# Outline of Mathematics Standards and Benchmarks

Standard 1: NUMBER AND COMPUTATION

Number Sense
Number Systems and Their Properties
Estimation
Computation

Standard 2: ALGEBRA

Patterns
Variables, Equations, and Inequalities
Functions
Models

Standard 3: GEOMETRY

Geometric Figures and Their Properties
Measurement and Estimation
Transformational Geometry
Geometry from an Algebraic Perspective

Standard 4: DATA

Probability
Statistics

While the standards definitions remain the same across the grade levels, the scope of the Benchmarks does change

Example:

Benchmark 2 (for kindergarten): Number Systems and Their Properties - The student demonstrates an understanding of the whole numbers with a special emphasis on place value in a variety of situations.

Benchmark 2 (for high school): Number Systems and Their Properties - The student demonstrates an understanding of the real number system; recognizes, applies, and explains their properties, and extends these properties to algebraic expressions.

Standards are available from the KSDE website http://www.ksde.org/outcomes/Mathpg.html

## Standard 1: Number and Computation

**Number and Computation - The student uses numerical and computational concepts and procedures in a variety of situations.**

**Benchmark 3: Estimation - The student uses computational estimation with whole numbers, fractions, decimals and money in a variety of situations.**

| Fifth Grade Knowledge Base Indicators | Fifth Grade Application Indicators |
|---|---|
| The student . . .<br>1. estimates whole numbers quantities from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero through hundredths place; and monetary amounts to $10,000 using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology (2.4.K1a-c) ($)<br>2. ▲ N uses various estimation strategies to estimate whole number quantities from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero through hundredths place, and monetary amounts to $10,000 and explains how various strategies are used (2.4.K1a-c) ($).<br>3. recognizes and explains the difference between an exact and an approximate answer (2.4.K1a-c).<br>4. explains the appropriateness of an estimation strategy used and whether the estimate is greater than (overestimate) or less than (underestimate) the exact answer (2.4.K1a). | The student . . .<br>1. adjusts original estimate using whole numbers from 0 through 100,000 of a real-world problem based on additional information (a frame of reference) (2.4.A1a) ($), e.g., given a large container of marbles, estimate the quantity of marbles. Then, using a smaller container filled with marbles, count the number of marbles in the smaller container and adjust your original estimate.<br>2. estimates to check whether or not the result of a real-world problem using whole numbers from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero to tenths place; and monetary amount to $10,000 is reasonable and makes predictions based on the information (2.4.A1a-c) ($), e.g., at your birthday party, you ate 4 1/2 pepperoni Pizzas, 3 1/4 cheese pizzas, and 2 3/4 sausage pizzas. On the bill they charged you for 10 pizzas. Is that reasonable? If pizzas cost $6.99 each, about how much should you save for your next birthday party?<br>3. selects a reasonable magnitude from given quantities based on a real-world problem using whole numbers from 0 through 100,000 and explains the reasonableness of selection (2.4.A1a), e.g., about how many tulips can fit in the flower vase, 2, 10, or 25? The student chooses ten and explains that the vase at home is a jelly jar and either two or ten will fit, but ten looks prettier.<br>4. ▲■ determines if a real-world problem calls for an exact or approximate using whole numbers from 0 through 100,000 and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology (2.4.A1a) ($). |

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▲ - Assessed Indicator on the Objective Assessment
■ - Assessed Indicatior on the Optional Constructed Response Assessment
N - Noncalculator
**($)** - Financial Literacy

THESE STANDARDS ARE ALIGNED ONLY TO THE ASSESSMENTS THAT WILL BEGIN DURING THE 2005-06 SCHOOL YEAR

## Standard 1: Number and Computation

**Number and Computation - The student uses numerical and computational concepts and procedures in a variety of situations.**
**Benchmark 2: Number Systems and Their Properties - The student demonstrates an understanding of number systems in a variety of situations.**

| Extended Knowledge Base Indicators | Clarifying Examples of Extended Indicators |
|---|---|
| The student . . .<br>1. matches like numerals **($)**.<br>2. counts concrete objects.<br>3. establishes number/numerical correspondence **($)**.<br>4. identifies subsets **($)**.<br>5. identifies place value **($)**. | The student . . .<br>1. matches bus number on identification (ID) card to numerals on side of school bus parked in school loading area.<br>2. determines the number of steps he/she must take from the classroom to reach another designated location in the school.<br>3. counts school newsletters according to number of students in homerooms.<br>4. separates recyclable items from trash collected when he/she is cleaning the cafeteria after lunch period.<br>5. lines up numerals vertically in a problem when copying from the overhead. |
| **Kindergarten Knowledge Base Indicators** | **Kindergarten Application Indicators** |
| The student . . .<br>1. reads and writes whole numbers from 0 through 20 in numerical form **($)**.<br>2. represents whole numbers from 0 through 20 using place value models (2.4.K1b) **($)**, e.g., ten frames, unifix cubes, straws bundled in 10s, or base ten blocks.<br>3. counts (2.4.K1a) **($)**.<br>a. whole numbers from 0 through 20,<br>b. whole numbers from 10 to 0 backwards<br>c. subsets of whole numbers from 0 through 20.<br>4. groups objects by 5s and by 10s (2.4.K1a).<br>5. **uses** the **concept** of the zero property of addition (additive identity) with whole numbers from 0 through 20 and demonstrates its meaning using concrete objects (2.4.K1a) **($)**, e.g., 4 apples and no (zero) other apples are 4 apples. | The student . . .<br>1. solves real-world problems with whole numbers from 0 through 20 using place value models (2.4.A1b) **($)**, e.g., group the class into tens, count by tens; then continue counting by ones to find the total.<br>2. counts forwards and backwards from a specific whole number using a number line from 0 through 10 (2.4.A1a). |

| First Grade Knowledge Base Indicators | First Grade Application Indicators |
|---|---|
| The student . . .<br>1. reads and writes whole numbers from 0 through 100 in numerical form ($).<br>2. represents whole numbers from 0 through 100 using various groupings and place value models (place value mats, hundred charts, or base ten blocks) emphasizing ones, ten, and hundreds (2.4.K1b) **($)**, e.g., how many groups of tens are there in 32 or how many groups of tens and ones are there in 62?<br>3. counts subsets of whole numbers from 0 through 100 both forwards and backwards (2.4.K1a) **($)**.<br>4. writes in words whole numbers from 0 through 10.<br>5. identifies the place value of the digits in whole numbers from 0 through 100 (2.4.K1b) **($)**.<br>6. identifies any whole number from 0 through 30 as even or odd (2.4.K1a).<br>7. **uses the concepts** of these properties with whole numbers from 0 through 100 and demonstrates their meaning using concrete objects (2.4.K1a) **($)**:<br>a. commutative property of addition, e.g., 3 + 2 = 2 + 3,<br>b. zero property of addition (additive identity), e.g., 4 + 0 = 4. | The student . . .<br>1. solves real-world problems with whole numbers from 0 through 50 using place value models (place value mats, hundred charts, or base ten blocks) and the concepts of these properties to explain reasoning (2.4.A1a-b) **($)**:<br>a. commutative property of addition, e.g., group 5 students into a group of 3 and a group of 2, add to find the total; then reverse the order of the students to show that 2 + 3 still equals 5;<br>b. zero property of addition, e.g., have students lay out 11 crayons, tell them to add zero (crayons). Then ask: How many crayons are there? |

| Second Grade Knowledge Base Indicators | Second Grade Application Indicators |
|---|---|
| The student . . .<br>1. reads and writes<br>a. whole numbers from 0 through 100 in numerical form, e.g., 942 is read as nine hundred forty-two and is written in numerical form as 942;<br>b. whole numbers from 0 through 100 in words, e.g., 76 is read as seventy-six and is written in words as seventy-six.<br>c. whole numbers from 0 through 1,000 in numerical form when presented in word form, e.g., nine hundred forty-six is read as nine hundred forty-six and is written as 946.<br>2. ▲ represents whole numbers from 0 through 1,000 using vario groupings and place value models emphasizing 1s, 10s, and 100s; explains the groups; and states the value of the digit in ones place, tens place, and hundreds place (2.4.K1b) ($), e.g., in 385, the 3 represents 3 hundreds, 30 tens, or 300 ones; the 8 represents 8 tens or 80 ones; and the 5 represents 5 ones.<br>3. counts subsets of whole numbers from 0 through 1,000 forwards and backwards (2.4.K1a) ($), e.g., 311,312, ..., 320; or 210, 209, ..., 204.<br>4. ▲ identifies the place value of the digits in whole numbers, from 0 through 1,000 (2.4.K1b) ($).<br>5. identifies any whole number from 0 through 100 as even or odd (2.4.K1a).<br>6. **uses** the **concepts** of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects (2.4.K1a) ($):<br>a. commutative property of addition, e.g., 5 + 6 = 6 + 5;<br>b. zero property of addition (additive identity), e.g., 4 + 0 = 4;<br>c. associative property of addition, e.g., (3 + 2) + 4 = 3 + (2 + 4);<br>d. symmetric property of equality applied to basic addition and subtraction facts, e.g., 10 = 2 + 8 is the same as 2 + 8 = 10 or 7 = 10 - 3 is the same as 10 - 3 = 7. | The student . . .<br>1. solves real-world problems with whole numbers from 0 through 100 using place value models and the concepts of these properties to explain reasoning (2.4.A1a-b)<br>a. communtative property of addition, e.g., group 17 students into a 9 and an 8, add to find the total, then reverse the students to show 8 + 9 still equals 17;<br>b. zero property of addition, e.g., have students lay out 22 crayons, tell them to add zero (crayons). How many crayons? 22 + 0 = 22.<br>2. perfoms various computational procedures with whole numbers from 0 through 100 using these properties and explains how they were used (2.4.A1b):<br>a. commutative property of addition (5 + 6 = 6 + 5), e.g., given 6 + 5, the student says: I know that the anwer is 11 because 5 + 6 is 11 and the order you add them in does not matter;<br>b. zero property of addition (17 + 0 = 0 + 17), e.g., given 17 + 0, the student says: I know that the answer is 17 because adding 0 does not change the answer (sum). |

**Standard 1: Number and Computation Benchmark 1: Number Sense**

| Organizer | Indicator lead in phrase/wording | Kindergarten | First Grade | Second Grade | Third Grade | Fourth Grade | Fifth Grade | Sixth Grade | Seventh Grade | Eighth Grade | Ninth and Tenth Grades |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Equivalent Representations | **knows, explains, and represents/uses equivalent representations for ...** | K.1…1-to-1 match with numbers 0 through 20 (identifies, states, writes) using concrete objects | K.1 … numbers from 0 through 100 using concrete objects | K.1 … numbers from 0 through 1,000 using concrete objects | K.1…numbers from 0 through 10,000, fractions (halves, fourths, thirds, eighths, tenths, sixteenths) and decimals through tenths | K.1…numbers from 0 through 100,000, fractions (halves, fourths, thirds, eighths, tenths, twelfths, sixteenths, hundredths, and mixed numbers) and decimal that are monetary | ^K.1 … numbers from 0 through 1,000,000 positive fractions and decimals that are monetary amounts | K.1…rational numbers (including percents and rational number bases) | K.1…rational numbers and simple algebraic expressions | K.1…rational numbers and simple algebraic expressions | K.1…real numbers and algebraic expressions |
| | **solves and/or generates real-world problems with equivalent representations to/of . . .** | A.1…compare and order from 0 through 10 | A.1…compare and order from 0 through 50 | A.1…compare and order 0 through 1,000 and mixed coins to $1.00; add and subtract 0 through 100, and equivalent values of coins to $1.00 without mixing coins | A.1…compare and order 0 through 5,000; add and subtract 0 through 1,000 | A.1…compare and order 0 through 100,000, add/subtract 0 through 10,000, decimals that are monetary amounts and multiply (2 by 1) | A.1 & A.3…compare and order through 1,000,000, positive fractions and greater than or equal to zero through hundredths place, and integers; add/subtract 0 through 100,000, decimals that are monetary amounts, multiply (2 digit by 2 digit) and divide | A.1 … integers, positive fractions, and decimals | ^A.1…rationales, simple algebraic expressions, and fraction and decimal approximations of pi | A.1…rationales and simple algebraic expressions | A.1…reals and simple algebraic expressions |
| | **knows, explains, and/or uses equivalent representations of/to** | | | k.3…add and subtract numbers 0 through 100 | ^K.3…add and subtract numbers 0 through 1,000 and multiply using basic facts 1-5 and 10s, and add/subtract money | | K.4…percents and decimals for one whole, one-half, one-fourth, three-fourths, and one tenth through nine tenths | ^K.4…numerical relationships between percents, decimals, and fractions 0 - 1<br>K.5 …same simple algebraic expression with coefficients of one | | | |
| Coins | **identifies, recognizes, states, and/or counts …** | K.5…value of pennies and dimes using money models | K.5 & K.6…value of each coin and type of currency ($1, $5, $10) using money models and a like group of coins (pennies, nickels, dimes) | K.5 & K.6…total value (to $1) of a mixed group of coins and a like group of currency (to $100) | ^K.4 …total value of mixed coins and bills ($50 or less)<br>A.3 … amount of change owed (to $100) | | | | | | |

**Module I Part 3: Outline of Standards and Benchmarks - Mathematics**

The Mathematics Standards are available in ____ formats?
2
3
4
5

The correct answer is (B. 3)

How many Standards are there in the Mathematics Standards document?
3
4
5
6

The correct answer is (B. 4)

The Scope and Sequence is a new format of the Mathematics Standards document from previous documents?
True or False

The correct answer is (True)

While the definitions of the Standards are the same across all grade levels, the scope of the Benchmarks changes?
True or False

The correct answer is (True)