Overview of Standards for Mathematics Content

Summer Institute • 2013

erikson
early math collaborative
INNOVATIONS

COMMON CORE
STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Comparing the Standards: K-8

K-8 Mathematics Content/Performance Standards		
Former Illinois Learning Standards		CCSS (which are becoming new Illinois Learning Standards)
STATE GOAL 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions. Standard B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships. Level: Early Elementary		Domain(Strand): Numbers & Operations in Base Ten Cluster: Use place value understanding and properties of operations to add and subtract. Grade: 1st
Benchmark *6.B.1* Solve one- and two-step problems with whole numbers using addition, subtraction, multiplication and division.		*Standards* *CC.1.NBT.4* Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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*. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. *CC.1.NBT.5* Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; *explain the reasoning used.* *CC.1.NBT.6* Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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*.
What's the difference?		

Key Shifts of the Common Core State Standards in Mathematics

Focus strongly where the Standards focus	The Standards call for a greater ***focus*** in mathematics. Rather than racing to cover topics in today's mile-wide, inch-deep curriculum, teachers use the power of the eraser and significantly narrow and deepen the way time and energy is spent in the math classroom. They focus deeply on the major work of each grade so that students can gain strong foundations: solid conceptual understanding, a high degree of procedural skill and fluency, and the ability to apply the math they know to solve problems inside and outside the math classroom.
Coherence: think across grades, and link to major topics within grades	***Thinking across grades***: The Standards are designed around coherent progressions from grade to grade. Principals and teachers carefully connect the learning across grades so that students can build new understanding onto foundations built in previous years. Teachers can begin to count on deep conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning. ***Linking to major topics***: Instead of allowing additional or supporting topics to detract from the focus of the grade, these topics can serve the grade level focus. For example, instead of data displays as an end in themselves, they support grade-level word problems.
Rigor: in major topics, pursue: • conceptual understanding, • procedural skill and fluency, and • application ***with equal intensity***.	***Conceptual understanding:*** The Standards call for conceptual understanding of key concepts, such as place value and ratios. Teachers support students' ability to access concepts from a number of perspectives so that students are able to see math as more than a set of mnemonics or discrete procedures. ***Procedural skill and fluency:*** The Standards call for speed and accuracy in calculation. Teachers structure class time and/or homework time for students to practice core functions such as single-digit multiplication so that students have access to more complex concepts and procedures. ***Application:*** The Standards call for students to use math flexibly for applications. Teachers provide opportunities for students to apply math in context. Teachers in content areas outside of math, particularly science, ensure that students are using math to make meaning of and access content.

GOAL 6[19]

Demonstrate and apply a knowledge and sense of numbers, including numeration and operations.

LEARNING STANDARD A[20]

Demonstrate beginning understanding of number, number names and numerals.

Benchmarks

6.A.ECa Use subitizing (the rapid and accurate judgment of how many items there are without counting) to identify the number of objects without counting in sets of four or less.[22]

6.A.ECb Count with understanding and recognize "how many" in small sets up to 5.[21]

6.A.ECc Understand and appropriately use informal or everyday terms that mean "zero", such as "none" or "nothing".[23]

6.A.ECd Connect numbers to quantities they represent using physical models and informal representations.[24]

6.A.ECe Differentiate numerals from letters and recognize some single-digit written numerals.[25]

6.A.ECf Verbally recite numbers from 1 to 10.[26]

6.A.ECg Be able to say the number after another in the series up to 9 when given a "running start," as in "What comes after one, two, three, four…?"

6.A.ECh Identify which of two verbally-presented consecutive numbers up to 5 is greater.

6.A.ECi Know the difference between two consecutive counting numbers up to 5 is 1.

19 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 1-7 and Operations and Algebraic Thinking, 1-6.
20 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 1-7.
21 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 4-5.
22 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 4-5.
23 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 3.
24 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 3-4.
25 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 3 & 7.
26 Aligns with Kindergarten Mathematics Common Core, Counting and Cardinality, 1.

Example Performance Descriptors

Point to each object and use one-to-one correspondence when counting sets up to ten.

Recognize how many there are in a small set without counting them (e.g., four blocks or three yellow beads).

Recite counting words in order from 1-10.

Connect numbers to quantities (e.g., match counting bears to written numerals).

Label "how many" in a set using last count word stated (e.g., "one, two, three…three cups!").

Identify numerals in the environment.

Fill in the next number when the teacher says, "one, two, three…"

Demonstrate an understanding of zero by making a comment such as, "Now I have none" when finished with a snack of four crackers.

LEARNING STANDARD B[27]

Begin to construct sets, add and subtract to create new numbers.

Benchmarks

6.B.ECa Recognize that numbers (or sets of objects) can be combined or separated to make another number.[27]

6.B.ECb Show understanding of how to count out and construct sets of objects of a given number up to 5.[28]

6.B.ECc Identify the new number created when small sets (up to 5) are combined or separated.[29]

6.B.ECd Informally solve simple mathematical problems presented in a meaningful context.[30]

6.B.ECe Fairly share a set of up to 10 items between two children.

Example Performance Descriptors

Combine items to create a new number (e.g., combine two blocks with a friend's two blocks and say, "Now we have four.")

Solve simple math problems (e.g. know that if one orange is taken away from a group of five there are four oranges left).

Count out a given number of objects correctly (e.g., count five crackers on plate at snack time).

Recognize that combining sets always results in "more" and separating sets always results in "less".

Divide a set of eight cookies between self and a friend evenly.

27 Aligns with Kindergarten Mathematics Common Core, Operations and Algebraic Thinking, 1-5.
28 Aligns with Kindergarten Mathematics Common Core, Operations and Algebraic Thinking, 1-2.
29 Aligns with Kindergarten Mathematics Common Core, Operations and Algebraic Thinking, 1-4.
30 Aligns with Kindergarten Mathematics Common Core, Operations and Algebraic Thinking, 4-5.

Content Emphases by Cluster--Kindergarten*

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade.

Key: Major Clusters; Supporting Clusters; Additional Clusters

Counting and Cardinality
Know number names and the count sequence.
Count to tell the number of objects.
Compare numbers.
Operations and Algebraic Thinking
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
Number and Operations in Base Ten
Work with numbers 11-19 to gain foundations for place value.
Measurement and Data
Describe and compare measureable attributes.
Classify objects and count the number of objects in categories.
Geometry
Identify and describe shapes.
Analyze, compare, create, and compose shapes.

* Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Content Emphases by Cluster--Grade 1*

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade.

Key: Major Clusters; Supporting Clusters; Additional Clusters

Operations and Algebraic Thinking
- **Represent and solve problems involving addition and subtraction.**
- **Understand and apply properties of operations and the relationship between addition and subtraction.**
- **Add and subtract within 20.**
- **Work with addition and subtraction equations.**

Number and Operations in Base Ten
- **Extending the counting sequence.**
- **Understand place value.**
- **Use place value understanding and properties of operations to add and subtract.**

Measurement and Data
- **Measure lengths indirectly and by iterating length units.**
- **Tell and write time.**
- **Represent and interpret data.**

Geometry
- **Reason with shapes and their attributes.**

* Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Content Emphases by Cluster--Grade 2*

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade.

Key: Major Clusters; Supporting Clusters; Additional Clusters

Operations and Algebraic Thinking
- **Represent and solve problems involving addition and subtraction.**
- **Add and subtract within 20.**
- **Work with equal groups of objects to gain foundations for multiplication.**

Number and Operations in Base Ten
- **Understand place value.**
- **Use place value understanding and properties of operations to add and subtract.**

Measurement and Data
- **Measure and estimate lengths in standard units.**
- **Relate addition and subtraction to length.**
- **Work with time and money.**
- **Represent and interpret data.**

Geometry
- **Reason with shapes and their attributes.**

* Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Content Emphases by Cluster--Grade 3*

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade.

Key: Major Clusters; Supporting Clusters; Additional Clusters

Operations and Algebraic Thinking

- **Represent and solve problems involving multiplication and division.**
- **Understand properties of multiplication and the relationship between multiplication and division.**
- **Multiply and divide within 100.**
- **Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

Number and Operations in Base Ten

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

Number and Operations—Fractions

- **Develop understanding of fractions as numbers.**

Measurement and Data

- **Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**
- **Represent and interpret data.**
- **Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**
- **Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**

Geometry

- **Reason with shapes and their attributes.**

* Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Content Emphases by Cluster--Grade 4*

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade.

Key: Major Clusters; Supporting Clusters; Additional Clusters

Operations and Algebraic Thinking

- **Use the four operations with whole numbers to solve problems.**
- **Gain familiarity with factors and multiples.**
- **Generate and analyze patterns.**

Number and Operations in Base Ten

- **Generalize place value understanding for multi-digit whole numbers.**
- **Use place value understanding and properties of operations to perform multi-digit arithmetic.**

Number and Operations--Fractions

- **Extend understanding of fraction equivalence and ordering.**
- **Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**
- **Understand decimal notation for fractions, and compare decimal fractions.**

Measurement and Data

- **Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**
- **Represent and interpret data**
- **Geometric measurement: understand concepts of angle and measure angles.**

Geometry

- **Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

* Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Required Fluencies in K-6

Grade	Standard	Required Fluency
K	K.OA.5	Add/subtract within 5
1	1.OA.6	Add/subtract within 10
2	2.OA.2 2.NBT.5	Add/subtract within 20 Add/subtract within 100
3	3.OA.7 3.NBT.2	Multiply/divide within 100 Add/subtract within 1000
4	4.NBT.4	Add/subtract within 1,000,000
5	5.NBT.5	Multi-digit multiplication
6	6.NS.2,3	Multi-digit division Multi-digit decimal operations

Note: Standards 2.OA.2 and 3.OA.7 are "from memory" by the end of the year.

Processing the Shifts

Math Shifts	*What this shift means for WHAT is taught in my classroom/school/district*	*What this shift means for HOW we teach in my classroom/school/district*
1. **Focus: Focus** strongly where the Standards focus.		
2. **Coherence: Think** across grades, and **link** to major topics within grades.		
3. **Rigor:** In major topics, pursue **conceptual understanding**, procedural skill and **fluency**, and **application** with equal intensity		