

## Appendix B

### Mathematics Content Assessed by FCAT and Item Formats by Benchmark

<b>A: Number Sense, Concepts, and Operations</b>		
<b>1. The student understands the different ways numbers are represented and used in the real-world.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.A.1.2.1 names whole numbers combining 3-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.</p> <p style="text-align: right;">(Assessed with A.1.2.4)</p>	<p>MA.A.1.3.1 associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.</p> <p style="text-align: right;">(Assessed with A.1.3.4)</p>	<p>MA.A.1.4.1 associates verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers, real numbers, and complex numbers.</p> <p style="text-align: right;">(Assessed with A.1.4.4)</p>
<p>MA.A.1.2.2 understands the relative size of whole numbers, commonly used fractions, decimals, and percents.</p> <p style="text-align: right;">Grades 3-4                      MC Grade 5                         GR, MC</p>	<p>MA.A.1.3.2 understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios.</p> <p style="text-align: right;">MC</p>	<p>MA.A.1.4.2 understands the relative size of integers, rational numbers, irrational numbers, and real numbers.</p> <p style="text-align: right;">MC</p>
<p>MA.A.1.2.3 understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.</p> <p style="text-align: right;">(Assessed with A.1.2.4)</p>	<p>MA.A.1.3.3 understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.</p> <p style="text-align: right;">(Assessed with A.1.3.4 and D.2.3.1)</p>	<p>MA.A.1.4.3 understands concrete and symbolic representations of real and complex numbers in real-world situations.</p> <p style="text-align: right;">(Assessed with A.1.4.4)</p>

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<b>A: Number Sense, Concepts, and Operations</b>		
<b>1. The student understands the different ways numbers are represented and used in the real-world. (continued)</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.A.1.2.4 understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents. (Also assesses A.1.2.1 and A.1.2.3)</p> <p style="text-align: right;">Grades 3-4    MC Grade 5    GR, MC</p>	<p>MA.A.1.3.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value. (Also assesses A.1.3.1 and A.1.3.3)</p> <p style="text-align: right;">GR, MC</p>	<p>MA.A.1.4.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, absolute value, and logarithms. (Also assesses A.1.4.1 and A.1.4.3)</p> <p style="text-align: right;">GR, MC</p>
<b>2. The student understands number systems.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.A.2.2.1 uses place-value concepts of grouping based upon powers of ten (thousandths, hundredths, tenths, ones, tens, hundreds, thousands) within the decimal number system.</p> <p style="text-align: right;">Grades 3-4    MC Grade 5    GR</p>	<p>MA.A.2.3.1 understands and uses exponential and scientific notation.</p> <p style="text-align: right;">GR, MC</p>	<p>MA.A.2.4.1 understands and uses the basic concepts of limits and infinity.</p> <p style="text-align: right;">(Not assessed)</p>
<p>MA.A.2.2.2 recognizes and compares the decimal number system to the structure of other number systems such as the Roman numeral system or bases other than ten.</p> <p style="text-align: right;">(Not assessed)</p>	<p>MA.A.2.3.2 understands the structure of number systems other than the decimal number system.</p> <p style="text-align: right;">(Not assessed)</p>	<p>MA.A.2.4.2 understands and uses the real number system.</p> <p style="text-align: right;">(Assessed with A.3.4.1, A.3.4.2, and A.3.4.3)</p>

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<b>A: Number Sense, Concepts, and Operations</b>		
<b>2. The student understands number systems. (continued)</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
		MA.A.2.4.3 understands the structure of the complex number system. (Not assessed)
<b>3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
MA.A.3.2.1 understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division.  <div style="text-align: right;">MC</div>	MA.A.3.3.1 understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers and fractions, including mixed numbers and decimals, including the inverse relationships of positive and negative numbers.  <div style="text-align: right;">MC</div>	MA.A.3.4.1 understands and explains the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships. (Also assesses A.2.4.2)  <div style="text-align: right;">GR, MC</div>
MA.A.3.2.2 selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers.  <div style="text-align: right;">MC</div>	MA.A.3.3.2 selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.  <div style="text-align: right;">GR, MC</div>	MA.A.3.4.2 selects and justifies alternative strategies, such as using properties of numbers, including inverse, identity, distributive, associative, and transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems. (Also assesses A.2.4.2 and A.3.3.2)  <div style="text-align: right;">Grade 9 GR, MC Grade 10 MC</div>

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<b>A: Number Sense, Concepts, and Operations</b>		
<b>3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving. (continued)</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.A.3.2.3 adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 GR, MC</p>	<p>MA.A.3.3.3 adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator.</p> <p style="text-align: right;">GR, MC</p>	<p>MA.A.3.4.3 adds, subtracts, multiplies, and divides real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. (Also assesses A.2.4.2)</p> <p style="text-align: right;">GR, MC</p>
<b>4. The student uses estimation in problem solving and computation.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.A.4.2.1 uses and justifies different estimation strategies in a real-world problem situation and determines the reasonableness of results of calculations in a given problem situation. (Also assesses B.3.2.1)</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 SR</p>	<p>MA.A.4.3.1 uses estimation strategies to predict results and to check the reasonableness of results. (Also assesses A.4.2.1, B.2.3.1, and B.3.3.1)</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 SR</p>	<p>MA.A.4.4.1 uses estimation strategies in complex situations to predict results and to check the reasonableness of results. (Also assesses A.4.2.1 and B.3.4.1)</p> <p style="text-align: right;">Grade 9 MC Grade 10 SR</p>
<p>MA.A.5.2.1 understands and applies basic number theory concepts, including primes, composites, factors, and multiples.</p> <p style="text-align: right;">MC</p>	<p>MA.A.5.3.1 uses concepts about numbers, including primes, factors, and multiples, to build number sequences.</p> <p style="text-align: right;">(Assessed with D.1.3.1 and D.1.3.2)</p>	<p>MA.A.5.4.1 applies special number relationships such as sequences and series to real-world problems.</p> <p style="text-align: right;">(Not assessed)</p>

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### Mathematics Content Assessed by FCAT and Item Formats by Benchmark

<b>B: Measurement</b>		
<b>1. The student measures quantities in the real-world and uses the measures to solve problems.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.B.1.2.1 uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.</p> <p style="text-align: right;">Grades 3-4 not assessed Grade 5 assessed with C.2.2.1</p>	<p>MA.B.1.3.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids and cylinders. (Also assesses B.1.2.2 and B.2.3.1)</p> <p style="text-align: right;">Grades 6-7 GR, MC Grade 8 GR, SR</p>	<p>MA.B.1.4.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids. (Also assesses B.1.2.2)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 GR, SR</p>
<p>MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 GR, MC</p>	<p>MA.B.1.3.2 uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures. (Also assesses B.1.2.2 and B.2.3.1)</p> <p style="text-align: right;">Grades 6-7 GR, MC Grade 8 GR, SR</p>	<p>MA.B.1.4.2 uses concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc lengths. (Also assesses B.1.2.2)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 SR, MC</p>
	<p>MA.B.1.3.3 understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume. (Also assesses C.2.3.1)</p> <p style="text-align: right;">GR, MC</p>	<p>MA.B.1.4.3 relates the concepts of measurement to similarity and proportionality in real-world situations.</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 assessed with C.2.4.1</p>
	<p>MA.B.1.3.4 constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems. (Also assesses B.2.3.1)</p> <p style="text-align: right;">GR, MC</p>	

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<b>B: Measurement</b>		
<b>2. The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.B.2.2.1 uses direct (measured) and indirect (not measured) measures to calculate and compare measurable characteristics.</p> <p style="text-align: right;">Grades 3-4      MC Grade 5      GR, MC</p>	<p>MA.B.2.3.1 uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.</p> <p style="text-align: center;">(Assessed with A.4.3.1, B.1.3.1, B.1.3.2, and B.1.3.4)</p>	<p>MA.B.2.4.1 selects and uses direct (measured) or indirect (not measured) methods of measurement as appropriate.</p> <p style="text-align: right;">Grade 9      GR, MC Grade 10      MC</p>
<p>MA.B.2.2.2 selects and uses appropriate standard and nonstandard units of measurement, according to type and size. (Also assesses B.4.2.1)</p> <p style="text-align: right;">MC</p>	<p>MA.B.2.3.2 solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system.</p> <p style="text-align: right;">GR, MC</p>	<p>MA.B.2.4.2 solves real-world problems involving rated measures (miles per hour, feet per second). (Also assesses B.2.3.2)</p> <p style="text-align: right;">GR, MC</p>
<b>3. The student estimates measurements in real-world problem situations.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.B.3.2.1 solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume.</p> <p style="text-align: center;">(Assessed with A.4.2.1)</p>	<p>MA.B.3.3.1 solves real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume, in either customary or metric units.</p> <p style="text-align: center;">(Assessed with A.4.3.1)</p>	<p>MA.B.3.4.1 solves real-world and mathematical problems involving estimates of measurements, including length, time, weight/mass, temperature, money, perimeter, area, and volume, and estimates the effects of measurement errors on calculations.</p> <p style="text-align: center;">(Assessed with A.4.4.1)</p>

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<b>B: Measurement</b>		
<b>4. The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.B.4.2.1 determines which units of measurement, such as seconds, square inches, and dollars per tankful, to use with answers to real-world problems.</p> <p style="text-align: right;">(Assessed with B.2.2.2)</p>	<p>MA.B.4.3.1 selects appropriate units of measurement and determines and applies significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.)</p> <p style="text-align: right;">(Not assessed)</p>	<p>MA.B.4.4.1 determines the level of accuracy and precision, including absolute and relative errors or tolerance, required in real-world measurement situations.</p> <p style="text-align: right;">(Not assessed)</p>
<p>MA.B.4.2.2 selects and uses appropriate instruments and technology, including scales, rulers, thermometers, measuring cups, protractors, and gauges, to measure in real-world situations.</p> <p style="text-align: right;">MC</p>	<p>MA.B.4.3.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.</p> <p style="text-align: right;">(Not assessed)</p>	<p>MA.B.4.4.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.</p> <p style="text-align: right;">(Not assessed)</p>

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<b>C: Geometry and Spatial Sense</b>		
<b>1. The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.C.1.2.1 given a verbal description, draws and/or models two- and three-dimensional shapes, and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures.</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 SR</p>	<p>MA.C.1.3.1 understands the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions. (Also assesses C.1.2.1)</p> <p style="text-align: right;">GR, MC</p>	<p>MA.C.1.4.1 uses properties and relationships of geometric shapes to construct formal and informal proofs. (Also assesses C.1.2.1 and C.1.3.1)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 GR, MC, SR</p>
<b>2. The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.C.2.2.1 understands the concepts of spatial relationships, symmetry, reflections, congruency, and similarity. (Also assesses B.1.2.2, C.1.2.1, and C.3.2.1)</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 MC, ER</p>	<p>MA.C.2.3.1 understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements. (Also assesses B.1.3.3, C.1.2.1, C.1.3.1, and C.3.3.1)</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 GR, MC, ER</p>	<p>MA.C.2.4.1 understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals. (Also assesses B.1.4.3, C.1.4.1, and C.3.4.1)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 GR, MC, ER</p>
<p>MA.C.2.2.2 predicts, illustrates, and verifies which figures could result from a flip, slide, or turn of a given figure.</p> <p style="text-align: right;">MC</p>	<p>MA.C.2.3.2 predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles).</p> <p style="text-align: right;">Grade 6 not assessed Grades 7-8 MC</p>	<p>MA.C.2.4.2 analyzes and applies geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).</p> <p style="text-align: right;">Grade 9 not assessed Grade 10 MC</p>

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<b>C: Geometry and Spatial Sense</b>		
<b>3. The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.C.3.2.1 represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems. (Also assesses C.2.2.1)</p> <p style="text-align: right;">Grades 3-4      MC Grade 5      MC, SR</p>	<p>MA.C.3.3.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems. (Also assesses C.2.3.1)</p> <p style="text-align: right;">Grades 6-7      MC Grade 8      MC, SR</p>	<p>MA.C.3.4.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry. (Also assesses C.2.4.1)</p> <p style="text-align: right;">Grade 9      MC Grade 10      MC, SR</p>
<p>MA.C.3.2.2 identifies and plots positive ordered pairs (whole numbers) in a rectangular coordinate system (graph).</p> <p style="text-align: right;">Grades 3-4      MC Grade 5      MC, SR</p>	<p>MA.C.3.3.2 identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines.</p> <p style="text-align: right;">Grades 6-7      MC Grade 8      MC, SR</p>	<p>MA.C.3.4.2 using a rectangular coordinate system (graph), applies and algebraically verifies properties of two- and three-dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity. (Also assesses C.3.3.2 and D.2.4.1)</p> <p style="text-align: right;">Grade 9      GR, MC Grade 10      GR, MC, SR</p>

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<b>D: Algebraic Thinking</b>		
<b>1. The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.D.1.2.1 describes a wide variety of patterns and relationships through models, such as manipulatives, tables, graphs, and rules using algebraic symbols. (Also assesses D.1.2.2)</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 GR, MC</p>	<p>MA.D.1.3.1 describes a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations, and inequalities. (Also assesses A.5.3.1)</p> <p style="text-align: right;">GR, MC</p>	<p>MA.D.1.4.1 describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs.</p> <p style="text-align: right;">GR, MC</p>
<p>MA.D.1.2.2 generalizes a pattern, relation, or function to explain how a change in one quantity results in a change in another. (Also assesses D.1.2.1)</p> <p style="text-align: right;">Grades 3-4 not assessed Grade 5 SR</p>	<p>MA.D.1.3.2 creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships. (Also assesses A.5.3.1)</p> <p style="text-align: right;">Grades 6-7 GR, MC Grade 8 GR, MC, SR</p>	<p>MA.D.1.4.2 determines the impact when changing parameters of given functions.</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 SR</p>
<b>2. The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.</b>		
<p>MA.D.2.2.1 represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal phrases translated from symbolic expressions, etc. (Also assesses D.2.2.2)</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 MC, SR</p>	<p>MA.D.2.3.1 represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities. (Also assesses A.1.3.3)</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 MC, SR</p>	<p>MA.D.2.4.1 represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.</p> <p style="text-align: right;">(Assessed with C.3.4.2 and D.2.4.2)</p>
<p>MA.D.2.2.2 uses informal methods, such as physical models and graphs, to solve real-world problems involving equations and inequalities. (Also assesses D.2.2.1)</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 GR, MC</p>	<p>MA.D.2.3.2 uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.</p> <p style="text-align: right;">GR, MC</p>	<p>MA.D.2.4.2 uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices. (Also assesses D.2.3.1, D.2.3.2, and D.2.4.1)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 GR, MC, SR</p>

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<b>E: Data Analysis and Probability</b>		
<b>1. The student understands and uses the tools of data analysis for managing information.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.E.1.2.1 solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts. (Also assesses E.1.2.3)</p> <p style="text-align: right;">Grades 3-4      MC Grade 5      GR, MC, ER</p>	<p>MA.E.1.3.1 collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, and bar graphs, to determine how different ways of presenting data can lead to different interpretations. (Also assesses E.1.3.3)</p> <p style="text-align: right;">Grades 6-7      GR, MC Grade 8      GR, MC, ER</p>	<p>MA.E.1.4.1 interprets data that have been collected, organized, and displayed in charts, tables, and plots. (Also assesses E.1.3.1 and E.1.4.3)</p> <p style="text-align: right;">Grade 9      GR, MC Grade 10      GR, MC, ER</p>
<p>MA.E.1.2.2 determines range, mean, median, and mode from sets of data. (Also assesses E.1.2.3)</p> <p style="text-align: right;">Grades 3-4      MC Grade 5      GR, MC</p>	<p>MA.E.1.3.2 understands and applies the concepts of range and central tendency (mean, median, and mode). (Also assesses E.1.3.3)</p> <p style="text-align: right;">GR, MC</p>	<p>MA.E.1.4.2 calculates measures of central tendency (mean, median, and mode) and dispersion (range, standard deviation, and variance) for complex sets of data and determines the most meaningful measure to describe the data. (Also assesses E.1.4.3)</p> <p style="text-align: right;">GR, MC</p>
<p>MA.E.1.2.3 analyzes real-world data to recognize patterns and relationships of the measures of central tendency using tables, charts, histograms, bar graphs, line graphs, pictographs, and circle graphs generated by appropriate technology, including calculators and computers.</p> <p style="text-align: right;">(Assessed with E.1.2.1 and E.1.2.2)</p>	<p>MA.E.1.3.3 analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.</p> <p style="text-align: right;">(Assessed with E.1.3.1 and E.1.3.2)</p>	<p>MA.E.1.4.3 analyzes real-world data and makes predictions of larger populations by applying formulas to calculate measures of central tendency and dispersion using the sample population data, and using appropriate technology, including calculators and computers.</p> <p style="text-align: right;">(Assessed with E.1.4.1 and E.1.4.2)</p>

Unless otherwise noted, the item format or formats listed for an individual benchmark apply to all grades covered by that benchmark.

MC = Multiple Choice; GR = Gridded Response; SR = Short Response; ER = Extended Response

## Appendix B

### Mathematics Content Assessed by FCAT and Item Formats by Benchmark

<b>E: Data Analysis and Probability</b>		
<b>2. The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.E.2.2.1 uses models, such as tree diagrams, to display possible outcomes and to predict events.</p> <p style="text-align: right;">Grades 3-4 MC Grade 5 SR</p>	<p>MA.E.2.3.1 compares experimental results with mathematical expectations of probabilities.</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 SR</p>	<p>MA.E.2.4.1 determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations. (Also assesses E.2.4.2)</p> <p style="text-align: right;">GR, MC</p>
<p>MA.E.2.2.2 predicts the likelihood of simple events occurring.</p> <p style="text-align: right;">MC</p>	<p>MA.E.2.3.2 determines odds for and odds against a given situation. (Also assesses E.2.2.2)</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 GR, MC</p>	<p>MA.E.2.4.2 determines the probability for simple and compound events as well as independent and dependent events.</p> <p style="text-align: right;">(Assessed with E.2.4.1)</p>
<b>3. The student uses statistical methods to make inferences and valid arguments about real-world situations.</b>		
Grades 3-5 Benchmark	Grades 6-8 Benchmark	Grades 9-10 Benchmark
<p>MA.E.3.2.1 designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs. (Also assesses E.3.2.2)</p> <p style="text-align: right;">Grades 3-4 not assessed Grade 5 MC, SR</p>	<p>MA.E.3.3.1 formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts. (Also assesses E.3.3.2)</p> <p style="text-align: right;">Grades 6-7 MC Grade 8 MC, SR</p>	<p>MA.E.3.4.1 designs and performs real-world statistical experiments that involve more than one variable, then analyzes results and reports findings. (Also assesses E.3.3.1 and E.3.4.2)</p> <p style="text-align: right;">Grade 9 GR, MC Grade 10 GR, MC, SR</p>
<p>MA.E.3.2.2 uses statistical data about life situations to make predictions, and justifies reasoning.</p> <p style="text-align: right;">(Assessed with E.3.2.1)</p>	<p>MA.E.3.3.2 identifies the common uses and misuses of probability and statistical analysis in the everyday world.</p> <p style="text-align: right;">(Assessed with E.3.3.1)</p>	<p>MA.E.3.4.2 explains the limitations of using statistical techniques and data in making inferences and valid arguments.</p> <p style="text-align: right;">(Assessed with E.3.4.1)</p>

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MC = Multiple Choice; GR = Gridded Response; SR = Short Response; ER = Extended Response