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Office of Standards, Assessment and Reporting

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TO: District Superintendents
Superintendents of Public and Nonpublic Schools,
Principals of Public, Charter, and Nonpublic Schools

FROM: David Abrams *David Abrams*

SUBJECT: Grades 3-8 Mathematics Testing Program Guidance, September-April/May-June

At their June 22, 2009, meeting, the Board of Regents directed the Department to reschedule the administration of the 2009-10 Grades 3-8 Mathematics Tests from March to May.

To assist schools in the curriculum planning process for the May administration, the Department has developed the following guidance for the Grades 3-8 Mathematics Testing Program. Please use this guidance to ensure that your local curriculum sequencing is aligned with the May administration of the Grades 3-8 Mathematics Tests.

The document lists all the content performance indicators by grade level and categorizes them as September-April/May-June. To illustrate, any of the May-June content performance indicators in Grade 3 and any of the September-April content performance indicators in Grade 4 could be included on the Grade 4 Mathematics Test. Please note that for the 2009-10 school year only, content performance indicators that were included as post-March for Grade 3 may also be included on the Grade 4 Mathematics Test; see <http://www.emsc.nysed.gov/3-8/march.htm> for examples.

The process strands are not listed in the new Program Guidance because they are presumed to be integrated throughout all the concepts taught during the school year. The locally developed academic components of curricula, instructional programs, and assessments must be designed with this in mind. Additionally, all three of these components must address conceptual understanding, procedural fluency, and problem solving.

Schools and districts are encouraged to use this document when reviewing local curricula and in designing their Grades 3 through 8 instructional programs. As additional resources, the Mathematics Core Curriculum and content and process strands are posted on the Department's web site at <http://www.emsc.nysed.gov/ciai/mst/math/standards/core.html>.

Please direct any questions that arise in connection with this rescheduling to the Office of State Assessment at emacassessinfo@mail.nysed.gov.

We appreciate the efforts of all teachers and school officials and look forward to further collaboration as the new testing schedule is implemented during the 2009-10 school year. Thank you for all the hard work that you do, and for your continued cooperation in helping the Department maintain the integrity of New York State's Testing Program.

Grades 3-8 Mathematics Testing Program Guidance, September-April/May-June

Grade 3

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations Number Systems		
3.N.1	Skip count by 25's, 50's, 100's to 1,000	September-April
3.N.2	Read and write whole numbers to 1,000	September-April
3.N.3	Compare and order numbers to 1,000	September-April
3.N.4	Understand the place value structure of the base ten number system: 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand	September-April
3.N.5	Use a variety of strategies to compose and decompose three-digit numbers	September-April
3.N.6	Use and explain the commutative property of addition and multiplication	September-April
3.N.7	Use 1 as the identity element for multiplication	September-April
3.N.8	Use the zero property of multiplication	September-April
3.N.9	Understand and use the associative property of addition	September-April
3.N.10	Develop an understanding of fractions as part of a whole unit and as parts of a collection	September-April
3.N.11	Use manipulatives, visual models, and illustrations to name and represent unit fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{10}$) as part of a whole or a set of objects	September-April
3.N.12	Understand and recognize the meaning of numerator and denominator in the symbolic form of a fraction	September-April
3.N.13	Recognize fractional numbers as equal parts of a whole	September-April
3.N.14	Explore equivalent fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$)	May-June
3.N.15	Compare and order unit fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$) and find their approximate locations on a number line	May-June

Number Sense and Operations		
Number Theory		
3.N.16	Identify odd and even numbers	September-April
3.N.17	Develop an understanding of the properties of odd/even numbers as a result of addition or subtraction	September-April
Number Sense and Operations		
Operations		
3.N.18	Use a variety of strategies to add and subtract 3-digit numbers (with and without regrouping)	September-April
3.N.19*	Develop fluency with single-digit multiplication facts	September-April
3.N.20*	Use a variety of strategies to solve multiplication problems with factors up to 12×12	September-April
3.N.21	Use the area model, tables, patterns, arrays, and doubling to provide meaning for multiplication	September-April
3.N.22*	Demonstrate fluency and apply single-digit division facts	September-April
3.N.23*	Use tables, patterns, halving, and manipulatives to provide meaning for division	September-April
3.N.24	Develop strategies for selecting the appropriate computational and operational method in problem solving situations	September-April
Number Sense and Operations		
Estimation		
3.N.25*	Estimate numbers up to 500	September-April
3.N.26*	Recognize real world situations in which an estimate (rounding) is more appropriate	September-April
3.N.27	Check reasonableness of an answer by using estimation	September-April
Algebra		
Equations and Inequalities		
3.A.1*	Use the symbols $<$, $>$, and $=$ (with and without the use of a number line) to compare whole numbers and unit fractions ($1/2, 1/3, 1/4, 1/5, 1/6$, and $1/10$)	September-April
Algebra		
Patterns, Relations and Functions		
3.A.2	Describe and extend numeric (+, -) and geometric patterns	September-April
Geometry		
Shapes		
3.G.1	Define and use correct terminology when referring to shapes (circle, triangle, square, rectangle, rhombus, trapezoid, and hexagon)	September-April
3.G.2*	Identify congruent and similar figures	September-April
3.G.3	Name, describe, compare, and sort three-dimensional shapes: cube, cylinder, sphere, prism, and cone	September-April

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

3.G.4	Identify the faces on a three-dimensional shape as two-dimensional shapes	September-April
Geometry Transformational Geometry		
3.G.5	Identify and construct lines of symmetry	September-April
Measurement Units of Measurement		
3.M.1	Select tools and units (customary) appropriate for the length measured	September-April
3.M.2	Use a ruler/yardstick to measure to the nearest standard unit (whole and 1/2 inches, whole feet, and whole yards)	September-April
3.M.3	Measure objects, using ounces and pounds	September-April
3.M.4	Recognize capacity as an attribute that can be measured	September-April
3.M.5	Compare capacities (e.g., Which contains more? Which contains less?)	September-April
3.M.6	Measure capacity, using cups, pints, quarts, and gallons	September-April
Measurement Units		
3.M.7	Count and represent combined coins and dollars, using currency symbols (\$0.00)	September-April
3.M.8	Relate unit fractions to the face of the clock: Whole = 60 minutes, 1/2 = 30 minutes, 1/4 = 15 minutes	September-April
Measurement Estimation		
3.M.9	Tell time to the minute, using digital and analog clocks	September-April
3.M.10	Select and use standard (customary) and non-standard units to estimate measurements	September-April
Statistics and Probability Collection of Data		
3.S.1	Formulate questions about themselves and their surroundings	May-June
3.S.2	Collect data using observation and surveys, and record appropriately	May-June
Statistics and Probability Organization and Display of Data		
3.S.3	Construct a frequency table to represent a collection of data	September-April
3.S.4	Identify the parts of pictographs and bar graphs	September-April
3.S.5	Display data in pictographs and bar graphs	September-April
3.S.6	State the relationships between pictographs and bar graphs	September-April
Statistics and Probability Analysis of Data		
3.S.7	Read and interpret data in bar graphs and pictographs	September-April

Statistics and Probability		
Predictions from Data		
3.S.8	Formulate conclusions and make predictions from graphs	September-April

Key to	3.N.22
Performance	3 = 3 rd Grade
Indicator	N = Number Sense & Operations
Code:	22 = Performance Indicator Number

Grade 4

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations		
Number Systems		
4.N.1	Skip count by 1,000's	September-April
4.N.2	Read and write whole numbers to 10,000	September-April
4.N.3	Compare and order numbers to 10,000	September-April
4.N.4	Understand the place value structure of the base ten number system 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand 10 thousands = 1 ten thousand	September-April
4.N.5	Recognize equivalent representations for numbers up to four digits and generate them by decomposing and composing numbers	September-April
4.N.6	Understand, use, and explain the associative property of multiplication	September-April
4.N.7*	Develop an understanding of fractions as locations on number lines and as divisions of whole numbers	September-April
4.N.8*	Recognize and generate equivalent fractions (halves, fourths, thirds, fifths, sixths, and tenths) using manipulatives, visual models, and illustrations	September-April
4.N.9*	Use concrete materials and visual models to compare and order unit fractions or fractions with the same denominator (with and without the use of a number line)	September-April
4.N.10*	Develop an understanding of decimals as part of a whole	September-April
4.N.11*	Read and write decimals to hundredths using money as a context	September-April
4.N.12*	Use concrete materials and visual models to compare and order decimals (less than 1) to the hundredths place in the context of money	September-April
Number Sense and Operations		
Number Theory		
4.N.13	Develop an understanding of the properties of odd/even numbers as a result of multiplication	September-April
Number Sense and Operations		
Operations		
4.N.14	Use a variety of strategies to add and subtract numbers up to 10,000	September-April

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

4.N.15	Select appropriate computational and operational methods to solve problems	September-April
4.N.16	Understand various meanings of multiplication and division	September-April
4.N.17	Use multiplication and division as inverse operations to solve problems	September-April
4.N.18	Use a variety of strategies to multiply two-digit numbers by one-digit numbers (with and without regrouping)	September-April
4.N.19*	Use a variety of strategies to multiply two-digit numbers by two-digit numbers (with and without regrouping)	September-April
4.N.20	Develop fluency in multiplying and dividing multiples of 10 and 100 up to 1,000	September-April
4.N.21	Use a variety of strategies to divide two-digit dividends by one-digit divisors (with and without remainders)	September-April
4.N.22	Interpret the meaning of remainders	September-April
4.N.23*	Add and subtract proper fractions with common denominators	September-April
4.N.24*	Express decimals as an equivalent form of fractions to tenths and hundredths	September-April
4.N.25*	Add and subtract decimals to tenths and hundredths using a hundreds chart	September-April
Number Sense and Operations		
Estimation		
4.N.26	Round numbers less than 1,000 to the nearest tens and hundreds	September-April
4.N.27	Check reasonableness of an answer by using estimation	September-April
Algebra		
Variables and Expressions		
4.A.1	Evaluate and express relationships using open sentences with one operation	September-April
Algebra		
Equations and Inequalities		
4.A.2*	Use the symbols $<$, $>$, $=$, and \neq (with and without the use of a number line) to compare whole numbers and unit fractions and decimals (up to hundredths)	September-April
4.A.3	Find the value or values that will make an open sentence true, if it contains $<$ or $>$	September-April
Algebra		
Patterns, Relations and Functions		
4.A.4	Describe, extend, and make generalizations about numeric (+, -, \times , \div) and geometric patterns	September-April
4.A.5	Analyze a pattern or a whole-number function and state the rule, given a table or an input/output box	September-April

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

Geometry Shapes		
4.G.1	Identify and name polygons, recognizing that their names are related to the number of sides and angles (triangle, quadrilateral, pentagon, hexagon, and octagon)	September-April
4.G.2	Identify points and line segments when drawing a plane figure	September-April
4.G.3	Find perimeter of polygons by adding sides	September-April
4.G.4	Find the area of a rectangle by counting the number of squares needed to cover the rectangle	September-April
4.G.5	Define and identify vertices, faces, and edges of three-dimensional shapes	September-April
Geometry Geometric Relationships		
4.G.6	Draw and identify intersecting, perpendicular, and parallel lines	May-June
4.G.7	Identify points and rays when drawing angles	May-June
4.G.8	Classify angles as acute, obtuse, right, and straight	May-June
Measurement Units of Measurement		
4.M.1	Select tools and units (customary and metric) appropriate for the length being measured	September-April
4.M.2	Use a ruler to measure to the nearest standard unit (whole, $\frac{1}{2}$ and $\frac{1}{4}$ inches, whole feet, whole yards, whole centimeters, and whole meters)	September-April
4.M.3	Know and understand equivalent standard units of length: 12 inches = 1 foot, 3 feet = 1 yard	September-April
4.M.4	Select tools and units appropriate to the mass of the object being measured (grams and kilograms)	September-April
4.M.5	Measure mass, using grams	September-April
4.M.6	Select tools and units appropriate to the capacity being measured (milliliters and liters)	September-April
4.M.7	Measure capacity, using milliliters and liters	September-April
Measurement Units		
4.M.8	Make change, using combined coins and dollar amounts	September-April
4.M.9	Calculate elapsed time in hours and half hours, not crossing A.M./P.M.	September-April
4.M.10	Calculate elapsed time in days and weeks, using a calendar	September-April

Statistics and Probability Collections of Data		
4.S.1	Design investigations to address a question from given data	May-June
4.S.2	Collect data using observations, surveys, and experiments and record appropriately	May-June
Statistics and Probability Organization and Display of Data		
4.S.3	Represent data using tables, bar graphs, and pictographs	September-April
Statistics and Probability Analysis of Data		
4.S.4*	Read and interpret line graphs	September-April

Statistics and Probability Predictions from Data		
4.S.5	Develop and make predictions that are based on data	September-April
4.S.6	Formulate conclusions and make predictions from graphs	September-April

Key to	4.N.22
Performance	4 = 4th Grade
Indicator	N = Number Sense & Operations
Code:	22 = Performance Indicator Number

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

Grade 5

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations Number Systems		
5.N.1	Read and write whole numbers to millions	September-April
5.N.2	Compare and order numbers to millions	September-April
5.N.3	Understand the place value structure of the base ten number system 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand 10 thousands = 1 ten thousand 10 ten thousands = 1 hundred thousand 10 hundred thousands = 1 million	September-April
5.N.4	Create equivalent fractions, given a fraction	September-April
5.N.5	Compare and order fractions including unlike denominators (with and without the use of a number line) Note: Commonly used fractions such as those that might be indicated on a ruler, measuring cup, etc.	September-April
5.N.6	Understand the concept of ratio	September-April
5.N.7	Express ratios in different forms	September-April
5.N.8	Read, write, and order decimals to thousandths	September-April
5.N.9	Compare fractions using $<$, $>$, or $=$	September-April
5.N.10	Compare decimals using $<$, $>$, or $=$	September-April
5.N.11	Understand that percent means part of 100, and write percents as fractions and decimals	September-April
Number Sense and Operations Number Theory		
5.N.12	Recognize that some numbers are only divisible by one and themselves (prime) and others have multiple divisors (composite)	September-April
5.N.13	Calculate multiples of a whole number and the least common multiple of two numbers	September-April
5.N.14	Identify the factors of a given number	September-April
5.N.15	Find the common factors and the greatest common factor of two numbers	September-April
Number Sense and Operations Operations		
5.N.16	Use a variety of strategies to multiply three-digit by three-digit numbers Note: Multiplication by anything greater than a three-digit multiplier/multiplicand should be done using technology.	September-April

5.N.17	Use a variety of strategies to divide three-digit numbers by one- and two-digit numbers Note: Division by anything greater than a two-digit divisor should be done using technology.	September-April
5.N.18	Evaluate an arithmetic expression using order of operations including multiplication, division, addition, subtraction, and parentheses	September-April
5.N.19	Simplify fractions to lowest terms	September-April
5.N.20	Convert improper fractions to mixed numbers, and mixed numbers to improper fractions	September-April
5.N.21	Use a variety of strategies to add and subtract fractions with like denominators	September-April
5.N.22	Add and subtract mixed numbers with like denominators	September-April
5.N.23	Use a variety of strategies to add, subtract, multiply, and divide decimals to thousandths	September-April
Number Sense and Operations		
Estimation		
5.N.24	Round numbers to the nearest hundredth and up to 10,000	September-April
5.N.25	Estimate sums and differences of fractions with like denominators	September-April
5.N.26	Estimate sums, differences, products, and quotients of decimals	September-April
5.N.27	Justify the reasonableness of answers using estimation	September-April
Algebra		
Variables and Expressions		
5.A.1	Define and use appropriate terminology when referring to constants, variables, and algebraic expressions	September-April
5.A.2*	Translate simple verbal expressions into algebraic expressions	September-April
5.A.3*	Substitute assigned values into variable expressions and evaluate using order of operations	September-April
Algebra		
Equations and Inequalities		
5.A.4*	Solve simple one-step equations using basic whole-number facts	September-April
5.A.5*	Solve and explain simple one-step equations using inverse operations involving whole numbers	September-April
5.A.6	Evaluate the perimeter formula for given input values	September-April
Algebra		
Patterns, Relations, and Functions		
5.A.7	Create and explain patterns and algebraic relationships (e.g., 2,4,6,8...) algebraically: $2n$ (doubling)	September-April
5.A.8	Create algebraic or geometric patterns using concrete objects or visual drawings (e.g., rotate and shade geometric shapes)	September-April

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

Geometry Shapes		
5.G.1	Calculate the perimeter of regular and irregular polygons	September-April
Geometry Geometric Relationships		
5.G.2	Identify pairs of similar triangles	September-April
5.G.3	Identify the ratio of corresponding sides of similar triangles	September-April
5.G.4	Classify quadrilaterals by properties of their angles and sides	September-April
5.G.5	Know that the sum of the interior angles of a quadrilateral is 360 degrees	September-April
5.G.6	Classify triangles by properties of their angles and sides	September-April
5.G.7	Know that the sum of the interior angles of a triangle is 180 degrees	September-April
5.G.8	Find a missing angle when given two angles of a triangle	September-April
5.G.9	Identify pairs of congruent triangles	September-April
5.G.10	Identify corresponding parts of congruent triangles	September-April
Geometry Transformational Geometry		
5.G.11	Identify and draw lines of symmetry of basic geometric shapes	September-April
Geometry Coordinate Geometry		
5.G.12	Identify and plot points in the first quadrant	May-June
5.G.13	Plot points to form basic geometric shapes (identify and classify)	May-June
5.G.14	Calculate perimeter of basic geometric shapes drawn on a coordinate plane (rectangles and shapes composed of rectangles having sides with integer lengths and parallel to the axes)	May-June
Measurement Units of Measurement		
5.M.1	Use a ruler to measure to the nearest inch, $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ inch	September-April
5.M.2	Identify customary equivalent units of length	September-April
5.M.3	Measure to the nearest centimeter	September-April
5.M.4	Identify equivalent metric units of length	September-April
5.M.5	Convert measurement within a given system	September-April
Measurement Tools and Methods		
5.M.6	Determine the tool and technique to measure with an appropriate level of precision: lengths and angles	September-April
Measurement Units		
5.M.7	Calculate elapsed time in hours and minutes	September-April
5.M.8	Measure and draw angles using a protractor	September-April

Measurement Estimation		
5.M.9	Determine personal references for customary units of length (e.g., your pace is approximately 3 feet, your height is approximately 5 feet, etc.)	September-April
5.M.10	Determine personal references for metric units of length	September-April
5.M.11	Justify the reasonableness of estimates	September-April
Statistics and Probability Collection of Data		
5.S.1	Collect and record data from a variety of sources (e.g., newspapers, magazines, polls, charts, and surveys)	September-April
Statistics and Probability Organization and Display of Data		
5.S.2	Display data in a line graph to show an increase or decrease over time	September-April
Statistics and Probability Analysis of Data		
5.S.3	Calculate the mean for a given set of data and use to describe a set of data	September-April
Statistics and Probability Predictions from Data		
5.S.4	Formulate conclusions and make predictions from graphs	September-April
Statistics and Probability Probability		
5.S.5	List the possible outcomes for a single-event experiment	May-June
5.S.6	Record experiment results using fractions/ratios	May-June
5.S.7	Create a sample space and determine the probability of a single event, given a simple experiment (e.g., rolling a number cube)	May-June

Key to	5.N.22
Performance	5 = 5th Grade
Indicator	N = Number Sense & Operations
Code:	22 = Performance Indicator Number

Grade 6

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations Number Systems		
6.N.1	Read and write whole numbers to trillions	September-April
6.N.2	Define and identify the commutative and associative properties of addition and multiplication	September-April
6.N.3	Define and identify the distributive property of multiplication over addition	September-April
6.N.4	Define and identify the identity and inverse properties of addition and multiplication	September-April
6.N.5	Define and identify the zero property of multiplication	September-April
6.N.6	Understand the concept of rate	September-April
6.N.7	Express equivalent ratios as a proportion	September-April
6.N.8	Distinguish the difference between rate and ratio	September-April
6.N.9	Solve proportions using equivalent fractions	September-April
6.N.10	Verify the proportionality using the product of the means equals the product of the extremes	September-April
6.N.11	Read, write, and identify percents of a whole (0% to 100%)	September-April
6.N.12	Solve percent problems involving percent, rate, and base	September-April
6.N.13	Define absolute value and determine the absolute value of rational numbers (including positive and negative)	September-April
6.N.14	Locate rational numbers on a number line (including positive and negative)	September-April
6.N.15	Order rational numbers (including positive and negative)	September-April
Number Sense and Operations Operations		
6.N.16	Add and subtract fractions with unlike denominators	September-April
6.N.17	Multiply and divide fractions with unlike denominators	September-April
6.N.18	Add, subtract, multiply, and divide mixed numbers with unlike denominators	September-April
6.N.19	Identify the multiplicative inverse (reciprocal) of a number	September-April
6.N.20	Represent fractions as terminating or repeating decimals	September-April
6.N.21	Find multiple representations of rational numbers (fractions, decimals, and percents 0 to 100)	September-April
6.N.22	Evaluate numerical expressions using order of operations (may include exponents of two and three)	September-April
6.N.23	Represent repeated multiplication in exponential form	September-April
6.N.24	Represent exponential form as repeated multiplication	September-April
6.N.25	Evaluate expressions having exponents where the power is an exponent of one, two, or three	September-April

Number Sense and Operations Estimation		
6.N.26	Estimate a percent of quantity (0% to 100%)	September-April
6.N.27	Justify the reasonableness of answers using estimation (including rounding)	September-April
Algebra Variables and Expressions		
6.A.1	Translate two-step verbal expressions into algebraic expressions	September-April
6.A.2*	Use substitution to evaluate algebraic expressions (may include exponents of one, two, and three)	September-April
Algebra Equations and Inequalities		
6.A.3*	Translate two-step verbal sentences into algebraic equations	September-April
6.A.4*	Solve and explain two-step equations involving whole numbers using inverse operations	September-April
6.A.5*	Solve simple proportions within context	September-April
6.A.6	Evaluate formulas for given input values (circumference, area, volume, distance, temperature, interest, etc.)	September-April
Geometry Shapes		
6.G.1	Calculate the length of corresponding sides of similar triangles, using proportional reasoning	September-April
6.G.2	Determine the area of triangles and quadrilaterals (squares, rectangles, rhombi, and trapezoids) and develop formulas	September-April
6.G.3	Use a variety of strategies to find the area of regular and irregular polygons	September-April
6.G.4	Determine the volume of rectangular prisms by counting cubes and develop the formula	September-April
6.G.5	Identify radius, diameter, chords, and central angles of a circle	September-April
6.G.6	Understand the relationship between the diameter and radius of a circle	September-April
6.G.7	Determine the area and circumference of a circle, using the appropriate formula	September-April
6.G.8	Calculate the area of a sector of a circle, given the measure of a central angle and the radius of the circle	September-April

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

6.G.9	Understand the relationship between the circumference and the diameter of a circle	September-April
Geometry		
Coordinate Geometry		
6.G.10*	Identify and plot points in all four quadrants	September-April
6.G.11*	Calculate the area of basic polygons drawn on a coordinate plane (rectangles and shapes composed of rectangles having sides with integer lengths)	September-April
Measurement		
Units of Measurement		
6.M.1	Measure capacity and calculate volume of a rectangular prism	September-April
6.M.2	Identify customary units of capacity (cups, pints, quarts, and gallons)	September-April
6.M.3	Identify equivalent customary units of capacity (cups to pints, pints to quarts, and quarts to gallons)	September-April
6.M.4	Identify metric units of capacity (liter and milliliter)	September-April
6.M.5	Identify equivalent metric units of capacity (milliliter to liter and liter to milliliter)	September-April
Measurement		
Tools and Methods		
6.M.6	Determine the tool and technique to measure with an appropriate level of precision: capacity	September-April
Measurement		
Estimation		
6.M.7	Estimate volume, area, and circumference (see figures identified in geometry strand)	September-April
6.M.8	Justify the reasonableness of estimates	September-April
6.M.9	Determine personal references for capacity	September-April
Statistics and Probability		
Collection of Data		
6.S.1	Develop the concept of sampling when collecting data from a population and decide the best method to collect data for a particular question	May-June
Statistics and Probability		
Organization and Display of Data		
6.S.2	Record data in a frequency table	May-June
6.S.3	Construct Venn diagrams to sort data	May-June
6.S.4	Determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, line graph, histogram, or circle graph)	May-June

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

Statistics and Probability Analysis of Data		
6.S.5	Determine the mean, mode, and median for a given set of data	September-April
6.S.6	Determine the range for a given set of data	September-April
6.S.7	Read and interpret graphs	September-April
Statistics and Probability Predictions from Data		
6.S.8	Justify predictions made from data	September-April
Statistics and Probability Probability		
6.S.9*	List possible outcomes for compound events	September-April
6.S.10*	Determine the probability of dependent events	September-April
6.S.11*	Determine the number of possible outcomes for a compound event by using the fundamental counting principle and use this to determine the probabilities of events when the outcomes have equal probability	September-April

Key to	6.A.1
Performance	6 = 6th Grade
Indicator	A =Algebra
Code:	1 = Performance Indicator Number

*This performance indicator was designated as Post-March prior to the 2009–10 school year.

Grade 7

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations Number Systems		
7.N.1	Distinguish between the various subsets of real numbers (counting/natural numbers, whole numbers, integers, rational numbers, and irrational numbers.)	September-April
7.N.2	Recognize the difference between rational and irrational numbers (e.g., explore different approximations of π .)	September-April
7.N.3	Place rational and irrational numbers (approximations) on a number line and justify the placement of the numbers	September-April
7.N.4	Develop the laws of exponents for multiplication and division	September-April
7.N.5	Write numbers in scientific notation	September-April
7.N.6	Translate numbers from scientific notation into standard form	September-April
7.N.7	Compare numbers written in scientific notation	September-April
Number Sense and Operations Number Theory		
7.N.8	Find the common factors and greatest common factor of two or more numbers	September-April
7.N.9	Determine multiples and least common multiple of two or more numbers	September-April
7.N.10	Determine the prime factorization of a given number and write in exponential form	September-April
Number Sense and Operations Operations		
7.N.11	Simplify expressions using order of operations. Note: Expressions may include absolute value and/or integral exponents greater than 0	September-April
7.N.12	Add, subtract, multiply, and divide integers	September-April
7.N.13	Add and subtract two integers (with and without the use of a number line)	September-April
7.N.14	Develop a conceptual understanding of negative and zero exponents with a base of ten and relate to fractions and decimals (e.g., $10^{-2} = .01 = 1/100$)	September-April
7.N.15	Recognize and state the value of the square root of a perfect square (up to 225)	September-April
7.N.16	Determine the square root of non-perfect squares using a calculator	September-April
7.N.17	Classify irrational numbers as non-repeating/non-terminating decimals	September-April

Number Sense and Operations		
Estimation		
7.N.18	Identify the two consecutive whole numbers between which the square root of a non-perfect square whole number less than 225 lies (with and without the use of a number line)	September-April
7.N.19	Justify the reasonableness of answers using estimation	September-April
Algebra		
Variables and Expressions		
7.A.1	Translate two-step verbal expressions into algebraic expressions	September-April
7.A.2*	Add and subtract monomials with exponents of one	September-April
7.A.3*	Identify a polynomial as an algebraic expression containing one or more terms	September-April
Algebra		
Equations and Inequalities		
7.A.4*	Solve multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation	September-April
7.A.5	Solve one-step inequalities (positive coefficients only) (See 7.G.10)	September-April
7.A.6	Evaluate formulas for given input values (surface area, rate, and density problems)	September-April
Algebra		
Patterns, Relations and Functions		
7.A.7*	Draw the graphic representation of a pattern from an equation or from a table of data	September-April
7.A.8*	Create algebraic patterns using charts/tables, graphs, equations, and expressions	September-April
7.A.9	Build a pattern to develop a rule for determining the sum of the interior angles of polygons	May-June
7.A.10	Write an equation to represent a function from a table of values	May-June
Geometry		
Shapes		
7.G.1	Calculate the radius or diameter, given the circumference or area of a circle	September-April
7.G.2	Calculate the volume of prisms and cylinders, using a given formula and a calculator	September-April
7.G.3	Identify the two-dimensional shapes that make up the faces and bases of three-dimensional shapes (prisms, cylinders, cones, and pyramids)	September-April
7.G.4	Determine the surface area of prisms and cylinders, using a calculator and a variety of methods	September-April

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Geometry		
Geometric Relationships		
7.G.5*	Identify the right angle, hypotenuse, and legs of a right triangle	September-April
7.G.6*	Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean Theorem	September-April
7.G.7	Find a missing angle when given angles of a quadrilateral	September-April
7.G.8*	Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle	September-April
7.G.9*	Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and using a calculator	September-April
Geometry		
Coordinate Geometry		
7.G.10	Graph the solution set of an inequality (positive coefficients only) on a number line (See 7.A.5)	September-April
Measurement		
Units of Measurement		
7.M.1	Calculate distance using a map scale	May-June
7.M.2	Convert capacities and volumes within a given system	September-April
7.M.3	Identify customary and metric units of mass	September-April
7.M.4	Convert mass within a given system	September-April
7.M.5	Calculate unit price using proportions	May-June
7.M.6	Compare unit prices	May-June
7.M.7	Convert money between different currencies with the use of an exchange rate table and a calculator	May-June
7.M.8	Draw central angles in a given circle using a protractor (circle graphs)	September-April
Measurement		
Tools and Methods		
7.M.9	Determine the tool and technique to measure with an appropriate level of precision: mass	September-April
Measurement		
Estimation		
7.M.10	Identify the relationship between relative error and magnitude when dealing with large numbers (e.g., money, population)	September-April
7.M.11	Estimate surface area	September-April
7.M.12	Determine personal references for customary/metric units of mass	September-April
7.M.13	Justify the reasonableness of the mass of an object	September-April

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Statistics and Probability Collection of Data		
7.S.1	Identify and collect data using a variety of methods	September-April
Statistics and Probability Organization and Display of Data		
7.S.2	Display data in a circle graph	September-April
7.S.3	Convert raw data into double bar graphs and double line graphs	September-April
Statistics and Probability Analysis of Data		
7.S.4	Calculate the range for a given set of data	September-April
7.S.5	Select the appropriate measure of central tendency	September-April
7.S.6	Read and interpret data represented graphically (pictograph, bar graph, histogram, line graph, double line/bar graphs, or circle graph.)	September-April
Statistics and Probability Predictions from Data		
7.S.7	Identify and explain misleading statistics and graphs	September-April
Statistics and Probability Probability		
7.S.8	Interpret data to provide the basis for predictions and to establish experimental probabilities	September-April
7.S.9	Determine the validity of sampling methods to predict outcomes	September-April
7.S.10	Predict the outcome of an experiment	September-April
7.S.11	Design and conduct an experiment to test predictions	September-April
7.S.12	Compare actual results to predicted results	September-April

Key to	7.N.12
Performance	7 = 7th Grade
Indicator	N = Number Sense & Operations
Code:	12 = Performance Indicator Number

Grade 8

Performance Indicator Code	Performance Indicator	Sept.-April/ May-June Instructional Periods
Number Sense and Operations Operations		
8.N.1	Develop and apply the laws of exponents for multiplication and division	September-April
8.N.2	Evaluate expressions with integral exponents	September-April
8.N.3	Read, write, and identify percents less than 1% and greater than 100%	September-April
8.N.4	Apply percents to: Tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities	September-April
Number Sense and Operations Estimation		
8.N.5	Estimate a percent of a quantity, given an application	September-April
8.N.6	Justify the reasonableness of answers using estimation	September-April
Algebra Variables and Expressions		
8.A.1	Translate verbal sentences into algebraic inequalities	September-April
8.A.2	Write verbal expressions that match given mathematical expressions	September-April
8.A.3	Describe a situation involving relationships that matches a given graph	September-April
8.A.4	Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	September-April
8.A.5	Use physical models to perform operations with polynomials	September-April
8.A.6	Multiply and divide monomials	September-April
8.A.7	Add and subtract polynomials (integer coefficients)	September-April
8.A.8	Multiply a binomial by a monomial or binomial (integer coefficients)	September-April
8.A.9	Divide a polynomial by a monomial (integer coefficients). Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables	September-April
8.A.10	Factor algebraic expressions using the GCF	September-April
8.A.11	Factor a trinomial in the form ax^2+bx+c ; $a=1$ and c having no more than 3 sets of factors	September-April

Algebra Equations and Inequalities		
8.A.12	Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines	September-April
8.A.13*	Solve multi-step inequalities and graph the solution set on a number line	September-April
8.A.14*	Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number)	September-April
Algebra Patterns, Relations and Functions		
8.A.15	Understand that numerical information can be represented in multiple ways: arithmetically, algebraically, and graphically	September-April
8.A.16	Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line	September-April
8.A.17	Define and use correct terminology when referring to function (domain and range)	May-June
8.A.18	Determine if a relation is a function	May-June
8.A.19	Interpret multiple representations using equation, table of values, and graph	May-June
Algebra Coordinate Geometry		
Geometry Constructions		
8.G.0	Construct the following using a straight edge and compass: Segment congruent to a segment; angle congruent to an angle; perpendicular bisector; and angle bisector	May-June
Geometry Geometric Relationships		
8.G.1	Identify pairs of vertical angles as congruent	September-April
8.G.2	Identify pairs of supplementary and complementary angles	September-April
8.G.3	Calculate the missing angle in a supplementary or complementary pair	September-April
8.G.4	Determine angle pair relationship when given two parallel lines cut by a transversal	September-April

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8.G.5	Calculate the missing angle measurements when given two parallel lines cut by a transversal	September-April
8.G.6	Calculate the missing angle measurements when given two intersecting lines and an angle	September-April
Geometry		
Transformational Geometry		
8.G.7	Describe and identify transformations in the plane, using proper function notation (rotations, reflections, translations, and dilations.)	September-April
8.G.8	Draw the image of a figure under rotations of 90 and 180 degrees	September-April
8.G.9	Draw the image of a figure under a reflection over a given line	September-April
8.G.10	Draw the image of a figure under a translation	September-April
8.G.11	Draw the image of a figure under a dilation	September-April
8.G.12	Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation	September-April
Geometry		
Coordinate Geometry		
8.G.13*	Determine the slope of a line from a graph and explain the meaning of slope as a constant rate of change	September-April
8.G.14*	Determine the y-intercept of a line from a graph and be able to explain the y-intercept	September-April
8.G.15*	Graph a line using a table of values	September-April
8.G.16*	Determine the equation of a line given the slope and the y-intercept	September-April
8.G.17*	Graph a line from an equation in slope-intercept form ($y=mx+b$).	September-April
8.G.18*	Solve systems of equations graphically (only linear, integral solutions, $y=mx+b$ format, no vertical/horizontal lines)	September-April
8.G.19*	Graph the solution set of an inequality on a number line	September-April
8.G.20*	Distinguish between linear and nonlinear equations ax^2+bx+c ; $a=1$ (only graphically)	September-April
8.G.21*	Recognize the characteristics of quadratics in tables, graphs, equations, and situations	September-April
Measurement		
Units of Measurement		
8.M.1	Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems. Note: Also allow Fahrenheit to Celsius and vice versa	September-April

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Key to Performance Indicator Code:	8.N.6 8 = 8th Grade N = Number Sense & Operations 6= Performance Indicator Number
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