Sterling Middle School Scope and Sequence

Math 8	Cycle 1	Cycle 2	Cycle 3
Central Concepts(s)	One Variable Statistics	Linear Inequalities and Systems	Introduction to Quadratic Functions
	Linear Equations and Systems	Functions	Quadratic Functions
	Two Variable Statistics	Introduction to Exponential Functions Pythagorean Theorem	Problem Solving Geometry
Supporting Concepts	Linear Equations and Systems	Systems of Equations	Introduction to Quadratic Functions
Supporting Concepts	Create and graph linear equations	Create equations that describe numbers or relationships	Factoring Quadratic Expressions such as x ² +8x+15
	Solve for a variable as in a scientific formula	Solving Systems of Equations Using Substitution	Factor Quadratic Expressions such as x ² =49
	Interpret functions	Solving Systems of Equations Using Elimination	Understand the relationship between zeros and factors of polynomials
	Understand solving equations as a process of reasoning and explain the reasoning	Solve Systems of Equations and Inequalities Graphically	Sketch X and Y intercepts, vertex and line of symmetry of a quadratic without using a
	Solve equations and inequalities in one variable Use linear equations to compare to cost structures e.g. two cell data plans with a fixed charge	Functions Understand the concept of a function and use function notation.	calculator Quadratic Function
	and a per GB cost	Evaluate functions - plug in a value	Factor to find key features of the context such as how long after a ball is thrown into the air it
	Compare slopes given two sets of points	Domain and range of a function	hits the ground
	One and Two Variable Statistics	Interpret function according to the context	Analyze quadratics in different contexts and forms
	Summarize, represent, and interpret data on a single count or measurement variable	Find average rate of change of function	Geometry
	Measures of center (mean, median, mode, StdDev, IQR)	Represent functions with visual patterns	Use coordinate geometry for area and perimeter
	Outliers, skew left, skew right Analyze two variable data	Write a function from a verbal description Build geometric and arithmetic sequences	Mid-point formula
	Compute and analyze residuals	Introduction to Exponential Functions	
	Use graphing calculator on exponential function data	Exponential growth as in compound interest	
	Interpret rate of change and y-intercept of line of best fit	Exponential decay as in depreciation of a car	
	Compute and explain correlation coefficient	Construct and compare linear and exponential models	
	Correlation is not causation	Exponential growth always eventually outpaces linear growth Pythagorean Theorem	
		Distance Formula	
		Irrational square roots	
		Pythagorean Triples	
Essential Qustions	Linear Equations and Systems	System of Equations	Problem Solving
	What corresponds to your breakeven point when you model your business sales as a linear	In general, what does the intersection of two linear equations represent?	How would you use scientific notation to solve a big problem, such as the number of seconds
	equation and have some initial start-up costs?	In general, how many solutions does a linear equation have?	since the Big Bang?
	What does your y-intercept represent when graphing, e.g. average altitude gained per mile	What are the possible results when you have a system of two linear equations?	How can you make an overwhelming problem, such as how many days would it take to stack a
	hiked? cost of a plumber's visit if there is a fixed fee for showing up and an hourly charge? If you think of a linear equation as a function machine, what two operations generally occur	How can you check your solution to a system of linear equations? If your cell phone provider offers two plans, one with lower monthly rate but higher per GB	of the Starbucks cups used and make a tower to the moon? Why can you round to the nearest power of 10 when doing calculations in a Fermi problem and
	within the machine?	charge and the second with higher monthly rate but lower per GB charge, what does the	usually come close to the precise answer?
	What does it mean to interpolate a value in a scatter plot?	intersection of the linear equations corresponding to these two plans mean?	Expressions and Polynomials
	What does it mean to extrapolate a value in a scatter plot?	What are some good scenarios for explaining a system of equations?	What is the difference between an expression and an equation?
	In the context of a specific scenario, what does slope mean? For example, what does slope	Functions	What variables would I include in an expression that describes the profit on a single item sold
	refer to if you are graphing the money you earn vs the hours you worked? One and Two Variable Statistics	How can I use a graph to distinguish a function from a non-function? Which straight line can I draw that is not a function?	by my imaginary business? What variables would I include in an expression that describes the profit by my imaginary
	In what situation is median a better measure of center than mean?	Which variable is generally used as the input variable and which as the output variable of a	business?
	Why is interguartile range a better measure of center than median or mode?	function?	Inequalities
	Measured intelligence increases with shoe size. Explain why this is correlation but not	What is the difference between writing f(x) =3x+2 and y=3x+2?	How do I represent the idea of "at least" in an inequality?
		Introduction to Exponential Functions	How do I represent "no more than" with an inequality?
	causation.		
	What does the slope of the line of best fit of a scatterplot of hours studied vs test score show?	Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two	How do I represent "up to but not including" with an inequality?
		Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two pennies on day two, doubling every day through day 30?	How do I represent "up to but not including" with an inequality? Into what four sections do two inequalities divide the Cartesian plane?
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NC State Standards	What does the slope of the line of best fit of a scatterplot of hours studied vs test score show? the y-intercept?	Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two pennies on day two, doubling every day through day 30? A pond plant doubles in surface area every day. If 30 days after the plant was introduced to the pond it entirely covers the pond, after how many days did it cover half of the pond? A car's value depreciates by 10% per year. Is the dollar amount of its decrease in value constant, increasing or decreasing? Pythagorean Theorem How do video games use the Pythagorean theorem? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? Systems of Equations	How do I represent "up to but not including" with an inequality? Into what four sections do two inequalities divide the Cartesian plane? Problem Solving How long would it take one person to paint the Great Pyramid of Giza Carolina blue? How many silkworms would it take to produce in one year enough cloth for Christo to wrap the Tower of Pisa?
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NC State Standards Alignment	What does the slope of the line of best fit of a scatterplot of hours studied vs test score show? the y-intercept? Linear Equations and Systems NC. M1.A-CED.2 (Create and graph linear equations) NC. M1.A-CED.4 (Solve for a variable as in a scientific formula) NC.M1.F-IF.1 (Interpret functions) NC.M1.A-REI.1 NC.M1.A-REI.3 NC.M1.A-REI.3	Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two pennies on day two, doubling every day through day 30? A pond plant doubles in surface area every day. If 30 days after the plant was introduced to the pond it entirely covers the pond, after how many days did it cover half of the pond? A car's value depreciates by 10% per year. Is the dollar amount of its decrease in value constant, increasing or decreasing? Pythagorean Theorem How do video games use the Pythagorean theorem? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? Systems of Equations NC.M1.A.REI.0 (Solve Systems Graphically) NC.M1.A.REI.10 Functions NC.M1.F.F.1	How do I represent "up to but not including" with an inequality? Into what four sections do two inequalities divide the Cartesian plane? Problem Solving How long would it take one person to paint the Great Pyramid of Giza Carolina blue? How many silkworms would it take to produce in one year enough cloth for Christo to wrap the Tower of Pisa? Introduction to Quadratic Functions M1.A-APR.3 NC.M1.A-REI.4 Quadratic Functions NC.M1.F-IF.7 (Identify Intercepts, vertex, line of symmetry) NC.M1.F-IF.2 (Identify Intercepts, vertex, line of symmetry) NC.M1.F-IF.2 (Identify Intercepts, vertex, line of symmetry)
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	What does the slope of the line of best fit of a scatterplot of hours studied vs test score show? the y-intercept? Linear Equations and Systems NC.M1.A-CED.2 (Create and graph linear equations) NC.M1.A-CED.4 (Solve for a variable as in a scientific formula) NC.M1.F.1. (Interper functions) NC.M1.A-REL1 NC.M1.F-BF.1b (use linear equations to compare e.g. cell plans) NC.M1.G-GPE.5 (compare slopes from sets of points) One and Two Variable Statistics NC.M1.S-ID.1 Summarize, represent, and interpret data on a single count or measurement variable	Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two pennies on day two, doubling every day through day 30? A pond plant doubles in surface area every day. If 30 days after the plant was introduced to the pond it entirely covers the pond, after how many days did it cover half of the pond? A car's value depreciates by 10% per year. Is the dollar amount of its decrease in value constant, increasing or decreasing? Pythagorean Theorem How do video games use the Pythagorean theorem? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? How can you use the progression from one square to the next to find a Pythagorean triple starting with any even number? Systems of Equations NC.M1.4.REL5 NC.M1.4.REL10 (Solve Systems Graphically) NC.M1.4.REL10 NC.M1.F.IF.1 NC.M1.F.IF.2 NC.M1.F.IF.2 (Interpret function in context) NC.M1.F.IF.4 (Interpret function in context) NC.M1.F.IF.6 (find average rate of change of function) NC.M1.F.IF.1 (Represent function) NC.M1.F.IF.1 (Represent function)	How do I represent 'up to but not including' with an inequality? Into what four sections do two inequalities divide the Cartesian plane? Problem Solving How long would it take one person to paint the Great Pyramid of Giza Carolina blue? How many sitkworms would it take to produce in one year enough cloth for Christo to wrap the Tower of Pisa? Introduction to Quadratic Functions M1.A-APR.3 NC.M1.A-REI.4 Quadratic Functions NC.M1.F-IF.7 (Identify intercepts, vertex, line of symmetry) NC.M1.F-IF.9 (Analyze quadratics in different contexts and forms) Geometry NC.M1.G-GPE.4 (area, perimeter)
	What does the slope of the line of best fit of a scatterplot of hours studied vs test score show? the y-intercept? Linear Equations and Systems NC. M1. A-CED 2 (Create and graph linear equations) NC. M1. A-CED 4 (Solve for a variable as in a scientific formula) NC. M1. A-REI.1 NC. M1. A-REI.3 NC. M1. A-REI.3 NC. M1. A-REI.3 NC. M1. S-B7.16 (use linear equations to compare e.g. cell plans) NC. M1. S-B7.15 (use linear equations to compare e.g. cell plans) NC. M1. S-B7.15 (use linear equations to compare e.g. cell plans) NC. M1. S-D1.2 Keasures of center	Would you rather have \$1000 per day every day for thirty days or 1 penny on day one, two pennies on day two, doubling every day through day 30? A pond plant doubles in surface area every day. If 30 days after the plant was introduced to the pond it entirely covers the pond, after how many days did it cover half of the pond? A car's value depreciates by 10% per year. Is the dollar amount of its decrease in value constant, increasing or decreasing? Pythagorean Theorem How do video games use the Pythagorean theorem? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? How can you use the progression from one square to the next to find a Pythagorean triple starting with any odd number? How can you use the progression from one square to the next to find a Pythagorean triple starting with any even number? Systems of Equations NCM1.4-REI.10 (Solve Systems Graphically) NC.M1.4-REI.10 (Solve Systems Graphically) NC.M1.4-REI.10 Functions NC.M1.F-IF.2 (done and range of a function) NC.M1.F-IF.2 (done and range of a function) NC.M1.F-IF.4 (Interpret function in context) NC.M1.F-IF.4 (Interpret function in context) NC.M1.F-IF.4 (Interpret function in context) NC.M1.F-IF.4 (Write a function with visual patterns) NC.M1.F-IF.4 (Write a function function (NC.M1.F-IF.4 (Write A nucleon function)	How do I represent "up to but not including" with an inequality? Into what four sections do two inequalities divide the Cartesian plane? Problem Solving How long would it take one person to paint the Great Pyramid of Giza Carolina blue? How many sitkworms would it take to produce in one year enough cloth for Christo to wrap the Tower of Pisa? Introduction to Quadratic Functions M1.A-APR.3 NC.M1.A-REI.4 Quadratic Functions NC.M1.F-IF.7 (Identify intercepts, vertex, line of symmetry) NC.M1.F-IF.9 (Analyze quadratics in different contexts and forms) Geometry NC.M1.G-GPE.4 (area, perimeter)
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