Unit Plan

Title: ___ Unit 1: Modeling Linear Relationships & Functions __ Duration: __25 days_____

Grade Level____8th_____ Academic Area: _____Math_____

Essential Standards:	**Learning Targets:**	**Key Vocabulary:**	**Resources:**
A.FGR.2: Construct and interpret arithmetic sequences as functions, algebraically and graphically, to model and explain real-life phenomena. Use formal notation to represent linear functions and the key characteristics of graphs of linear functions and informally compare linear and non-linear functions using parent graphs. **A.MM.1:** Apply mathematics to real-life situations; model real-life phenomena using mathematics. NOTE: The following learning objective(s) will be addressed throughout the unit. **<u>Supporting standards:</u>**	students will incorporate patterning and algebraic reasoning to create, interpret, solve, and graph linear equations and linear functions in different forms Students will interpret expressions with multiple factors and/or terms and manipulate linear and literal equations expressed in various forms Students will use formal notation to represent linear functions, use functional and graphical reasoning to informally compare linear and non-linear functions using parent graphs, and identify key characteristics of graphs of linear functions.	function linear model point-slope form term arithmetic sequence explicit rule recursive rule Domain Range Rate of change	**Big Ideas (Found on Clever)** **Chapter 2**

A.FGR.2.1 Use mathematically applicable situations algebraically and graphically to build and interpret arithmetic sequences as functions whose domain is a subset of the integers. A.FGR.2.2 Construct and interpret the graph of a linear function that models real-life phenomena and represent key characteristics of the graph using formal notation. A.FGR.2.5 Analyze the difference between linear functions and nonlinear functions by informally analyzing the graphs of various parent functions (linear, quadratic, exponential, absolute value, square root, and cube root parent curves). A.FGR.2.3 Relate the domain and range of a linear function to its graph and, where applicable, to the quantitative relationship it describes. Use formal interval and set notation to	Students will also construct and interpret arithmetic sequences as functions, algebraically and graphically, to model and explain real-life phenomena.		

describe the domain and range of linear functions. A.FGR.2.4 Use function notation to build and evaluate linear functions for inputs in their domains and interpret statements that use function notation in terms of a mathematical framework. A.MM.1.1 Explain applicable, mathematical problems using a mathematical model A.MM.1.2 Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities domains. A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems			

Unit Plan

Title: _ Unit 2: Analyzing Systems of Linear Equations and Inequalities __ Duration: _15 days_____

Grade Level_____8th____ Academic Area: _____Math_____

Essential Standards:	**Learning Targets:**	**Key Vocabulary:**	**Resources:**
A.PAR.4: Create, analyze, and solve linear inequalities in two variables and systems of linear inequalities to model real-life phenomena. A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics. **Supporting Standards:** A.PAR.4.1 Create and solve linear inequalities in two variables to represent	students will extend their understanding of solving equations and functional and graphical reasoning to solving systems of equations, including those created by parallel and/or perpendicular lines. Students will also create, analyze, interpret, solve, and graph linear inequalities in one and two variables and find solutions to systems of linear inequalities to model real-life phenomena.	Inequality Infinite solutions Parallel lines Perpendicular lines Slope Substitution method Elimination method Interval notation Set notation	**Big Ideas (Found on clever)** **Chapter 1**

relationships between quantities including mathematically applicable situations; graph inequalities on coordinate axes with labels and scales. A.PAR.4.2 Represent constraints of linear inequalities and interpret data points as possible or not possible. A.PAR.4.3 Solve systems of linear inequalities by graphing, including systems representing a mathematically applicable situation **A.MM.1.1** Explain applicable, mathematical problems using a mathematical model. A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.			

Unit Plan

Title: _ Unit 3: Investigating Rational and Irrational Numbers __ Duration: ____10 days_____

Grade Level____8th___ Academic Area: ____Math_____

Essential Standards:	**Learning Targets:**	**Key Vocabulary:**	**Resources:**
A.NR.5: Investigate rational and irrational numbers and rewrite expressions involving square roots and cube roots **A.MM.1:** Apply mathematics to real-life situations; model real-life phenomena using mathematics. **Supporting Standards:**	Students extend their knowledge of numerical reasoning and real numbers to include irrational numbers, develop an understanding of the properties of exponents, and perform operations with numbers expressed in scientific notation.	Square root Cube root Real numbers Irrational number Rational number Integers Whole number Natural numbers Exponent Perfect square Perfect cube Power rule Zero Exponent rule Power of product rule Power of quotient rule	**Big Ideas (Found on Clever)** **Chapter 3**

A.NR.5.1 Rewrite algebraic and numeric expressions involving radicals. A.NR.5.2 Using numerical reasoning, show and explain that the sum or product of rational numbers is rational, the sum of a rational number and an irrational number is irrational, and the product of a nonzero rational number and an irrational number is irrational. A.MM.1.1 Explain applicable, mathematical problems using a mathematical model. A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems		Root Scientific notation Index Radical Radican	

Unit Plan

Title: <u>Unit 4 – Modeling and Analyzing Quadratic Functions</u> Duration: <u>25-30 Days</u>

Grade Level: <u>8th</u> Academic Area: <u>Math</u>

Essential Standards:	Learning Targets:	Key Vocabulary:	Resources:
A.PAR.6: Build quadratic expressions and equations to represent and model real-life phenomena; solve quadratic equations in contextual situations. A.FGR.7: Construct and interpret quadratic functions from data points to model and explain real-life phenomena; describe key	Students will investigate key features of graphs Students will solve quadratic equations by taking square roots, factoring (x2 + bx + c AND ax2 + bx + c) completing the square, and using the quadratic formula Students will compare and contrast graphs in standard, vertex, and intercept forms.	Vertex Axis of Symmetry Zero Maximum Value Minimum Value Parabola Standard Form	Big Ideas Chapter 4 (found on Clever) Deltamath

characteristics of the graph of a quadratic function to explain a contextual situation for which the graph serves as a model. A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics.	Students will only work with real number solutions.	Vertex Form Intercept Form Transformations	

Unit Plan

Title: Unit 5: Modeling and Analyzing Exponential Expressions, Equations, and Functions **Duration:** 25-30 Days

Essential Standards:	**Learning Targets:**	**Key Vocabulary:**	**Resources:**
A.PAR.8: Create and analyze exponential expressions and equations to represent and model real-life phenomena; solve exponential equations in mathematically applicable situations.	Students will interpret exponential expressions, one variable exponential equations in context, and understand parameters of two variable exponential equations.	Exponential Function Exponential Growth Exponential Decay Exponential Equation Asymptote	Big Ideas Chapter 6 (found on Clever) Deltamath

A.FGR.9: Construct and analyze the graph of an exponential function to explain a mathematically applicable situation for which the graph serves as a model; compare exponential with linear and quadratic functions. A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics. NOTE: The following learning objective(s) will be addressed throughout the unit.	Students will also construct and analyze the graph of an exponential function to explain a contextual situation for which the graph serves as a model Students will compare exponential with linear and quadratic functions.	Geometric Sequence	

Unit Plan

Title: Unit 6 - Investigating Data and Statistical Reasoning **Duration:** _15-20 Days

Essential Standards:	**Learning Targets:**	**Key Vocabulary:** Measure of Center	**Resources:**

8.FGR.6: Solve practical, linear problems involving situations using bivariate quantitative data. A.DSR.10: Collect, analyze, and interpret univariate quantitative data to answer statistical investigative questions that compare groups to solve real-life problems; Represent bivariate data on a scatter plot and fit a function to the data to answer statistical questions and solve real-life problems. A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics.	Students will extend the study of linear relationships by exploring models and tables to model relationships between quantities and describe the rate of change. Students will collect, analyze, and interpret univariate quantitative data to answer statistical investigative questions that compare groups to solve real-life problems. Students will represent bivariate data on a scatter plot and fit a function to the data to make predictions, answer statistical investigative questions, solve real-life problems based on data distributions.	Median Mean Mode Outlier Measure of Variation Range Standard Deviation Data transformation Qualitative Data Quantitative Data Correlation Interpolation Extrapolation	Big Ideas Chapter 7 (found on Clever) Deltamath

Unit Plan

Title: Unit 7- Algebraic Connections to Geometric Concepts **Duration:** 15-20 Days

Essential Standards:	**Learning Targets:**	**Key Vocabulary:**	**Resources:**
8.GSR.8 Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real-life phenomena. A.GSR.3: Solve problems involving distance, midpoint, slope, area, and perimeter to model and explain real-life phenomena. A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics.	Students will extend their work with irrational numbers and apply their geometric and spatial reasoning to interpret and solve problems involving the Pythagorean Theorem. Students will work with right triangles and investigate proofs of the Pythagorean Theorem and its converse. Students will solve problems involving distance, midpoint, slope, area, and perimeter to model and explain real-life phenomena.	Parallel lines Perpendicular lines Midpoint Distance Cone Sphere Cylinder Pythagorean Theorem	Big Ideas Chapter 8 (found on Clever) Deltamath

	Students will also extend their knowledge of volume from previous grades to solve problems involving cones, cylinders, and spheres.		