Louisiana Believes

Common Core State Standards for Mathematics

TEACHER SELF-LEARNING SERIES

Module 1

**Introduction to the Common Core State Standards in Mathematics:
The Need, The Development Process, The Common Language, and The Structure**

DEPARTMENT of EDUCATION
Louisiana Believes

COMMON CORE STATE STANDARDS for Mathematics

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Module 1: Introduction to the Common Core State Standards in Mathematics:

The Need, The Development Process, The Common Language, and The Structure

Time Frame: Approximately 45 minutes

Audience: Teachers, principals, and additional school faculty of all grade levels and all content areas

Module Description: This module provides background information and presents the new terminology used in the Common Core State Standards for Mathematics (CCSSM). Educators should complete this module to understand the need for common standards, determine information about who developed the Standards, and learn the terminology and the coding used in the CCSSM. An article written by the CCSSM authors' also provides insight into and reasons for the structure of the standards. Understanding the coding and the terminology is needed for lesson planning.

Course Objectives: By the end of the module, learner will be able to

    a. cite reasons for having Common Core State Standards.
    b. identify the process under which the Common Core State Standards were developed.
    c. define and use terminology found in the Common Core State Standards.
    d. decode a Common Core State Standard for Mathematics.

Materials Needed to Complete Module: copy of the Common Core State Standards for Mathematics posted at http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf, Internet access

Pre-Assessment: Those who can answer the questions below with confidence may want to skip this module.

1. What is international benchmarking?

2. What is the CCSS definition of college- and career-ready?

3. Describe the differences between the organization of the CCSSM in Grades K-8 and that of the high school standards?

4. Describe the hierarchy among standards, domains, and clusters?

5. Tell what 5.NF.3 means.

6. What are the meanings of the (+) and the (*) in the high school standards?

7. Explain how the structure of the Standards helps to address the "mile wide, inch deep" issue.

Introduction

The Standards are (1) aligned with college and work expectations, (2) rigorous and require application of knowledge through high-order thinking skills, (3) internationally benchmarked, and (4) research and evidence based. (*Introduction to Common Core State Standards*, http://tinyurl.com/aecnq4q). When considering what to include in the standards, the writers state: "It is critical that any standards document be translatable to and teachable in the classroom. As such, the standards must cover only those areas that are critical for student success." (Standards-Setting Considerations, http://tinyurl.com/a8gg6vs)

One goal of the Common Core State Standards for Mathematics is for students to be ready to succeed academically in credit-bearing, college-entry courses and in workforce training programs upon graduating from high school. The term "college" includes technical college, community college, four-year college or university. A second goal is that students are prepared for the 21st century. (Standards-Setting Criteria, http://tinyurl.com/bgf559m)

In summary, the two documents cited above indicate that the inclusion of a particular standard in the CCSSM document is because 1) its mastery is essential for college and career readiness and 2) such mastery will allow U.S. students to compete globally in 21st century society.

The Need

The first step to implementing new standards is understanding the need for the CCSS. The video below describes the need for the Common Core State Standards. It is short – less than 3 minutes.
http://tinyurl.com/c8r54vc Note: the link is to a YouTube video.

Why does Louisiana need the CCSS?
- About 60% of jobs nationwide will require some type of postsecondary education by 2018[1]
- More Louisiana jobs are requiring a postsecondary education[2]
  Of those:
    – 69% require vocational training, certification, or associate degree
    – 31% require bachelor degree
- Many Louisiana students are ill-equipped to succeed in college
    – Louisiana's college retention and graduation rates are among the lowest in the Southeast region (SREB) and the nation[3]
    – About one third of first-time freshmen need remediation in college level courses[4]

[1] Georgetown University Center on Education and the Workforce, June 2010
[2] Louisiana Workforce Commission, 2009 Job Vacancy Survey
[3] Southern Regional Education Board Fact Book on Higher Education, 2009
[4] LDOE First-Time Freshmen and Developmental Rates, Public School Data, 2007-08

The Development Process

The creation of the CCSS was instigated and coordinated by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO). CCSSO is an association for heads of state education agencies such as the Superintendent of Education in Louisiana. The development of the standards was possible through a collaboration of people from each state. The video below (approximately 8 minutes) describes who was involved in the creation of the Common Core State Standards for Mathematics.

- *The Mathematics Standards: How They Were Developed and Who Was Involved*
  http://tinyurl.com/ahx7qmy Note: The link is to a YouTube video.

Organization of the Standards

There are two types of standards in the CCSSM – mathematical practice and content. A summary of each type is provided below:

1. Standards for Mathematical Content
   - K-8 standards presented by grade level
   - High school standards presented by conceptual category
     - Number and Quantity
     - Algebra
     - Functions
     - Modeling
     - Geometry
     - Statistics and Probability
2. Standards for Mathematical Practice
   - Apply to all grade levels
   - Describe mathematically proficient students

Watch the video posted at http://tinyurl.com/bjnajm3 to hear the writers' thoughts on why it was important to use a different configuration for the high school standards.

The Common Language

To be able to engage fully in the CCSSM, it's important to know and understand the terminology used in the CCSSM document. In this section, you will explore the terminology used in the Common Core State Standards for Mathematics and learn how to read and write the codes. Understanding terminology and the codes is critical for lesson planning. The information shown on the next page can be found on page 5 of the CCSSM.
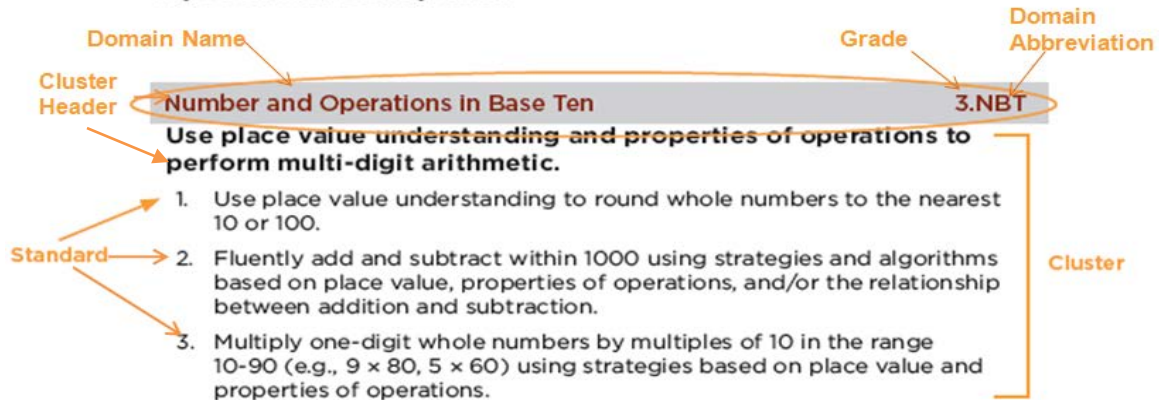
You should first read the definitions at the top of the page. Next, note how each term relates to the structure or design of the CCSSM.

Sample Math Standards

Standards define what students should understand and be able to do.

Clusters are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.

Domains are larger groups of related standards. Standards from different domains may sometimes be closely related.

Number and Operations in Base Ten   3.NBT

Use place value understanding and properties of operations to perform multi-digit arithmetic.

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

Things of Importance to Note

1) The term *strand* was used in the past as a way to organize standards. There were standards written for each strand (e.g., Algebra, Measurement) in each grade K-12. Domains are smaller groupings of standards than strands and are found in a cluster of grades, not in all grade levels. For example, the Number and Operations in Base Ten domain can be found only in Grades K – 5 as shown below.

DOMAINS	Counting & Cardinality	Operations & Algebraic Thinking	Number & Operations in Base Ten	Measurement & Data	Geometry	Number & Operations: Fractions	Ratios & Proportional Relationships	The Number System	Expressions & Equations	Statistics & Probability	Functions
K	X	X	X	X	X						
1		X	X	X	X						
2		X	X	X	X						
3		X	X	X	X	X					
4		X	X	X	X	X					
5		X	X	X	X	X					
6					X		X	X	X	X	
7					X		X	X	X	X	
8					X			X	X	X	X

2) All domains are assigned an abbreviation to be used in coding. The code for Numbers and Operations in Base Ten is NBT.

3) A cluster is a group of closely related standards. The cluster heading indicates how the standards are related. The Number and Operations in Base Ten domain for Grade 3 (shown above) has only one cluster. All the standards in this cluster are related because they require that students use place value understanding and properties of operations when doing arithmetic with multi-digit numbers.

4) Domains MAY have more than one cluster. For example, see the Measurement and Data domain for Grade 3 on pages 24-25 of the CCSSM. There are four clusters.

5) Standards within a domain are numbered consecutively across all clusters. Again, refer to the Measurement and Data domain for Grade 3 on pages 24-25 of CCSSM:
   - The first cluster has two standards (1, 2).
   - The second cluster has two standards (3, 4).
   - The third cluster has three standards (5, 6, 7), with the last standard having multiple parts.
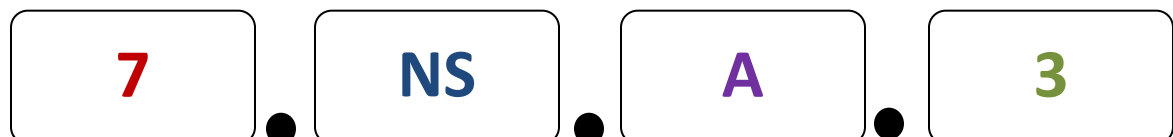   - The fourth cluster has only one standard (8).

Coding and Structure of the CCSSM

There are four parts to a Common Core State Standard code in mathematics. This is a change as of January 2013. Previously, a three part code was used. The Cluster Headings have now been assigned an uppercase letter (A, B, C…). If a Domain has four clusters, then A is assigned to the first cluster, B to the second, C to the third, and D to the fourth cluster. Documents posted at www.corestandards.org/math reflect this change. The CCSSM original document posted at www.corestandards.org/the-standards was not updated as of the creation of this module. Therefore, the graphic on page 4 of this module is from the original version and does not reflect the change in coding.

For K- 8 standards, each part of the code is separated by a period:

PART ONE	PART TWO	PART THREE	PART FOUR
Grade Level	**Domain**	**Cluster**	**Standard #**
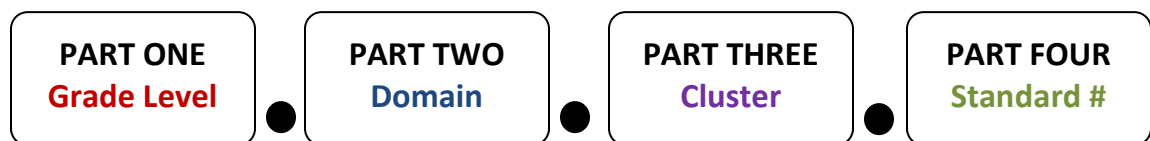
Look at the example below.

7	NS	A	3

The grade level is 7, the domain code is NS, cluster is A (first cluster), and the standard number is 3. *Until you become familiar with the abbreviations for a domain name, the CCSSM document should be used to find the meaning of the abbreviation.* Page 48 of the CCSSM shows that NS is the abbreviation for The Number System. The text of the standard 7.NS. A.3 is printed below.

7.NS.A.3 *Solve real world and mathematical problems involving the four operations with rational numbers.*

If a standard has multiple parts, the CCSSM coding uses lowercase letters. The standard number is followed by a letter. For example, 7.NS.A.2c means that standard 2 is broken into parts. The code indicates that the third part is being referenced.

7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
c. Apply properties of operations as strategies to multiply and divide rational numbers.

For high school standards, there are four parts as shown below. A hyphen separates the first two parts of the code, and periods separate each of the remaining parts. Since the high school standards were not written for specific courses or grade levels, the first part of the high school code is the abbreviation for a Conceptual Category. As of January 2013, the Conceptual Category abbreviations were changed in the documents posted at www.corestandards.org/math from a single letter (e.g., A for Algebra) to three letters (e.g., HSA for High School Algebra). Additionally, a letter was added to designate the cluster as was noted in the K-8 section. Therefore, the first two letters in the abbreviation for a Conceptual Category will always be HS followed by a letter to indicate the title of the category. The remaining three parts of the code show the same information as in grades K-8. They indicate the Domain, Cluster, and the Standard Number, respectively. The CCSSM original document posted at www.corestandards.org/the-standards was not updated as of the creation of this module. Therefore, the graphic on page 8 of this module is from the original version and does not reflect the change in coding.

PART ONE Conceptual Category	PART TWO Domain	PART THREE Cluster	PART FOUR Standard #
HSG	CO	C	10
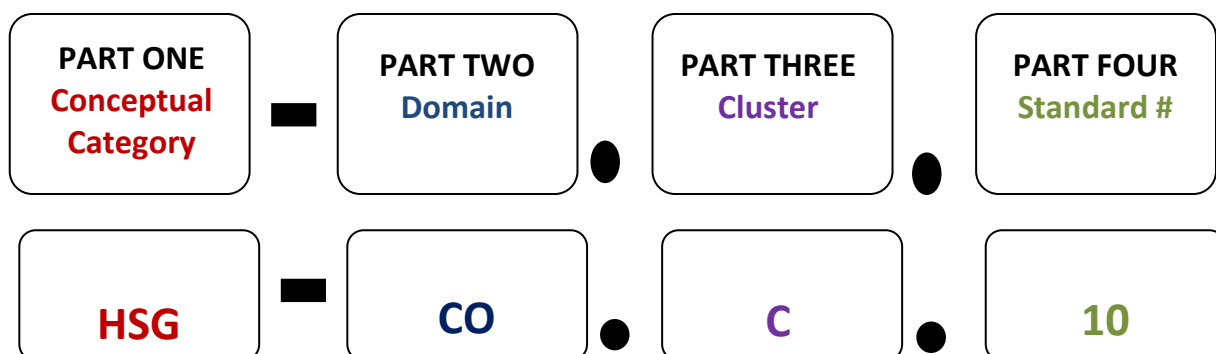
Geometry Conceptual Category, Congruence Domain, Cluster C (Third Cluster) Standard 10

HSG-CO.C.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

Special Symbols Used in High School Standards

In the high school standards, some standards are marked with a plus symbol (+) and/or a star symbol (*). Read page 57 of the CCSSM to find the meaning of each of these symbols.

Turn to page 71 in the CCSSM. There are examples of the use of these symbols in standards 5, 6, and 7 in the F-TF domain. Note that standards 5 and 6 are marked with one of the symbols and standard 7 is marked with both symbols.

The graphic below shows that the formatting structure of the high school standards is similar to that of the K-8 standards. Compare this graphic to the one on page 4 of this module.
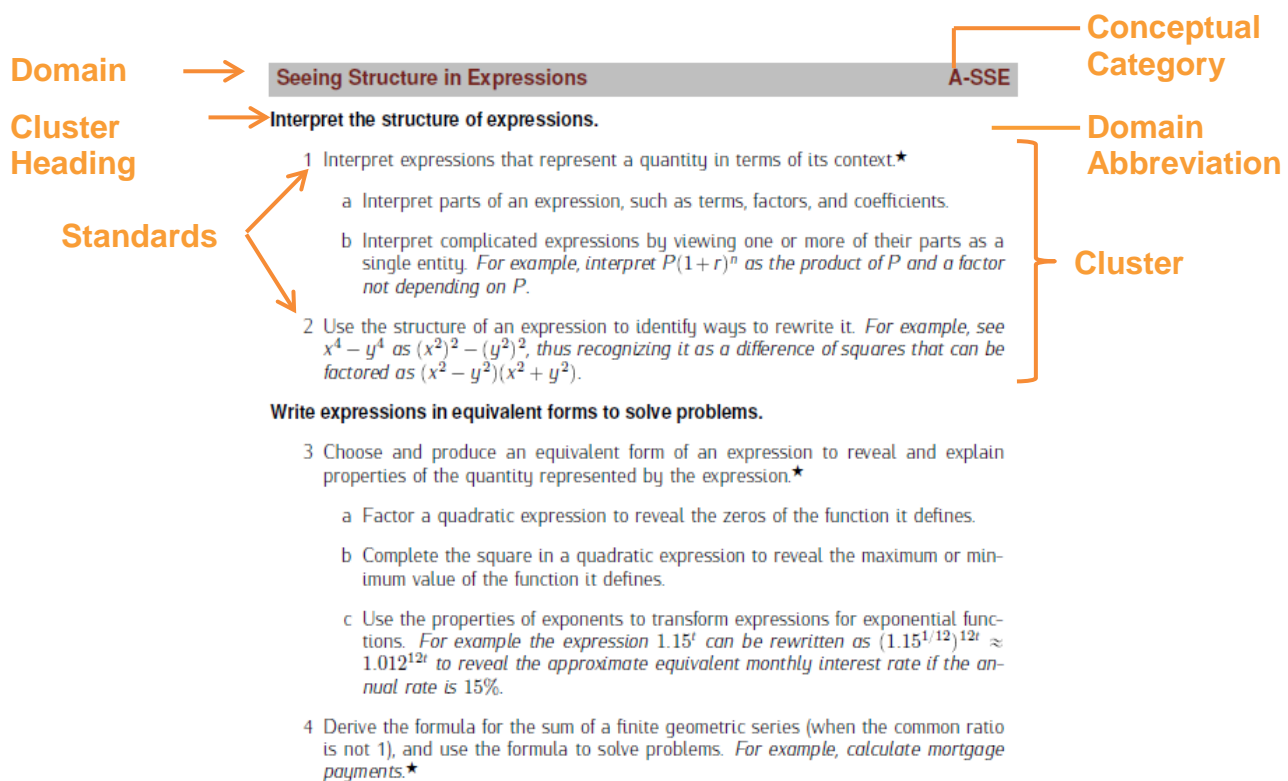
Why the Structure of the Standards is Important

The coding of the standards is tied to the structure of the standards as evidenced in the examples provided. The writers indicate that the structure of the standards is also important. Below is a link to the article, *The Structure is the Standards*, written by authors Bill McCallum, Phil Daro, and Jason Zimba. Read the article to see the authors' thoughts on this structure posted at http://commoncoretools.me/2012/02/16/the-structure-is-the-standards/#.

Summary

This module provided background on the need for the CCSSM, their development, the terminology, and the structure used.

Assignment

1) Return to the Pre-Assessment. You should now be able to complete all items with ease.

2) Complete the Scavenger Hunt on the next page of this module. The first row has been completed as an example of the information that should be used to complete the exercise.

Scavenger Hunt

CCSSM Code	Domain Name	Grade or Conceptual Category in which this standard is found	Text of Standard	Grade Span to which Domain or Conceptual Category applies
3.OA.B.6	Operations and Algebraic Thinking	Grade 3	Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	K-5
HSG-SRT.C.7				
K.CC.B.4a				
8.EE.A.1				
HSS-IC.B.3				
8.F. A.1				