California Department of Education | Curriculum, Learning and Accountability Branch | Standards, Curriculum Frameworks & Instructional Resources Division | November 2010

HIGHLIGHTS OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

The Common Core State Standards (CCSS) define what students should understand and be able to do in the study of mathematics. Students who master the CCSS for mathematics will be prepared for college-level courses and possess the skills necessary for success in today's workforce.

The CCSS include a focused and coherent set of standards that provide students the opportunity to achieve proficiency in key topics that are introduced in early grades and built upon in successive years. By focusing on central concepts necessary for the study of more advanced mathematics in later years, students gain greater depth of understanding.

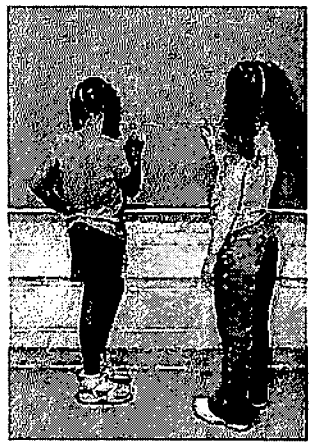
The kindergarten through grade eight standards are grouped by grade level and are organized into domains that vary slightly by grade. The high school standards are organized into conceptual categories. High school mathematics courses should be developed using standards from those categories. One such course that can be offered in eighth grade or in high school, Algebra I, is included in the CCSS. In addition, the CCSS include standards for advanced courses including Calculus and Advanced Placement Probability and Statistics; standards that are intended to prepare students for such advanced coursework in high school are highlighted with a plus (+) symbol. The standards also contain integrated *Standards for Mathematical Practice* that describe a set of skills and processes that all students should develop as part of their study of mathematics.

Kindergarten through Grade Eight Grade-Level Standards: Domains

Counting and Cardinality (CC), Operations and Algebraic Thinking (OA), Number and Operations in Base Ten (NBT), Number and Operations – Fractions (NF), Ratios and Proportional, Relationships (RP), The Number System (NS), Measurement and Data (MD), Expressions and Equations (EE), Functions (F), Geometry (G), and Statistics and Probability (SP).

High School Standards: Conceptual Categories

Number and Quantity (N), Algebra (A), Functions (F), Modeling (*), Geometry (G), and Statistics and Probability (S).



THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

Focus on arithmetic and fluency with whole numbers at early grades

The kindergarten through grade five standards provide students with a solid foundation in whole numbers arithmetic (addition, subtraction, multiplication and division), fractions, and decimals. Mastery of these skills prepares students for learning more advanced concepts and procedures in later grades. The CCSS provide students with time to master topics by developing procedural fluency as well as conceptual understanding. Students who achieve fluency with essential math facts involving whole numbers will be better able to focus on more complex skills and algorithms. A representative sample of standards includes:

- **K.OA.2** – Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- **2.NBT.7** – Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

- **3.OA.7** – Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g. knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of grade 3, know from memory all products of two one-digit numbers.
- **4.NBT.6** – Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Fluency with fractions and decimals
Student mastery of conceptual and procedural knowledge about fractions is essential to success in algebra. In grade three, students begin to develop an understanding of fractions as numbers and represent fractions on a number line diagram. Addition and subtraction of fractions are introduced in grade four and multiplication and division in grade five. The standards for grades six and seven extend work with fractions and develop concepts such as rational numbers and proportional relationships. A representative sample of standards includes:

- **3.NF.2.a** – Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
- **4.NF.3.d** – Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
- **5.NF.2** – Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g. by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5+ 1/2 = 3/7, by observing that 3/7 < 1/2.*
- **5.NBT.7** – Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
- **7.NS.2.c** – Apply properties of operations as strategies to multiply and divide rational numbers.
- **7.RP.3** – Use proportional relationships to solve multi-step ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

Algebra readiness by grade eight and established grade eight standards
The CCSS are consistent with the goal that all students succeed in Algebra 1. Students who master the content and skills through grade seven will be well-prepared for algebra in grade eight. Recognizing that all students must continue their study of mathematics, the CCSS moves students forward with grade eight standards that prepare them for higher math, include Algebra 1.

Real world applications using modeling
Throughout the standards, students apply the mathematics they have learned to solve problems that arise in everyday life, society, and the workplace. The *Standards for Mathematical Practice* emphasize this skill and provide specific suggestions for modeling real-world situations using mathematics. The high school standards include modeling standards throughout the other conceptual categories; these standards are identified with a star (★) symbol. A representative sample of standards includes:

- **3.MD.8** – Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
- **F-IF.5** – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**
- **G-MG** – Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*
- **S-MD.5.b** – Evaluate and compare strategies on the basis of expected values. *For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*