levels need to be able to read the arguments of other students and make sure that they make sense. If they do not make sense, students need to be able to ask questions to clarify or improve the arguments.

Model with Mathematics

Proficient students should be able to apply what math they know to everyday problems. In elementary classes, this might be as simple as figuring out how to double a recipe, and then increasing in complexity from there on out. Teachers are being asked to have their students use mathematics in more real-world applications. Students should be able to use diagrams, two-way tables, graphs etc. to map their relationships and to simplify a complicated situation.

Use Appropriate Tools Strategically

Students should demonstrate mastery in their consideration of the appropriate tools used to problem solve, not just in the classroom but in everyday life; understanding when to use a ruler vs. when to use computer algebra system. Mathematically proficient students should use all the tools at their disposal to help solve problems, and use technological tools to explore and deepen their meaning.

Attend to Precision

The Common Core pushes students to communicate precisely with other students and show their own reasoning. Proficient students should be able to state the meaning of what they choose to do, and be careful about specifying units of measure and labeling accordingly.

Look for and Make use of Structure

Students should be able to look closely at structure and pattern; building on these ideas so that later on students can not only see more complicated patterns and structure, but can also take a step back and see the bigger picture. To be able to look at an overview or look for a shift in perspective, students should be able to see complicated things, such as some algebraic expressions as single objects or being a grouping of several objects.

Look for and Express Regularity in Repeated Reasoning

Proficient students should be able to notice if there is a calculation repeated and look for both general methods and/or shortcuts. As students work to solve a problem, they should be able to look at the big picture while also seeing the smaller details, and continue to work towards evaluation of the practicality in the results.

Overall, the standards focus on what should be taught and learned, but not on how teachers should teach the content. Compared to previous state standards that were quite wordy, the Common Core focus more succinctly on what is most essential but not on all that can be taught. Instead, start focusing on the wording of the Standard itself and how you might allow the students to reach those goals and potentially go beyond them.

“One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student’s mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from... Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.”

—Common Core- Understanding Mathematics

Resources

[Common Core State Standards Initiative](#)

[MasteryConnect](#)

[Achieve Organization](#)