

Prentice Hall Mathematics, Pre-Algebra © 2009
Correlated to:
Kentucky Combined Curriculum Document for Grade 8

KENTUCKY COMBINED CURRICULUM DOCUMENT FOR GRADE 8	PRENTICE HALL MATHEMATICS, PRE-ALGEBRA © 2008
<p>Big Idea: Number Properties and Operations</p> <p>Middle grades students understand fractions, decimals, percents and integers, compare them and locate their relative positions on a number line. They develop and use proportional reasoning to solve problems. They work with large numbers and small numbers. They use factors, multiples and prime factorizations. They perform arithmetic operations with fractions, decimals and integers, use properties in computation, develop fluency and develop strategies to estimate the result of operations on rational numbers.</p> <p>Academic Expectations</p> <p>2.7 Students understand number concepts and use numbers appropriately and accurately.</p> <p>2.8 Students understand various mathematical procedures and use them appropriately and accurately.</p>	
Program of Studies: Understandings	
<p>MA-8-NPO-U-1</p> <p>Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.</p>	<p>SE/TE: 205-208, 229-230, 589-591, 627, 630</p>
Program of Studies: Skills and Concepts	
<p>MA-8-NPO-S-NS1</p> <p>Students will continue to develop number sense to include irrational numbers (e.g., square roots, cube roots, π).</p>	<p>SE/TE: 205-208, 229-230, 589-591, 627, 630</p>
<p>MA-8-NPO-S-NS2</p> <p>Students will provide examples of, describe and compare irrational and rational numbers (e.g., magnitude, order on a number line, scientific notation, very large and very small integers, numbers close to zero).</p>	<p>SE/TE: 205-208, 229-230, 237-240, 283, 286, 589-591, 627, 630</p>
<p>MA-8-NPO-S-NS3</p> <p>Students will describe and provide multiple representations of numbers (rational, square roots, cube roots and π) in a variety of equivalent forms using models, diagrams and symbols based on real-world and/or mathematical situations.</p>	<p>SE/TE: 24-34, 44-49, 60-62, 205-208, 229-230, 252-256, 284, 286, 589-591, 627, 630</p>
Related Core Content for Assessment	
<p>MA-08-1.1.1</p> <p>Students will provide examples of and identify rational numbers and irrational numbers (square roots and π only).</p> <p>DOK 1</p>	<p>SE/TE: 205-208, 229-230, 589-591, 627, 630</p>
<p><i>MA-08-1.1.2</i></p> <p><i>Students will describe and provide examples of representations of numbers (rational, square roots, and π) and operations in a variety of equivalent forms using models, diagrams and symbols (e.g., number lines, 10 by 10 grids, rectangular arrays, number sentences) based on real-world and mathematical problems.</i></p>	<p>SE/TE: 24-34, 44-49, 60-62, 205-208, 229-230, 252-256, 284, 286, 589-591, 627, 630</p>

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Program of Studies: Understandings	
MA-8-NPO-U-2 Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life.	SE/TE: 8-13, 24-34, 44-49, 59-60, 62, 247-256, 284-286
Program of Studies: Skills and Concepts	
MA-8-NPO-S-NO1 Students will add, subtract, multiply, divide and apply order of operations (including positive whole number exponents) using rational numbers to solve real-world problems	SE/TE: 8-13, 24-34, 44-49, 59-60, 62, 247-256, 284-286
MA-8-NPO-S-NO2 Students will determine and explain the inverse relationship between addition and subtraction, multiplication and division, or raising to an exponent and taking the root of a number.	SE/TE: 88-90, 94-95, 121-122
MA-8-NPO-S-PNO1 Students will identify and use the commutative properties, the associative properties, the identity properties and the inverse properties for addition and multiplication, the distributive property and inverse relationships to justify a given step in solving problems.	SE/TE: 68-77, 119-120, 122
Related Core Content for Assessment	
MA-08-1.1.3 Students will convert, compare and order multiple numerical representations (e.g., fractions, decimals, percentages) of rational numbers and irrational numbers (square roots and π only). DOK 2	SE/TE: 205-208, 221, 229-230, 237-245, 283-284, 286
MA-08-1.3.1 Students will add, subtract, multiply and divide rational numbers to solve real-world problems and apply order of operations (including positive whole number exponents) to simplify numerical expressions. DOK 2	SE/TE: 8-13, 24-34, 44-49, 59-60, 62, 247-256, 284-286
<i>MA-08-1.3.2</i> <i>Students will explain how operations (additions and subtraction; multiplication and division; squaring and taking the square root of a number) are inversely related.</i>	SE/TE: 88-90, 94-95, 121-122

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Program of Studies: Understandings	
MA-8-NPO-U-3 Students will understand that computing fluently and making reasonable estimates with fractions, decimals, percents and integers increases the ability to solve realistic problems encountered in everyday life.	SE/TE: 129-138, 171-172, 174, 246
Program of Studies: Skills and Concepts	
MA-8-NPO-S-E1 Students will estimate to solve real-world and/or mathematical problems with rational numbers and common irrational numbers, checking for reasonable and appropriate computational results.	SE/TE: 129-138, 171-172, 174, 246
MA-8-NPO-S-E2 Students will estimate with large and small quantities of objects.	SE/TE: 129-138, 171-172, 174, 246
Related Core Content for Assessment	
MA-08-1.2.1 Students will estimate to solve real-world and mathematical problems with rational numbers, checking for reasonable and appropriate computational results. DOK 2	SE/TE: 129-138, 171-172, 174, 246
MA-08-1.5.2 Students will identify the use of properties (commutative properties of addition and multiplication, the associative properties of addition and multiplication, the identity properties for addition and multiplication, inverse properties and the distributive property of multiplication over addition and subtraction) to justify a given step in solving problems. DOK 1	SE/TE: 68-81, 119-120, 122
Program of Studies: Understandings	
MA-8-NPO-U-4 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.	SE/TE: 298-302, 343, 346
Program of Studies: Skills and Concepts	
MA-8-NPO-S-RP1 Students will use percentages and proportions in problem solving, including consumer applications (e.g., simple interest, percentages of increase and decrease, discounts, unit pricing, sale prices).	SE/TE: 298-302, 314-323, 329-337, 343-346

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MA-8-NPO-S-RP2 Students will derive and use formulas for various rates (e.g., distance/time, miles per hour).	SE/TE: 293-297, 343, 346
Related Core Content for Assessment	
MA-08-1.4.1 Students will apply ratios and proportional reasoning to solve real-world problems (e.g., percents, constant rate of change, unit pricing, percent of increase or decrease). DOK 3	SE/TE: 298-302, 314-323, 329-337, 343-346
Big Idea: Measurement Students continue to measure and estimate measurements including fractions and decimals. They use formulas to find perimeter, area, circumference and volume. They use rulers and protractors. They use US Customary and metric units of measurement. They use the Pythagorean theorem. Academic Expectations 2.10 Students understand measurement concepts and use measurements appropriately and accurately. 2.11 Students understand mathematical change concepts and use them appropriately and accurately.	
Program of Studies: Understandings	
MA-8-M-U-1 Students will understand that there are two major measurement systems (U.S. Customary and metric) and either may be used to solve problems.	SE/TE: 158-162, 258-262, 285-286, 293-294, 296-297
Program of Studies: Skills and Concepts	
MA-8-M-S-SM1 Students will provide examples of and apply money, time and U.S. Customary and metric units of measurement to solve real-world problems.	SE/TE: 158-162, 258-262, 285-286, 293-294, 296-297
Related Core Content for Assessment	
MA-08-2.2.1 Students will convert units within the same measurement system and use these units to solve real-world problems. DOK 2	SE/TE: 158-162, 258-262, 285-286, 293-294, 296-297
Program of Studies: Understandings	
MA-8-M-U-2 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.	SE/TE: 158-162, 258-262, 285-286, 293-294, 296-297
MA-8-M-U-3 Students will understand that measurements are determined by using appropriate techniques, tools, formulas and degree of accuracy needed for the situation.	SE/TE: 164-165

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Program of Studies: Skills and Concepts	
MA-8-M-S-MPA1 Students will read and use measurement tools (e.g., rulers, scales, protractors, angle rulers).	SE/TE: 164-165, 468-469
MA-8-M-S-MPA2 Students will estimate and find angle measures and segment measures.	SE/TE: 468-469
MA-8-M-S-MPA3 Students will determine measures of the lengths of sides and the perimeter both regular and irregular shapes, including lengths to the nearest sixteenth of an inch or the nearest millimeter.	
MA-8-M-S-MPA4 Students will determine the area of triangles and quadrilaterals.	SE/TE: 526-537, 579-580, 582
MA-8-M-S-MPA5 Students will determine the area and circumference of circles.	SE/TE: 490-494, 519-520
MA-8-M-S-MPA6 Students will develop and apply the Pythagorean theorem.	SE/TE: 592-597, 628, 630
MA-8-M-S-MPA7 Students will develop and apply formulas for volume and surface area of cubes, cylinders and right rectangular prisms; investigate relationships between and among them.	SE/TE: 551-567, 572-577, 580-582
MA-8-M-S-MPA8 Students will estimate measurements in standard units in real world and/or mathematical situations.	SE/TE: 159-165, 173-174, 260
Related Core Content for Assessment	
MA-08-2.1.3 Students will evaluate the measures of angles by estimation, measurement with a protractor or angle ruler and determine angle measures in mathematical and/or real-world situations (e.g., supplementary, exterior, vertical). DOK 2	SE/TE: 468-473, 518, 520

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MA-08-2.1.1 Students will measure lengths (to the nearest sixteenth of an inch or the nearest millimeter) and will determine and use in real-world or mathematical problems: <ul style="list-style-type: none"> • area and perimeter of triangles and quadrilaterals; • area and circumference of circles; • area and perimeter of compound figures composed of triangles, quadrilaterals and circles; • area from circumference or perimeter and • circumference or perimeter from area. DOK 3	SE/TE: 10, 146-149, 172, 174, 490-494, 519-520, 526-543, 579-580, 582
<i>MA-08-2.1.2</i> <i>Students will estimate measurements in standard units in real-world and mathematical problems.</i>	SE/TE: 159-165, 173-174, 260
MA-08-2.1.4 Students will apply formulas to determine the volume of right rectangular prisms in real-world problems. DOK 2	SE/TE: 563-567, 581-582
<i>MA-08-2.1.5</i> <i>Students will use formulas to find surface area of right rectangular prisms in real-world and mathematical problems.</i>	SE/TE: 551-557, 580, 582
Program of Studies: Skills and Concepts	
MA-8-M-S-MPA9 Students will explain how measurements and measurement formulas are related or different (perimeter and area; rate, time and distance; circumference and area of a circle).	SE/TE: 146-149, 172, 174
Related Core Content for Assessment	
MA-08-2.1.6 Students will apply the Pythagorean theorem to determine the length of a hypotenuse. DOK 2	SE/TE: 592-597, 628, 630

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<p>Big Idea: Geometry Middle grade students expand analysis of two-dimensional shapes and three-dimensional shapes. They translate shapes in a coordinate plane. They extend work with congruent and similar figures, including proportionality.</p> <p>Academic Expectation</p> <p>2.8 Students understand various mathematical procedures and use them appropriately and accurately.</p> <p>2.9 Students understand space and dimensionality concepts and use them appropriately and accurately.</p>	
Program of Studies: Understandings	
<p>MA-8-G-U-1 Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.</p>	SE/TE: 544-550, 568-571, 580-582
Program of Studies: Skills and Concepts	
<p>MA-8-G-S-SR1 Students will describe and provide examples of basic geometric elements that include points, segments, rays, lines, angles and planes; use these elements in real-world and/or mathematical situations.</p>	SE/TE: 426-467, 495-499, 517, 520
<p>MA-8-G-S-SR2 Students will identify and compare properties of two-dimensional figures (circles; triangles: acute, right, obtuse, scalene, isosceles, equilateral; quadrilaterals: square, rectangle, rhombus, parallelogram, trapezoid; regular/irregular polygons); apply these properties and figures to solve real-world problems.</p>	SE/TE: 474-479, 518, 520
<p>MA-8-G-S-SR3 Students will compare properties of three-dimensional figures (spheres, cones, cylinders, prisms, pyramids); apply these properties and figures to solve real-world problems.</p>	SE/TE: 544-567, 580, 582
<p>MA-8-G-S-SR4 Students will provide examples of and apply congruent and similar two-dimensional figures to solve real-world problems.</p>	SE/TE: 303-308, 344, 346, 484-489, 518, 520
Related Core Content for Assessment	
<p><i>MA-08-3.1.1</i> <i>Students will describe and provide examples of basic geometric elements that include points, segments, rays, lines, angles, and planes and will use these elements in real-world and mathematical problems.</i></p>	SE/TE: 462-467, 495-499, 517, 520

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<p>MA-08-3.1.2 Students will identify and compare properties of two-dimensional figures (circles, triangles acute, right, obtuse, scalene, isosceles, equilateral), quadrilaterals [square, rectangle, rhombus, parallelogram, trapezoid], regular/irregular polygons), and will apply these properties and figures to solve real-world and mathematical problems. DOK 2</p>	<p>SE/TE: 474-479, 518, 520</p>
<p>MA-08-3.1.3 Students will compare properties of three-dimensional figures (spheres, cones, cylinders, prisms, pyramids), and will apply these properties and figures to solve real-world and mathematical problems. DOK 2</p>	<p>SE/TE: 544-567, 580, 582</p>
<p>MA-08-3.1.4 Students will:</p> <ul style="list-style-type: none"> • provide examples of congruent and similar figures; • apply congruent and similar figures to solve real-world and mathematical problems and • apply proportional reasoning to solve problems involving scale drawings and proportional figures. <p>DOK 3</p>	<p>SE/TE: 303-308, 344, 346, 484-489, 518, 520</p>
<p>Program of Studies: Understandings</p>	
<p>MA-8-G-U-2 Students will understand that representational systems, including coordinate geometry, are means for specifying locations and describing spatial relationships and are organizers for making sense of the world around them.</p>	<p>SE/TE: 52-57, 61-62, 598-602</p>
<p>Program of Studies: Skills and Concepts</p>	
<p>MA-8-G-S-TS4 Students will transform figures in a coordinate plane (translations, reflections and dilations [magnifications and contractions] with the center of dilation at the origin); determine the new coordinates of the image after the transformation.</p>	<p>SE/TE: 501-515, 519-520</p>

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MA-8-G-S-CG1 Students will identify and graph ordered pairs on a coordinate system, identifying the origin, axes and ordered pairs; apply graphing in the coordinate system to solve real-world problems.	SE/TE: 52-57, 61-62
MA-8-G-S-CG2 Students will analyze the graph of a line to determine the slope, y-intercept and equation of the line.	SE/TE: 415-421, 454, 456
Related Core Content for Assessment	
MA-08-3.3.1 Students will identify and graph ordered pairs on a coordinate system, correctly identifying the origin, axes and ordered pairs; and will apply graphing in the coordinate system to solve real-world and mathematical problems. DOK 2	SE/TE: 52-57, 61-62, 598-602
Program of Studies: Understandings	
MA-8-G-U-3 Students will understand that transformations and symmetry are used to analyze real-world situations (e.g., art, nature, construction and scientific exploration).	SE/TE: 512-515, 519-520
Program of Studies: Skills and Concepts	
MA-8-G-S-TS2 Students will describe, provide examples of and apply to real-world and/or mathematical situations rotational symmetry (45° , 90° , 180° , 270° , 360°).	SE/TE: 512-515, 519-520
MA-8-G-S-TS3 Students will rotate (clockwise or counterclockwise) shapes in a coordinate plane about the origin.	SE/TE: 512-515, 519-520
Related Core Content for Assessment	
<i>MA-08-3.2.1</i> <i>Students will describe, provide examples of, and apply to real-world and mathematical problems rotational symmetry (90°, 180°, 360°).</i>	SE/TE: 512-514, 519-520
<i>MA-08-3.2.3</i> <i>Students will identify rotations (clockwise or counterclockwise) of figures about the origin in a coordinate plane.</i>	SE/TE: 511-514, 519-520

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Program of Studies: Understandings	
MA-8-G-U-4 Students will understand that shape and area are conserved during mathematical transformations (flips, slides and turns). Scale conserves shape but changes size.	
Program of Studies: Skills and Concepts	
MA-8-G-S-SR5 Students will apply proportional reasoning to solve problems involving scale models and real objects and scale drawings and similar two-dimensional figures.	SE/TE: 298-308, 344, 346
MA-8-G-S-TS1 Students will investigate the congruence, proportionality and/or similarity of pre-images and images of dilations (e.g., enlargements, reductions) in a coordinate plane.	SE/TE: 298-308, 344, 346
Related Core Content for Assessment	
MA-08-3.2.2 Students will transform (translations, reflections, and dilations with the center of dilation at the origin) figures in a coordinate plane and determine the new coordinates of the image after the transformation. DOK 2	SE/TE: 501-515, 519-520
Program of Studies: Understandings	
MA-8-G-U-5 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.	SE/TE: 506-515, 519-520
Program of Studies: Skills and Concepts	
MA-8-G-S-SR4 Students will provide examples of and apply congruent and similar two-dimensional figures to solve real-world problems.	SE/TE: 303-308, 344, 346, 484-489, 518, 520
MA-8-G-S-SR5 Students will apply proportional reasoning to solve problems involving scale models and real objects and scale drawings and similar two-dimensional figures.	SE/TE: 298-307, 344, 346
MA-8-G-S-TS2 Students will describe, provide examples of and apply to real-world and/or mathematical situations rotational symmetry (45° , 90° , 180° , 270° , 360°).	SE/TE: 512-515, 519-520

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MA-8-G-S-CG2 Students will analyze the graph of a line to determine the slope, y-intercept and equation of the line.	SE/TE: 415-421, 454, 456
Related Core Content for Assessment	
MA-08-3.1.4 Students will: <ul style="list-style-type: none"> • provide examples of congruent and similar figures; • apply congruent and similar figures to solve real-world and mathematical problems and • apply proportional reasoning to solve problems involving scale drawings and proportional figures. DOK 3	SE/TE: 303-308, 344, 346, 484-489, 518, 520
<i>MA-08-3.2.1</i> <i>Students will describe, provide examples of, and apply to real-world and mathematical problems rotational symmetry (90°, 180°, 360°).</i>	SE/TE: 512-514, 519-520
MA-08-3.2.2 Students will transform (translations, reflections, and dilations with the center of dilation at the origin) figures in a coordinate plane and determine the new coordinates of the image after the transformation. DOK 2	SE/TE: 501-515, 519-520
MA-08-3.3.1 Students will identify and graph ordered pairs on a coordinate system, correctly identifying the origin, axes and ordered pairs; and will apply graphing in the coordinate system to solve real-world and mathematical problems. DOK 2	SE/TE: 52-57, 61-62, 598-602

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<p>Big Idea: Data Analysis and Probability Middle grades students extend the early development of data representations and examine the appropriateness of graphs and representations of data. They examine central tendencies and dispersion. They develop organized approaches to counting and use experimental and theoretical probabilities.</p> <p>Academic Expectations</p> <p>2.7 Students understand number concepts and use numbers appropriately and accurately.</p> <p>2.8 Students understand various mathematical procedures and use them appropriately and accurately.</p> <p>2.13 Students understand and appropriately use statistics and probability.</p>	
Program of Studies: Understandings	
<p>MA-8-DAP-U-1 Students will understand that quantitative literacy is a necessary tool to be an intelligent consumer and citizen.</p>	
<p>MA-8-DAP-U-2 Students will understand that the collection, organization, interpretation and display of data can be used to answer questions.</p>	SE/TE: 427-433, 455-456, 636-656, 687-688, 690
Program of Studies: Skills and Concepts	
<p>MA-8-DAP-S-DR1 Students will collect, organize, construct, analyze and make inferences from data in a variety of graphical methods (e.g., drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and-leaf plots, scatter plots, histograms, box-and-whiskers plots).</p>	SE/TE: 427-433, 455-456, 636-656, 687-688, 690
Related Core Content for Assessment	
<p>MA-08-4.1.4 Students will:</p> <ul style="list-style-type: none"> • construct data displays (Venn diagrams, tables, line graphs, stem-and-leaf plots, circle graphs, scatter plots); • explain why the type of display is appropriate for the data and • explain how misleading representations affect interpretations and conclusions about data (e.g., changing the scale on a graph). <p>DOK 2</p>	SE/TE: 427-433, 455-456, 636-656, 687-688, 690
<p><i>MA-08-4.1.5</i> <i>Students will construct box-and-whiskers plots.</i></p>	SE/TE: 641-645, 688, 690
<p><i>MA-08-4.3.1</i> Students will explain how data gathering, bias issues, and faulty data analysis can affect the results of data collection.</p>	SE/TE: 677-680

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Program of Studies: Understandings	
MA-8-DAP-U-3 Students will understand that the choice of data display can affect the visual message communicated.	SE/TE: 648-656, 688, 690
Program of Studies: Skills and Concepts	
MA-8-DAP-S-DR2 Students will select an appropriate graph to represent data and justify its use.	SE/TE: 648-656, 688, 690
MA-8-DAP-S-DR3 Students will compare similar data from various types of graphs.	SE/TE: 648-656, 688, 690
MA-8-DAP-S-DR4 Students will relate different representations of data (e.g., tables, graphs, diagrams, plots) and explain how misleading representations affect interpretations and conclusions about data.	SE/TE: 635-640, 648-656, 688, 690
MA-8-DAP-S-ES1 Students will explain how data gathering, bias issues or faulty data analysis can affect the results of data collection, data representation and data interpretation.	SE/TE: 648-656, 688, 690
Related Core Content for Assessment	
<i>MA-08-4.1.2</i> <i>Students will explain how different representations of data (e.g., tables, graphs, diagrams, plots) are related.</i>	SE/TE: 635-640, 687, 690
Program of Studies: Understandings	
MA-8-DAP-U-4 Students will understand that inferences and predictions from data are used to make critical and informed decisions.	SE/TE: 427-433, 455-456
Program of Studies: Skills and Concepts	
MA-8-DAP-S-P1 Students will make predictions, draw conclusions and verify results from statistical data and probability experiments, making use of technology as appropriate.	SE/TE: 427-433, 455-456, 636-656, 687-688, 690
Related Core Content for Assessment	
MA-08-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs, stem-and leaf plots, scatter plots, histograms, box-and-whiskers plots). DOK 3	SE/TE: 427-433, 455-456, 491-494, 519-520, 636-656, 687-688, 690

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Program of Studies: Understandings	
MA-8-DAP-U-5 Students will understand that for a given set of data or a graph, statistical measures (mean, median, mode, range) can be used to describe the distribution of the data.	SE/TE: 139-144, 172, 174
Program of Studies: Skills and Concepts	
MA-8-DAP-S-CD1 Students will determine and interpret clusters, quartiles, gaps and outliers in data.	SE/TE: 641-645, 688, 690
MA-8-DAP-S-CD3 Students will determine and interpret the mean, median, mode and range of a set of data.	SE/TE: 139-144, 172, 174
MA-8-DAP-S-CD4 Students will compare sets of data.	SE/TE: 427-433, 455-456
MA-8-DAP-S-DCD5 Students will explore how statistics can be interpreted in many ways.	SE/TE: 648-656, 688, 690
Related Core Content for Assessment	
MA-08-4.2.1 Students will: <ul style="list-style-type: none"> • determine the mean, median, mode, and range of a set of data; • identify clusters, gaps, and outliers and • apply these concepts to compare sets of data. DOK 2	SE/TE: 139-144, 172, 174
Program of Studies: Understandings	
MA-8-DAP-U-6 Students will understand that probability can be used to make decisions or predictions or to draw conclusions.	SE/TE: 309-313, 344, 346, 658-662, 673-676, 688-690
Program of Studies: Skills and Concepts	
MA-8-DAP-S-CD2 Students will make predictions, draw conclusions and verify results from probability experiments or simulations, making use of technology as appropriate.	SE/TE: 672-676, 689-690
MA-8-DAP-S-P2 Students will analyze situations, such as games of chance, board games or grading scales and make predictions using knowledge of probability.	SE/TE: 309-313, 344, 346, 658-662, 673-676, 688-690

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MA-8-DAP-S-P3 Students will identify and describe the number of possible arrangements of several objects, using a tree diagram or the basic counting principle; make a list, picture, chart or tree diagram to represent a sample space.	SE/TE: 657-662, 688, 690
MA-8-DAP-S-P4 Students will investigate counting techniques (e.g., networks).	SE/TE: 657-662, 688, 690
MA-8-DAP-S-P5 Students will investigate and explain the role of probability in everyday decision making.	SE/TE: 309-313, 344, 346, 658-662, 673-676, 688-690
MA-8-DAP-S-P6 Students will explore concepts of randomness and independent events.	SE/TE: 662-666, 688, 690
MA-8-DAP-S-P7 Students will determine theoretical (mathematical) probabilities (e.g., express probability as a ratio, decimal, percent, area model as appropriate for a given situation).	SE/TE: 309-313, 344, 346, 658-662, 673-676, 688-690
MA-8-DAP-S-P8 Students will compare theoretical and experimental results and explain reasons why there might be differences.	SE/TE: 673-676, 689-690
Related Core Content for Assessment	
MA-08-4.4.1 Students will apply counting techniques to determine the size of a sample space for a real-world or mathematical situation. DOK 2	SE/TE: 657-662, 688, 690
MA-08-4.4.2 Students will: <ul style="list-style-type: none"> • determine theoretical probabilities of simple events; • determine probabilities based on the results of an experiment and • make inferences from probability data. DOK 3	SE/TE: 309-313, 344, 346, 658-662, 673-676, 688-690
<i>MA-08-4.4.3</i> <i>Students will tabulate experimental results from simulations and explain how theoretical and experimental probabilities are related.</i>	SE/TE: 673-676, 689-690
<i>MA-08-4.4.4</i> <i>Students will determine theoretical probabilities and represent them using area models.</i>	SE/TE: 309-313, 344, 346

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<p>Big Idea: Algebraic Thinking Middle grade students extend pattern work to include arithmetic sequences. They use linear functions and linear equations. They plot rational number pairs in the Cartesian plane. They simplify algebraic and numeric expressions. They explore the effects of change on related variables. They use and solve two-step single variable equations and inequalities.</p> <p>Academic Expectations</p> <p>2.8 Students understand various mathematical procedures and use them appropriately and accurately.</p> <p>2.11 Students understand mathematical change concepts and use them appropriately and accurately.</p> <p>2.12 Students understand mathematical structure concepts including the properties and logic of various mathematical systems.</p>	SE/TE: 79-81, 120, 122
Program of Studies: Understandings	
<p>MA-8-AT-U-1 Students will understand that patterns, relations and functions are tools that help explain or predict real-world phenomena.</p>	SE/TE: 402-408, 453, 456
<p>MA-8-AT-U-2 Students will understand that numerical patterns can be written as rules that generate the pattern.</p>	SE/TE: 422-426, 454, 456
Program of Studies: Skills and Concepts	
<p>MA-8-AT-S-PRF1 Students will recognize, create and extend patterns (generalize the pattern by giving the rule for the nth term and explain the generalization).</p>	SE/TE: 696-701, 737-738, 740
Related Core Content for Assessment	
<p><i>MA-08-5.1.1</i> <i>Students will use variables to describe numerical patterns based on arithmetic sequences in real-world and mathematical problems (e.g., $f(N) = 2N + 3$).</i></p>	SE/TE: 696-701, 737-738, 740
Program of Studies: Understandings	
<p>MA-8-AT-U-3 Students will understand that algebra represents mathematical situations and structures for analysis and problem solving.</p>	SE/TE: 201-204, 228, 230

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Program of Studies: Skills and Concepts	
MA-8-AT-S-VEO1 Students will apply order of operations to evaluate and simplify algebraic expressions.	SE/TE: 8-17, 60, 62
MA-8-AT-S-VEO2 Students will given a formula, substitute appropriate elements from a real-world or mathematical situation.	SE/TE: 382-385, 395-396
MA-8-AT-S-EI1 Students will use multiple representations to model and solve one- and two-variable linear equations.	SE/TE: 108-116, 121-122, 268-277, 285-286, 352-376, 393-396
MA-8-AT-S-EI2 Students will solve problems using formulas	SE/TE: 382-385, 395-396
MA-8-AT-S-EI3 Students will investigate linear inequalities using a variety of methods and representations.	SE/TE: 377-380, 395-396
Related Core Content for Assessment	
MA-08-5.2.1 Students will evaluate and simplify algebraic expressions applying the order of operations. DOK 2	SE/TE: 8-17, 60, 62
<i>MA-08-5.2.2</i> <i>Students will describe, define and provide examples of variables and expressions with a missing value based on real-world and mathematical problems.</i>	SE/TE: 4-7, 14-17, 59-60, 62
MA-08-5.3.1 Students will model and solve single variable, first-degree real-world and mathematical problems (e.g., $5x + 2 = x + 22$, $x - 4 < -60$). DOK 2	SE/TE: 108-116, 121-122, 268-277, 285-286, 352-380, 393-396
Program of Studies: Understandings	
MA-8-AT-U-4 Students will understand that real-world situations can be represented using mathematical models to analyze quantitative relationships.	SE/TE: 366-370, 394, 396
Program of Studies: Skills and Concepts	
MA-8-AT-S-VEO3 Students will describe, define and provide examples of variables and expressions with a missing value based on real-world and/or mathematical situations.	SE/TE: 4-7, 59, 62

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MA-8-AT-S-EI4 Students will model and solve real-world problems with one- or two-step equations or inequalities (e.g., $4x + 2 = 22$, $x - 4 < -60$).	SE/TE: 377-380, 395-396
Related Core Content for Assessment	
MA-08-5.1.2 Students will represent, analyze and generalize simple first and second degree relationships using tables, graphs, words and algebraic notations, and will apply the relationships to solve real-world and mathematical problems. DOK 2	SE/TE: 402-403, 409-414, 422-426, 434-438, 454-456
Program of Studies: Understandings	
MA-8-AT-U-5 Students will understand that functions are used to analyze change in various contexts and model real-world phenomena.	SE/TE: 404-408, 453, 456
Program of Studies: Skills and Concepts	
MA-8-AT-S-PR3 Students will organize input-output coordinate pairs into tables, plot points in all four quadrants of a coordinate (Cartesian) system/grid and interpret resulting patterns or trends using technology as appropriate.	SE/TE: 402-421, 453-454, 456
MA-8-AT-S-PRF5 Students will graph linear functions in a four quadrant (Cartesian) system/grid and interpret the results, using technology as appropriate.	SE/TE: 409-421, 453-454, 456
MA-8-AT-S-PRF6 Students will explain how change in the input affects change in the output (e.g., in $d = rt$, increasing the time (t) increases the distance (d)).	SE/TE: 402-403, 414
Related Core Content for Assessment	
MA-08-5.1.5 Students will explain how the change in one variable affects the change in another variable (e.g., if rate remains constant, an increase in time results in an increase in distance). DOK 2	SE/TE: 402-403, 414
Program of Studies: Understandings	
MA-8-AT-U-6 Students will understand that functions can be written in words, in a symbolic sentence or in a table.	SE/TE: 404-408, 422-426, 453-454, 456

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Program of Studies: Skills and Concepts	
MA-8-AT-S-PRF2 Students will represent, interpret and describe linear and simple quadratic functional relationships (input/output) through tables, graphs and symbolic rules.	SE/TE: 422-426, 454, 456, 702-706, 738, 740
MA-8-AT-S-PRF4 Students will interpret and explain relationships between tables, graphs, verbal rules and equations, using technology as appropriate.	SE/TE: 402-403, 422-426, 454, 456