

## **Focus** strongly where the Standards Focus

Teachers use the power of the eraser and significantly narrow and deepen the scope of how time and energy is spent in the math classroom. They do so in order to focus deeply on only the concepts that are emphasized in the standards so that students can engage in the mathematical practices, reach strong foundational knowledge and deep conceptual understanding, and transfer mathematical skills and understanding across concepts and grades.

## **Coherence: Think** across grades, and **link** to major topics within grades

Thinking across grades: Principals and teachers carefully connect the learning within and across grades so that, for example, fractions or multiplication develop across grade levels and 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 less important topics to detract from the focus of the grade, these topics are taught in relation to the grade level focus. For example, data displays are not an end in themselves but are always presented along with grade-level word problems.

## **Rigor: Require fluency, application, and deep understanding**

Conceptual understanding: Teachers teach more than “how to get the answer” and 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. Students demonstrate deep conceptual understanding of core math concepts by solving short conceptual problems, applying math in new situations, and speaking about their understanding.

Procedural skill and fluency. Students are expected to have speed and accuracy in calculation. Teachers structure class time and/or homework time for students to practice core functions such as multiplication facts so that students are able to understand and manipulate more complex concepts.

Application: Students are expected to use math and choose the appropriate concept for application even when they are not prompted to do so. Teachers provide opportunities at all grade levels for students to apply math concepts in “real world” situations. Teachers in content areas outside of math, particularly science, ensure that students are using math – at all grade levels – to make meaning of and access content.

Meeting these standards requires intensity in the classroom.

| <b>Grade</b> | <b>Priorities in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding</b> |
|--------------|---|
| <b>K–2</b>   | <b>Addition and subtraction--concepts, skills, and problem solving</b>                                    |
| <b>3–5</b>   | <b>Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving</b> |
| <b>6</b>     | <b>Ratios and proportional relationships; early expressions and equations</b>                             |
| <b>7</b>     | <b>Ratios and proportional relationships; arithmetic of rational numbers</b>                              |
| <b>8</b>     | <b>Linear algebra</b>   |

## Required Fluencies in K-6

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

## 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 measurable attributes.**
- **Classify objects and count the number of objects in categories.**

### Geometry

- **Identify and describe shapes.**
- **Analyze, compare, create, and compose shapes.**

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## Content Emphases by Cluster--Grade 1\*

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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.

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## Content Emphases by Cluster--Grade 2\*

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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.**

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## Content Emphases by Cluster--Grade 3\*

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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.

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## Content Emphases by Cluster--Grade 4\*

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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.

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## Content Emphases by Cluster--Grade 5\*

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Key: ■ Major Clusters; ■ Supporting Clusters; ● Additional Clusters

### Operations and Algebraic Thinking

- Write and interpret numerical expressions.
- Analyze patterns and relationships.

### Number and Operations in Base Ten

- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.

### Number and Operations—Fractions

- Use equivalent fractions as a strategy to add and subtract fractions.
- Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

### Measurement and Data

- Convert like measurement units within a given measurement system.
- Represent and interpret data.
- Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

### Geometry

- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.

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## Content Emphases by Cluster--Grade 6\*

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### Ratios and Proportional Reasoning

- **Understand ratio concepts and use ratio reasoning to solve problems.**

### The Number System

- **Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**
- **Compute fluently with multi-digit numbers and find common factors and multiples.**
- **Apply and extend previous understandings of numbers to the system of rational numbers.**

### Expressions and Equations

- **Apply and extend previous understandings of arithmetic to algebraic expressions.**
- **Reason about and solve one-variable equations and inequalities.**
- **Represent and analyze quantitative relationships between dependent and independent variables.**

### Geometry

- **Solve real-world and mathematical problems involving area, surface area, and volume.**

### Statistics and Probability

- **Develop understanding of statistical variability.**
- **Summarize and describe distributions.**

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## Content Emphases by Cluster--Grade 7\*

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Key: ■ Major Clusters; ■ Supporting Clusters; ● Additional Clusters

### Ratios and Proportional Reasoning

- **Analyze proportional relationships and use them to solve real-world and mathematical problems.**

### The Number System

- **Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.**

### Expressions and Equations

- **Use properties of operations to generate equivalent expressions.**
- **Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

### Geometry

- **Draw, construct and describe geometrical figures and describe the relationships between them.**
- **Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.**

### Statistics and Probability

- **Use random sampling to draw inferences about a population.**
- **Draw informal comparative inferences about two populations.**
- **Investigate chance processes and develop, use, and evaluate probability models.**

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## Content Emphases by Cluster--Grade 8\*

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Key: ■ Major Clusters; ■ Supporting Clusters; ● Additional Clusters

### The Number System

- Know that there are numbers that are not rational, and approximate them by rational numbers.

### Expressions and Equations

- Work with radicals and integer exponents.
- Understand the connections between proportional relationships, lines, and linear equations.
- Analyze and solve linear equations and pairs of simultaneous linear equations.

### Functions

- Define, evaluate, and compare functions.
- Use functions to model relationships between quantities.

### Geometry

- Understand congruence and similarity using physical models, transparencies, or geometry software.
- Understand and apply the Pythagorean Theorem.
- Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

### Statistics and Probability

- Investigate patterns of association in bivariate data.

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