

LITCHFIELD PUBLIC SCHOOLS
Core Curriculum
Scope and Sequence
8th Grade Math

Essential questions:
 How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?
 How are quantitative relationships represented by numbers?
 How do geometric relationships and measurements help us to solve problems and make sense of our world?
 How can collecting, organizing and displaying data help us analyze information and make reasonable and informed decisions?

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
UNIT 1 MODELING WITH DATA 2 WEEKS	CT(8) 4.1a1 Collect, organize, display, compare, and analyze large data sets. CT(8) 4.1a2 Construct a variety of data display, including box-and-whisker plots, and identify where measures of central tendency and dispersion are found in graphical displays. CT(8) 4.2a1 Make predictions from scatter plots using or estimating a line-of-best-fit. CT(8) 4.2a2 Make inferences and evaluate reasonable hypotheses	<ul style="list-style-type: none"> • sort and organize data appropriately • use tables, graphs, and maps to reveal trends that may not be obvious in data • interpret data in a plausible manner • make predictions from data • create an economic model for a simple business • create a population model and use it to make predictions 	Quizzes – Each one will encompass at least one objective given throughout the unit. The total number will be dependent on the needs of the students. There will be a final summative test or performance project. <u>Possible quiz 1</u> – organizing large amounts of data for easier data comprehension. <u>Possible quiz 2</u> – graphing data to show trends. Using graphs to make interpolations and extrapolations. <u>Possible quiz 3</u> -Decision making using charts, graphs, data. Proposed Unit Project – Given a proposal for a decision and a large amount of data students will organize the information, sort	Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition) www.impactmath.com www.kutasoftware.com Manipulatives Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment. (weekly “skill drills”)

	<p>based on experimental data.</p> <p>CT(8) 4.2a3 Analyze and interpret data using descriptive statistics, including range, mode, median, quartiles, outliers and mean. CT(8) 4.2a4 Determine the accuracy of statistical claims.</p> <p>CT(8) 4.2a5 Describe the role of random sampling, random number generation and the effects of sample size in statistical claims.</p>		<p>through for relevant information and display the information in a way that allows one to make predictions or decisions.</p>	<p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: The amount of data the students sort through and the complexity of the numbers used can all be modified to ensure success by all students.</p> <p>Some students may only use data to interpolate points, others may be asked to extrapolate beyond the given data and to formulate algebraic prediction formulas</p>
--	---	--	--	---

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 2</p> <p style="text-align: center;">LINEAR RELATIONSHIPS</p> <p style="text-align: center;">6 WEEKS</p>	<p>CT(8) 1.1a2 Identify relationships that are Linear (and nonlinear) and compare and contrast their properties using tables, graphs, equation, and verbal descriptions.</p> <p>CT(8) 1.1a3 Recognize and solve problems of direct variations.</p> <p>CT(8) 1.2a1 Determine the constant rate of change in a linear relationship and recognize this as the slope of a line.</p> <p>CT(8) 1.2a2 Compare and contrast the graphs of lines with the same slope versus those with different slopes.</p> <p>CT(8) 1.2a3 Interpret slope and y-intercepts from contextual situations, graphs, and linear</p>	<ul style="list-style-type: none"> • represent and interpret linear relationships in words, tables, graphs, and equations, and to make connections among the representations • classify relationships as direct variation, linear relationships that are not direct variations, or nonlinear relationships • describe situations that can be represented by increasing or decreasing linear relationships • understand slope as the constant rate of change in a line • calculate slope as the ratio $\frac{\text{rise}}{\text{run}}$ • understand how a change of scale factor can affect the appearance of the 	<p>Assessments – Each one will encompass at least one objective given throughout the unit The total number will be dependent on the needs of the students.</p> <p>Possible Quiz– graphing points, substituting into equations to find solutions and graphing the ordered pairs</p> <p>Possible Quiz identifying slope and y intercept, graphing equations in $y = mx + b$ form. Possible Quiz transforming and writing equations to represent application problems.</p> <p>Possible quiz - solving systems of</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>www.impactmath.com www.kutasoftware.com</p> <p>Manipulatives</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation</p> <p>:</p> <p>Material can be modified as needed for difficulty of numerical computation and</p>

	<p>geometric relationships of parallel and perpendicular lines (and polygons and their transformations.)</p> <p>CT(Core) 1.3a3 Solve systems of two linear equations using algebraic or graphical methods.</p> <p>CT(8) 1.2a4 Given two linear relationships in context, recognize that they may have a common solution.</p>	<p>slope and one point are known</p> <ul style="list-style-type: none"> • determine from the slopes in their equations if two lines are parallel • determine if three points are collinear • determine if an equation can be written in the form $y = mx + b$ as a test for linearity • plot a set of data, identify outliers, and draw a line of best fit • assess the limitations of a linear model based on a given situations • write systems of equations to represent situations • solve systems of equations by graphing, substitution, and elimination • determine and use the most appropriate method of solving systems of equations 	<p>well as critical thinking and problem solving skills related to the objectives covered in the unit. Possible test will be on graphing linear equations. Possible test 2 will be on solving systems of equations. Cumulative review packets (CMT skills based) periodically.</p>	<p>graphing systems of linear inequalities, Transformations of linear equations and formulas.</p>
--	--	---	--	---

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 3</p> <p style="text-align: center;">SOLVING EQUATIONS</p> <p style="text-align: center;">5 WEEKS</p>	<p>CT(8) 1.3a1 Solve multistep equations using algebraic properties.</p> <p>CT(8) 1.3a2 Use tables, graphs, and equations to represent mathematical relationships and solve real-world problems.</p> <p>CT (Core) 1.3a1 Model and solve problems with linear, quadratic, and absolute value equations and linear inequalities.</p> <p>CT(Core) 1.3a2 Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.</p> <p>CT(Core) 2.1b1 Use technological tools such as spreadsheets, probes, computer algebra systems, and graphing utilities to organize and analyze large amounts of numerical information.</p> <p>CT(Core) 2.2a1 Select and use appropriate</p>	<ul style="list-style-type: none"> • solve equations by backtracking and to recognize the limitations of this method • solve equations by performing the same operations on both sides • solve equations using a guess-check-and-improve strategy • interpret solutions mathematically and create equations to represent them • choose the most appropriate equation-solving method for a particular situation • understand the symbolic representation of inequalities • interpret situations mathematically and create inequalities to represent them • learn and apply methods for solving inequalities • graphically represent inequalities • use graphs of equations to find approximate solutions 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit. The total number will be dependent on the needs of the students.</p> <p>Possible Quiz Solving 1 & 2 step equations.</p> <p>Possible Quiz Solving multistep equations.</p> <p>Possible Quiz solving inequalities and graphing on a number line.</p> <p>Possible Quiz compound inequalities and Absolute value inequalities.</p> <p>Unit Test – will assess computation as well as critical thinking and problem solving skills related to the objectives covered</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>www.impactmath.com www.kutasoftware.com Manipulatives</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations to ensure student success with the concepts.</p> <p>Extensions can include problems with no solution, compound inequalities</p>

	<p>methods for computing to solve problems in a variety of contexts.</p>	<p>and then refine estimates</p> <ul style="list-style-type: none"> • use calculator-generated tables to find approximate solutions and then refine estimates 	<p>in the unit. Possible Test – Solving equations and inequalities, identifying a variable and writing equations to represent application problems. Possible extension Quiz– Review of linear equations and graphing of systems of linear inequalities. Cumulative review packets (CMT skills based) periodically.</p>	<p>(conjunctions/disjunctions) and absolute value inequalities, Graphing systems of linear inequalities.</p>
--	--	--	--	--

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 4</p> <p style="text-align: center;">TRANSFORMATIONAL GEOMETRY</p> <p style="text-align: center;">3 WEEKS</p>	<p>CT(7) 3.1a1 Identify which classes of polygons have line and/or rotational symmetry.</p> <p>CT(7) 3.1a2 Use rectangular grids to represent polygons and perform transformations (translations, rotations, reflections, and dilations) on these polygons.</p> <p>CT(7) 3.1a3 Describe the effect of transformations on polygons with line and/or rotational symmetry.</p> <p>CT(8) 3.2a1 Use coordinate geometry to explore and test geometric relationships of parallel and perpendicular lines and polygons and their transformations.</p> <p>CT(Core) 3.2a3 Apply transformations to plane figures to determine</p>	<ul style="list-style-type: none"> • determine whether a figure has reflection symmetry and to find the lines of symmetry for figures that do • construct the reflected images of points and geometric figures over a line • describe the relationship between the line of reflection and the segment joining a point to its reflective image • recognize rotation symmetry • determine the center of rotation and angle of rotation given a figure and its rotated image • construct the image of a figure under rotation and to iterate a rotation of a figure to create a new figure with rotation symmetry • describe the relationship between the repetition of the number of identical elements and the angle of 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit..</p> <p>Possible Quiz reflections – drawing reflections with a geo mirror and graphing reflections on a coordinate grid.</p> <p>Possible Quiz Translations and Dilations both by using vectors and by using mappings on a coordinate grid.</p> <p>Possible Quiz recognizing reflective and rotational symmetry, drawing rotations of figures.</p> <p>Unit Test – will assess computation as well as critical thinking and problem solving skills related to the</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>www.impactmath.com www.kutasoftware.com</p> <p>Manipulatives</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Project –Cross curricular 8th grade project (Egypt). Math section uses transformations to create an amulet.</p> <p>Project: Tessellation</p>

	<p>congruence, similarity, symmetry, and tessellations.</p>	<p>rotation for a figure with rotation symmetry</p> <ul style="list-style-type: none"> • translate points and figures given a vector of translation • determine the vector of translation given a pair of translated figures • understand how to compose transformations and to analyze the results in terms of single transformations with the same result • enlarge or shrink diagrams on a coordinate grid by multiplying or dividing coordinates • understand and apply the projection method for dilating a drawing • describe the effect of an algebraically described transformation on a coordinate point • apply algebraic rules to transform points • write algebraic rules to translate points along a given vector 	<p>objectives covered in the unit.</p> <p>Cumulative review packets (CMT skills based) periodically.</p>	<p>poster.</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of shape to ensure student success with the concepts..</p> <p>Extensions can include vector transformation on a graph, rotational transformations with a protractor.</p>
--	---	--	--	---

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 5 PROBABILITY WEEKS</p>	<p>CT(8) 4.3a1 Distinguish between combinations and permutations as ways to predict possible outcomes in certain situations.</p> <p>CT(8) 4.3a2 Use combinations and permutations, trees and networks (counting strategies) in a variety of contexts, and identify when order is irrelevant in determining a solution.</p>	<ul style="list-style-type: none"> • understand a concept of a sample space and its application to probability • list the outcomes of sample spaces using strategies that guarantee no outcome will be left out • use a pattern or a shortcut to find the size of a sample space without listing every outcome • create sample spaces with equally likely outcomes for a variety of games of chance involving dice • apply calculated probabilities to create strategies for winning a game of choice • analyze probabilities in real-world situations 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit. The total number will be dependent on the needs of the students.</p> <p>Possible Quiz basic counting principle, tree diagrams</p> <p>Possible Quiz Calculate with factorials, permutations, combinations.</p> <p>Possible Quiz Probability, odds, experimental vs. theoretical probability, geometric probability.</p> <p>Unit Test – will assess computation as well as critical thinking and problem solving skills related to the</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>www.impactmath.com www.kutasoftware.com</p> <p>Manipulatives</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations to ensure student success with the concepts.</p>

			<p>objectives covered in the unit.</p> <p>Test – covering quiz 1 – 3 topics and concept of fairness of games.</p> <p>Cumulative review packets (CMT skills based)</p> <p>periodical</p>	<p>Extensions can include using the formulas for permutations, combinations</p>
--	--	--	---	---

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 6</p> <p style="text-align: center;">EXPONENTS AND EXPONENTIAL VARIATION</p> <p style="text-align: center;">4 WEEKS</p>	<p>CT(8) 2.1a1 Compare, locate, label, and order rational numbers on number lines, scales, coordinate grids, and measurement tools.</p> <p>CT(8) 2.1a2 Identify another rational number between any two rational numbers.</p> <p>CT(8) 2.1a3 Solve a variety of problems involving integers, powers, roots, and scientific notation. CT(8) 2.1b1 Use powers of ten and negative exponents to write decimal fractions.</p> <p>CT(8) 2.1b2 Use powers of ten and positive and negative exponents to express and compare magnitude of very large and very small numbers and connect to scientific notation.</p> <p>CT(8) 2.1b3 Find the results of multiplication and division with powers</p>	<ul style="list-style-type: none"> • calculate values of expressions with positive and negative integer exponents • raise positive and negative (including fractional) bases to powers • understand and use laws of exponents • write very large and very small numbers using scientific notation and to expand scientific notation into standard notation • recognize relationships of exponential growth and exponential decay • identify the growth factor in relationships of exponential growth and exponential decay • distinguish exponential growth from exponential decay when described in algebraic expressions, tables, graphs, and words • represent exponential growth and exponential decay relationships with 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit. Total number will be dependent on the needs of the students.</p> <p>Possible Quiz Evaluating numbers written with positive and negative exponents, converting large and small numbers into scientific notation.</p> <p>Possible Quiz Simplify expressions using the laws of exponents</p> <p>Possible Quiz – Evaluate roots and fractional exponents. Identify irrational numbers.</p> <p>Possible Quiz – Simplify radical</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>Manipulatives www.impactmath.com www.kutasoftware.com</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations to ensure student success with the concepts..</p>

	<p>of ten using patterns in operating with exponents. CT CT(8) 2.1b(4) Develop, describe, and use a variety of methods to operate with very large and very small numbers. CT(8) 2.2a(2) Solve problems involving scientific notation and absolute value. CT(8) 2.2b(1) Use the rules for exponents to multiply and divide with powers of ten, including negative exponents. CT(8) 2.2b(2) Develop, describe, and use a variety of methods to estimate and calculate mentally with very large and very small numbers. CT(8) 2.2c(1) Solve problems that involve repetitive patterns and iterations, such as compound interest, using tables, spreadsheets, and calculators.</p>	<p>algebraic expressions</p> <ul style="list-style-type: none"> • simplify radical expressions • understand that irrational numbers cannot be expressed as the ratio of two integers • determine whether simple radicals are rational or irrational numbers 	<p>expressions (including rationalizing denominators). Quiz 5 – Recognize, calculate, graph, and predict outcomes in situations involving exponential growth and decay. Unit Test – will assess computation as well as critical thinking and problem solving skills related to the objectives covered in the unit. Cumulative review packets (CMT skills based) periodically.</p>	<p>Extensions can include calculating with numbers expressed in scientific notation, rationalizing denominators, imaginary numbers</p>
--	--	--	--	--

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 7</p> <p style="text-align: center;">WORKING WITH EXPRESSIONS</p> <p style="text-align: center;">(COMBINE LIKE TERMS, DISTRIBUTE, FOIL, FACTOR)</p> <p style="text-align: center;">4 WEEKS</p>	CT(Core) 1.3a2 Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	<ul style="list-style-type: none"> • To use geometric models in illustrating the distributive property to expand expressions of the form $a(b + c)$ • To represent algebraic expressions using rectangle models • To simplify expressions by combining like terms • To use geometric models to multiply binomials • To multiply binomials using the distributive property • To understand patterns for shortcuts in multiplying binomials • To understand the pattern and apply a shortcut to square binomials of the forms $(a + b)^2$ and $(a - b)^2$ • To understand the pattern and apply a shortcut to expand binomials of the form $(x + a)(x - a)$ • To understand when the denominator of an algebraic fraction is 	Quizzes – Each one will encompass at least one objective given throughout the unit. There will be a minimum of three quizzes, but the total number will be dependent on the needs of the students. Possible Quiz distribution, combine like terms, F.O.I.L. Possible Quiz Factor patterns Possible extension quiz Geometric figures w. algebraic dimensions. Unit Test – will assess computation as well as critical thinking and problem solving skills related to the objectives covered in the unit. Cumulative review	Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition) Manipulatives www.impactmath.com www.kutasoftware.com Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment. Calculators SMARTBoard Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations to ensure student success with

		<p>undefined</p> <ul style="list-style-type: none"> • To understand how the graph and table of an equation with an algebraic fraction shows values for which the equation is undefined • To simplify algebraic fractions • To multiply and divide algebraic fractions • To add and subtract algebraic fractions using common denominators • To use the graphs of equations containing algebraic fractions to estimate solutions • To solve equations containing algebraic fractions 	<p>packets (CMT skills based) periodically.</p>	<p>the concepts.</p> <p>Extensions can include Graphs of solutions to equations using algebraic fractions, undefined values for algebraic fractions.</p>
--	--	---	---	--

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p style="text-align: center;">UNIT 8</p> <p style="text-align: center;">SOLVING QUADRATIC EQUATIONS</p> <p style="text-align: center;">3 WEEKS</p>	<p>CT(Core) 1.3a(1) Model and solve problems with linear, quadratic, and absolute value equations and linear inequalities.</p> <p>CT(Core) 2.2a(1) Select and use appropriate methods for computing to solve problems in a variety of contexts.</p>	<ul style="list-style-type: none"> • To backtrack to undo taking the square root of a number • To backtrack to undo taking the reciprocal of a number • To backtrack to undo changing the sign of a number • To use backtracking to find solutions to equations with powers and square roots • To understand that some equations have more than one solution • To understand the zero product property • To solve quadratic equations in factored form • To solve quadratic equations by factoring the difference of two squares and perfect square trinomials • To solve quadratic equations by factoring quadratic trinomials • To solve equations of the 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit. The total number will be dependent on the needs of the students. Possible Quiz – solving quadratic equations with only an x^2 term by using square roots. Possible quiz – solving quadratic equations by factoring</p> <p>Possible quiz (extension) - solving quadratic equations by completing the square and the quadratic equations (including irrational and imaginary solutions.)</p> <p>Unit Test – will assess computation as well as critical</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>Manipulatives</p> <p>www.impactmath.com www.kutasoftware.com</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations.</p>

		<p>form $a(x + b)^2 + c = d$</p> <ul style="list-style-type: none"> • To identify perfect square trinomials • To complete quadratic expressions to make them perfect squares • To solve quadratic equations by completing the square • To understand the origin of the quadratic formula • To use the quadratic formula to solve quadratic equations • To understand when the quadratic formula is appropriate to solve equations and when factoring is appropriate • To understand how to apply the quadratic formula to specific situations • To understand the significance of $b^2 - 4ac$ in the quadratic formula 	<p>thinking and problem solving skills related to the objectives covered in the unit.</p> <p>Project Project: Pythagorean theorem application “book”.</p> <p>Cumulative review packets (CMT skills based) periodically.</p>	<p>Extensions can include completing the square solution method and finding solutions which have irrational or imaginary number answers with the quadratic equation.</p>
--	--	--	---	--

	CT Frameworks/Standards	Content and Skill Objectives Students will be able to:	Assessments	Resources
<p>UNIT 9</p> <p>FUNCTIONS AND THEIR GRAPHS</p> <p>4 WEEKS</p>	<p>CT(Core) 1.1a(3) Identify the characteristics of functions and relations, including domain and range.</p> <p>CT(Core) 1.2a(2) Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.</p> <p>CT(Core) 1.2a(3) Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.</p> <p>CT(Core) 1.2a(4) Evaluate and interpret the graphs of linear, exponential, and polynomial functions.</p>	<ul style="list-style-type: none"> To understand the definition of a function To understand different ways of representing functions To identify functions in a variety of contexts and representations To describe the domain of a given function To find the maximum or minimum value of a function from its graph To understand how horizontal and vertical translations of a graph are related to the equation of a function To specify the range of a function and understand the relationship between the range of a function and its maximum or minimum point To use x-intercepts and completing the square to find the line of symmetry and vertex of a parabola To use graphs to find approximate solutions to 	<p>Quizzes – Each one will encompass at least one objective given throughout the unit. The total number will be dependent on the needs of the students. Possible quiz identify a function algebraically, from a chart or data, and when pictured on a graphic. Possible quiz distinguish between the graphs of linear, direct variation, quadratic, exponential, and indirect variation.</p> <p>Unit Test – will assess computation as well as critical thinking and problem solving skills related to the objectives covered in the unit.</p>	<p>Textbook: Impact Mathematics, Algebra and More, Course 3, (2003 edition)</p> <p>Manipulatives</p> <p>www.impactmath.com www.kutasoftware.com</p> <p>Teacher created supplemental worksheets for prerequisite skills remediation and for enrichment.</p> <p>Calculators</p> <p>SMARTBoard</p> <p>Differentiation: Material can be modified as needed for difficulty of numerical computation and complexity of equations.</p>

		equations	Cumulative review packets (CMT skills based) periodically.	Extensions can include The algebraic transformations of function graphs, Graphic investigations of domain and range.
--	--	-----------	--	--