Spooner Area School District

K-12 Mathematics Curriculum

Outcomes and Benchmarks

Spooner Area School District
K-12 Math Standards Alignment

Kindergarten	
Outcomes	**Benchmarks**
1. Write and know number names, number sequence, how to compare numbers, and how to count to tell the number of objects.	a. Count to 100 by ones. b. Count to answer 'how many?' c. Understand less than, greater than, and equal to. d. Write numbers 1-20.
2. Understand addition as putting together and adding to. Understand subtraction as taking apart or taking from.	a. Represent addition and subtraction problems using one or more strategies. b. Fluently add and subtract within 5.
3. Classify objects and identify and describe shapes.	a. Classify objects into given categories; count and sort the categories. b. Correctly name shapes regardless of their orientations or overall size.

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First Grade	
Outcomes	**Benchmarks**
1. Represent and solve problems involving addition and subtraction within 20. Understand and apply relationships between addition and subtraction.	a. Add within 20. b. Subtract within 20. c. Solve equations with unknown partners.
2. Understand 2 digit place value and use properties of operations to add within 100.	a. Add decade numbers. b. Add tens to 2-digit numbers.
3. Tell and write time.	a. Tell and write time to the hour. b. Tell and write time to the half-hour.
4. Reason with shapes and their attributes.	a. Create new shapes by combining 2-D or 3-D shapes.

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Second Grade	
Outcomes	**Benchmarks**
1. Represent and solve problems involving addition and subtraction within 100.	a. Add and subtract within 20. b. Solve one-step word problems c. Represent a word problem with a drawing and equation.
2. Understand 3 digit place value to add and subtract within 1000.	a. Fluently add and subtract within 100. b. Fluently add and subtract within 1000. c. Understand the three digits in a number represent ones, tens, and hundreds.
3. Use appropriate tools to measure length.	a. Accurately measure objects in inches and centimeters. b. Measure to determine how much longer one object is than the other.
4. Solve word problems involving money.	a. Identify name and value of penny, nickel, dime, and quarter. b. Count combinations of coins to $1.00 c. Solve word problems involving dollar bills, quarter, dimes, nickels, and pennies using cents and dollars.

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Third Grade	
Outcomes	**Benchmarks**
1. Understand properties of multiplication and division and the relationship between multiplication and division to represent and solve problems within 100.	a. Use multiplication and division within 100 to solve word problems. b. Apply properties of operations (commutative, associative, distributive) to multiply and divide. c. Fluently multiply and divide within 100 using factors 0-10.
2. Use place value understanding to round to nearest 10 of 100 and fluently add and subtract within 1000.	a. Round whole numbers to the nearest 10 or 100. b. Fluently add or subtract within 1000.
3. Develop understanding of a fraction as a number. Be able to partition shapes into equal parts and express as a fraction.	a. Understand a unit fractions is a whole divided into some number of equal parts. b. Understand a fraction as pieces out of the whole. c. Partition shapes into equal areas. Express the area of each part as a unit fraction.
4. Understand how to find perimeter and missing lengths of objects. Relate finding area to multiplication and addition.	a. Relate area of rectangles to the operations of multiplication and addition. b. Find perimeter of polygons with given side lengths.

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Fourth Grade	
Outcomes	**Benchmarks**
1. Use the 4 operations with whole numbers to solve problems.	a. Use the four operations with whole numbers to solve multi-step problems.
2. Use place value understanding and operations to perform multi-digit arithmetic.	a. Divide four digits by one digit. b. Multiply up to two digit by two digit. c. Add and subtract up to four digits.
3. Extend understanding of fraction equivalence and ordering to build fractions from unit fractions.	a. Compare fractions with the same denominators. b. Identify a fraction as a sum of unit fractions. c. Add and subtract fractions with the same denominators. d. Solve word problems involving addition and subtraction of fractions with the same denominators.
4. Solve problems involving measurements and conversion of measurements.	a. Apply area to real world problems. b. Apply perimeter to real world problems. c. Use a number line to plot and represent a data set of measurements in fractions of a unit.
5. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	a. Classify shapes by properties of their lines and angles. b. Draw and identify lines and angles (right, acute, and obtuse). c. Identify types of line segments.

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Grade 5	
Outcomes	**Benchmarks**
1. Write and interpret numerical expressions.	a. Use parentheses to solve multi-step word problems. b. Read, write, and simplify numerical expressions. c. Write expressions with variables with or without evaluating.
2. Understand the place value system to help perform operations with multi-digit whole numbers and with decimals to hundredths.	a. Understanding the place value system is based on multiplying and dividing by powers of ten. b. Round and estimate sums and differences with decimal numbers to the hundredths. c. Fluently multiply and divide whole numbers up to 4 digit by 2 digit. d. Add, subtract, multiply, and divide decimals to hundredths.
3. Extend understanding to be able to perform the 4 operations with like and unlike fractions, decimals, and whole numbers.	a. Solve fraction word problems using all 4 operations. b. Use benchmark fractions and number sense to estimate if an answer is reasonable. c. Interpret a fraction as division of the numerator by the denominator.
4. Graph points on the coordinate plane to solve real-world and math problems.	a. Graph mathematical problems in the first quadrant of a coordinate plane and interpret related points on the graph.

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Grade 6	
Outcomes	**Benchmarks**
1. Apply and extend previous understanding to algebraic expressions and solve one-variable equations and inequalities.	a. Use order of operations to evaluate an expressions when given a set of values. b. Determine if a number makes an equation or inequality true.
2. Understand ratio concepts and use ratio reasoning to solve problems.	a. Complete table of equivalent ratios with missing numbers. b. Find the unit rate or basic ratio given an equivalent ratio. c. Solve ratio problems. d. Find a percent of a quantity as a rate per 100.
3. Extend understanding of the Number System to divide fractions and multi-digit numbers, compute multi-digit decimals, and order rational numbers on a number line.	a. Divide fractions by fractions. b. Add, subtract, multiply and divide multi-digit numbers including decimals. c. Compare and order rational numbers and their absolute values. d. Graph rational numbers in all four quadrants of the coordinate plane.
4. Solve real-world math problems involving area, surface area, and volume.	a. Find the area of any triangle. b. Find area of special quadrilaterals. c. Find area of regular polygons by decomposing into triangles or other shapes. d. Apply the formula for volume of right rectangular prisms to find volume of that shape with fractional side lengths.

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Grade 7	
Outcomes	**Benchmarks**
1. Construct simple equations and inequalities to solve real-world problems and use properties of operations to create equivalent expressions.	a. Convert between fractions, decimals, and percent and apply properties of operations to calculate with numbers in any form. b. Apply properties of operations to add, subtract, factor and expand linear expressions with rational coefficients. c. Construct and solve simple equations and inequalities to solve problems.
2. Analyze proportional relationships and use them to solve real-world math problems.	a. Recognize and solve proportional relationships between quantities. b. Use proportional relationships to solve multi-step ratio and percent problems.
3. Apply and extend previous understandings of operations with rational numbers.	a. Solve mathematical problems by adding and subtracting rational numbers. b. Solve mathematical problems by multiplying and dividing rational numbers.
4. Investigate chance processes and develop, use, and evaluate probability models.	a. Understanding probability of an event is a number between 0 and 1 and determine if an event is impossible, likely, or certain to happen. b. Find the probability of theoretical and experimental probabilities and use them to approximate other probabilities. c. Find probabilities of compound events using organized lists, tables, tree diagram and simulation.
5. Solve real-world problems by using scale drawings, angle measure, area, surface area, and volume.	a. Solve problems involving scale drawings by using the appropriate scale factor. b. Calculate the area and circumference of a circle. c. Solve mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.

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Grade 8	
1. Perform operations with radical and integer exponents. Understand that there are numbers that are not rational and approximate them by rational numbers.	a. Identify rational and irrational numbers. b. Estimate square roots. c. Estimate cube roots. d. Multiply and divide numbers written in scientific notation.
2. Understand the connections between proportional relationship lines, and linear equations. Investigate patterns of association in bivariate data.	a. Find the slope of a graph. b. Find the slope from two points. c. Find the slope of a linear equation. d. Graph a line using a slope and from an equation in slope-intercept form. e. Write an equation from a graph. f. Use context of a bivariate data table to create a scatter plot and line of best fit.
3. Define, evaluate and compare functions.	a. Interpret graphs of proportional relationships. b. Identify functions (linear and nonlinear). c. Evaluate linear functions. d. Complete a table and a graph of a linear function. e. Interpret word problems of linear functions. f. Graph a line from an equation in slope-intercept form.
4. Understand and apply Pythagorean Theorem. Solve real-world problems involving volume of cylinders, cones, and spheres.	a. Find the lengths of the hypotenuse, missing leg lengths, and perimeter of triangles using the Pythagorean Theorem. b. Solve word problems using the Pythagorean Theorem. c. Know/Identify the formulas for the volumes of cylinders cones and spheres with 3 dimensional diagrams.

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Pre-Algebra	
Outcomes	**Benchmarks**
1. Identify Patterns	a. Identify patterns from a graph, situation, equation, or table. b. Construct a table, graph, rule, or situation using a pattern. c. Interpret the meaning of a pattern.
2. Understanding of Exponents	a. .State the three basic Laws of Exponents. b. Simplify an expression using the three basic Laws of Exponents.
3. Solve Linear Equations in a Single Variable.	a. Demonstrate the ability to algebraically solve problems by balancing equations. b. Identify situations when there are no solutions or an infinite number of solutions. c. Justify answers by checking and/or making sense of the answer through reasoning.

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Algebra	
Outcomes	**Benchmarks**
1. Describe Linear Relationships	a. Describe the graph of a linear function using shape, intercepts, symmetry and special points, as well as domain and range. b. Determine the change (slope) or y-intercept of a linear function when given a graph, two points, or a point and the slope/y-intercept. c. Write the equation for a linear relationship in the form of $y = mx + b$. d. Interpret the slope and y-intercept in context. e. Move between a situation, equation, table, and graph, understanding the connections between them. f. Solve systems of equations using substitution, elimination, equal values and graphing methods. g. Solve multi-variable equations for a specific variable.
2. Describe Exponential Functions.	a. Describe the graph of an exponential function using shape, intercepts, domain/range, symmetry and special points. b. Determine the rate of change (multiplier) or y-intercept when given a graph, two points, or a point and the multiplier/y-intercept. c. Write an equation for an exponential relationship in the form of $y = ab^x$. d. Interpret the rate of change and y-intercept in context. e. Move between a situation, equation, table, and graph, understanding the connections between them.
3. Identify Patterns.	a. Describe the difference between a discrete and continuous relationship. b. Write explicit and recursive equations for arithmetic sequences. c. Write explicit and recursive equations for geometric sequences. d. Simplify an expression using the Laws of Exponents. e. Understand that a relation is a function if there is one output for each input. f. Recognize and use different notations properly. g. Use the area model to show the relationship between a product and a sum.
4. Interpret Data	a. Fully describe the association of a graph. (Form, direction, strength, outliers, meaning of the graph in context.) b. Interpret data in terms of its context. c. Use data to make predictions.
5. Describe Quadratic Functions	a. Describe the graph of an exponential function using shape, intercepts, symmetry and special points. b. Make connections between a situation, equation, table, and graph. c. Solve quadratic equations by factoring. d. Solve quadratic equations using the Quadratic Formula.

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Geometry	
Outcomes	**Benchmarks**
1. Provide Reasoning Through Proofs	a. Use flow charts to prove geometric concepts. b. Justify conclusions with written arguments. c. Prove triangle congruence and similarity.
2. Use Triangle Trigonometry	a. Use Right Triangle Trigonometry and the Law of Cosines to solve for missing parts. b. Apply trigonometry to real world problems.
3. Use tools appropriately	a. Select the correct tool/procedure to solve a problem. b. Use the tool/procedure correctly.
4. Use Angle Relationships	a. Identify the type of relationship. b. Use properties of angles and lines to find values.

Algebra II	
Outcomes	**Benchmarks**
1. Identify Function Types	a. Fully describe the graph. b. Write the equation of a function. c. Apply function type to a real world problem.
2. Find Inverse Functions	a. Graphically determine the inverse to a function. b. Algebraically determine the inverse to a function. c. Use inverses to solve real life problems.
3. Understand the Trigonometric Ratios	a. Write the equations of a sinusoid. b. Draw the graph of a sinusoid. c. Apply sinusoids to a real world problem.
4. Interpret Data	a. Fully describe the association of a graph including variability, upper and lower bounds, and the Least Squares Regression Line. b. Interpret data in terms of its context. c. Use data to make predictions.

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Tech and Career Math	
Outcomes	**Benchmarks**
1. Perform Conversions	a. Understand and use decimals, fractions, and percentages. b. Convert metric and customary units. c. Understand how ratios and proportions work.
2. Use Algebraic Principles	a. Demonstrate the ability to algebraically solve problems by balancing equations. b. Identify situations when there are no solutions or an infinite number of solutions. c. Justify answers by checking and/or making sense of the answer through reasoning. d. Determine the change (slope) or y-intercept of a linear function when given a graph, two points, or a point and the slope/y-intercept. e. Write the equation for a linear relationship in the form of $y = mx + b$ f. Interpret the slope and y-intercept in context. g. Move between a situation, equation, table, and graph, understanding the connections between them. h. Solve systems of equations using substitution, elimination, equal values and graphing methods.
3. Use Geometric Principles	4. Use Right Triangle Trigonometry and the Law of Cosines to solve for missing parts. 5. Apply trigonometry to real world problems. 6. Select the correct tool/procedure to solve a problem. 7. Use the tool/procedure correctly. 8. Identify the type of relationship. 9. Use properties of angles and lines to find values.