PUBLIC SCHOOLS OF EDISON TOWNSHIP

OFFICE OF CURRICULUM AND INSTRUCTION

Integrated Math A

Length of Course:	Term
Elective/Required:	Required
Schools:	High School
Eligibility:	Grade 11-12
Credit Value:	5 Credits
Date Approved:	September 23, 2019

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Statement of Purpose

This course of study has been designed for the combination of some of the basic principles of Algebra I and Geometry. Students will review the algebraic concepts of functions and linear equations and build on those concepts to improve their understanding. The course then shifts to a Geometry focus with an emphasis on angles, and parallel and perpendicular lines. The students will learn mathematical sense making, make and test conjectures and justify conclusions, use mathematical models to represent real-world data, be able to provide clear and concise answers, and have computational and symbolic fluency.

Course Objectives

The student will be able to:

1. Evaluate and write expressions using verbal and algebraic models to solve problems.
2. Create, solve, and graph linear equations.
3. Write equations of lines.
4. Solve and graph inequalities.
5. Solve systems of linear equations and inequalities.
6. Perform operations on functions involving exponents.
7. Solve and graph radical functions.
8. Find the measures of central tendency and measures of variation for statistical data.
9. Recognizing geometric figures and identifying their properties.
10. Applying geometric concepts to the solution of practical problems.
11. Solve rational and radical equations.
12. Perform operations with functions.

Suggested Timeline

UNIT	NUMBER of Periods
Unit 1: Chapter 0 Preparing for Integrated Math A	7
0.2, 0.3, 0.4, 0.5	
Unit 2: Chapter 1 Expressions, Equations and Functions	15
1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7	
Unit 3: Chapter 2 Linear Equations	13
2.1, 2.2, 2.3, 2.4, 2.5, 2.8	
Unit 4: Chapter 0 & 2 Percents and Linear Equations	7
0.6, 2.6, 2.7	
Estimated End of Marking Period 1	
Unit 5: Chapters 3 & 4 Linear Functions	13
3.1, 3.3, 4.1, 4.4, 4.5, 4.7	
Unit 6: Chapter 5 Linear Inequalities	16
5.1, 5.2, 5.3, 5.4, 5.5, 5.6	
Unit 7: Chapter 6 Systems of Linear Equations and Inequalities	16
6.1, 6.2, 6.3, 6.4, 6.5	
Estimated End of Marking Period 2	
Unit 8: Chapter 7 Exponents and Exponential Functions	10
7.1, 7.2, 7.4	
Unit 9: Chapter 8 Radical Functions and Rational Equations	16
8.2, 8.3, 8.4	
Unit 10: Chapter 0 and 9 Statistics and Probability	15
0.11, 9.2, 9.3	

Estimated End of Marking Period 3

Unit 11: Chapter 0 and 10 Preparing for Integrated Math/Geometry	11
0.7, 0.8, 0.9, 0.10, 10.6	
Unit 12: Chapter 10 Tools of Geometry	11
10.1, 10.2, 10.3, 10.4	
Unit 13: Chapter 11 Parallel and Perpendicular Lines	10
11.1, 11.2	

Total Class Periods 160

Note- The above suggested time line is a rough guideline based on suggestions from the McGraw-Hill Integrated Mathematics 1 textbook. Teachers must adjust their timing and pacing as they feel necessary to accommodate actual class periods available.

Unit Title: Chapter 0 Preparing for Integrated Math 1

Targeted Standards: The Number System, Expressions and Equations, Geometry, Statistics and Probability

Unit Objectives/Conceptual Understandings: Review several concepts, skills, and vocabulary terms from previously learned mathematical topics

Essential Questions: What concepts need to be reviewed before moving on to Integrated Math A? How can these concepts be applied to the new course?

Unit Assessment: Teacher-generated assessments

	Core Content Objectives		Instructional Actions	
Cumulative Progress Indicators	**Concepts** **What students will know**	**Skills** **What students will be able to do**	**Activities/Strategies**	**Assessment Check Points**
S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).	Students will know: ❑ Definitions of the following terms: ❑ integer ❑ absolute value ❑ opposites ❑ reciprocal ❑ perimeter ❑ circle ❑ diameter ❑ center ❑ circumference ❑ radius ❑ area ❑ volume ❑ surface area ❑ probability ❑ sample space ❑ complement ❑ tree diagrams	Students will be able to: ● Classify and use real numbers ● Add, subtract, multiply, and divide integers ● Compare and order rational numbers ● Add, subtract, multiply, and divide rational numbers ● Use and apply the percent proportion ● Find the perimeter of 2-D figures ● Find the area of 2-D figures ● Find the volume of rectangular prisms and cylinders ● Find the surface area of rectangular prisms and cylinders	<u>Number Lines</u> Instruct students to be consistent in the scales on their number lines. Remind them to show tick marks at equal intervals. <u>Interactive Whiteboard</u> Draw a set diagram on the board showing how the set of real numbers is separated into rational and irrational numbers, integers, whole numbers, etc. Create a list of 12 real numbers, and have students come to the board to drag them into the correct set in the diagram.	Chapter 0 Pre-test Pgs. P3 Chapter 0 Post-test Pgs. P47-48 <u>Ticket Out the Door</u> Ask students to write one rational number and one irrational number on a sheet of paper. Have them label each as rational or irrational.

	❑ odds ❑ mean ❑ median ❑ mode ❑ range ❑ quartile ❑ interquartile range ❑ outliers ❑ bar graph ❑ histogram ❑ line graph ❑ circle graph ❑ box-and-whisker plot	• Find the probability and odds of simple events • Find the measures of central tendency, variation, and position • Represent sets of data using different visual displays	Draw a Diagram Encourage students to draw a diagram to organize the information given in the problem.	

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	Instructional Adjustments: Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 0. This study tool can also be used to review for the chapter test. Preventing Errors Remind students to subtract the lesser absolute value from the greater absolute value when adding integers with different signs. The sum will have the sign of the number with the greater absolute value.

Unit Title: Chapter 1 Expressions, Equations, and Functions

Targeted Standards: Number and Quantity: Number Quantities, Algebra: Seeing Structure of Expressions, Creating Equations, Reasoning with Equations and Inequalities, Functions: Interpreting Functions

Unit Objectives/Conceptual Understandings: How to perform operations on whole numbers, Write algebraic expressions, Use the order of operations, Solve equations, Represent and interpret relations and functions, Use function notation

Essential Questions: How can mathematical ideas be represented?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 1 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts** **What students will know**	**Skills** **What students will be able to do**	**Activities/Strategies**	**Assessment Check Points**
A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. A.SSE.2 Use the structure of an expression to identify ways to rewrite it. A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A.REI.10	Students will know: ❑ Definitions of the following terms: ❑ algebraic expression ❑ variable ❑ term ❑ power ❑ coefficient ❑ equation ❑ solution ❑ identity ❑ relation ❑ domain ❑ range ❑ independent variable ❑ dependent variable ❑ function	Students will be able to: ● Write verbal expressions for algebraic expressions. ● Wire algebraic expression for verbal expressions. ● Evaluate numerical and algebraic expressions by using order of operations. ● Recognize the properties of equality and identify ● Recognize Commutative and Associative Properties ● Use the Distributive Property to evaluate	1-3 Algebra Lab: Accuracy 1-7 Graphing Technology Lab: Representing Functions Encourage students to represent problems in multiple ways and compare the results. Interactive Whiteboard Write an algebraic expression on the board. Have students come to the board and use the highlighter tool to identify the variable. Copy the expression and have students replace the highlight with the value.	Mid-Chapter Quiz: Lessons 1.1-1.4 Pg. 32 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 62 - 66 Ch. 1 Practice Test Pg. 67 Ch. 1 Preparing for Standard Tests Pgs. 68 - 71 Write a numerical and an algebraic expression on the board. Have students work with a partner and take turns explaining how

Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*). F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		and simplify expressions. ● Solve equations. ● Represent relations. ● Interpret graphs of relations. ● Determine whether a relation is a function. ● Find function values.		to evaluate one of the expressions using the order of operations. <u>Ticket Out the Door</u> Tell students that temperatures, in Fahrenheit, were 81º, 84º, 85º, 86º, and 88º on days 1–5. Ask students to identify the independent and dependent variables on a slip of paper.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 1. This study tool can also be used to review for the chapter test. Preventing Errors: Some students may have difficulty remembering the names of the properties in this lesson. Remind these students that they already know how to use the properties. Encourage them to think of word associations that will help them relate what they know to the correct names of the properties.

Unit Title: Chapter 2 Linear Equations

Targeted Standards: Number and Quantity: Number Quantities, Algebra: Creating Equations, Reasoning with Equations and Inequalities

Unit Objectives/Conceptual Understandings: How to simplify algebraic expressions, Create equations that describe relationships, Solve linear equations in one variable, Solve proportions, Use formulas to solve real-world problems.

Essential Questions: Why is it helpful to represent the same mathematical idea in different ways?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 2 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
A.CED.1 Create equations and inequalities in one variable and use them to solve problems. A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable	Students will know: ❑ Definitions of the following terms: ❑ formula ❑ solve an equation ❑ equivalent equations ❑ multi-step equation ❑ identity ❑ ratio ❑ proportion ❑ rate ❑ unit rate ❑ scale model ❑ percent of change ❑ literal equation	Students will be able to: ● Translate sentences into equations. ● Translate equations into sentences. ● Solve equations by using addition, subtraction, multiplication, and division. ● Solve equations involving more than one operation. ● Solve equations involving consecutive integers. ● Solve equations with variable on each side.	2-2 Algebra Lab: Solving Equations 2-6 Spreadsheet Lab: Descriptive Modeling 2-7 Algebra Lab: Percentiles Isolating Variables Explain that when isolating a variable, it does not matter whether the variable ends up on the left or right side of an equation. For example, the solution of 8 = 15 + *z* is still –7, even though the final step may be –7 = *z*.	Mid-Chapter Quiz: Lessons 2.1 - 2.5 Pg. 110 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 139-144 Ch. 2 Practice Test Pg. 145 Ch. 2 Preparing for Standard Tests Pgs. 146-149 Ticket Out the Door Make several copies of five different equations. Give one equation to

argument to justify a solution method. N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	❑ dimensional analysis ❑ weighted average	• Solve equations involving grouping symbols. • Evaluate absolute value expressions. • Solve absolute value equations. • Compare ratios. • Solve proportions. • Find percent of change. • Solve problems involving percent of change. • Solve equations for given variable. • Use formulas to solve real world problems. • Solve mixture problems, • Solve uniform mixture problems.	Encourage students to think about the numerical relationship that is represented by each portion of a graph. Explain to students that reversing the *x*- and *y*-coordinates results in the inverse of a relation. Point out that the inverse of a relation has the same number of ordered pairs as the relation.	each student. As students leave, ask them to give a verbal sentence for the equation.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 2. This study tool can also be used to review for the chapter test. Preventing Errors: Students may try to skip a step and solve the problem without first writing the equation. Tell students that they will make fewer mistakes in solving equations if they translate the sentence and write the equation before solving it Preventing Errors Remind students that the product of a fraction and its reciprocal is 1.

Unit Title: Chapter 3 Linear Functions

Targeted Standards: Number and Quantity: Number Quantities, Algebra: Reasoning with Equations and Inequalities, Functions: Interpreting Functions, Linear, Quadratic, and Exponential Models

Unit Objectives/Conceptual Understandings: Identify linear equations, intercepts, and zeros, Graph and write linear equations, Use rate of change to solve problems

Essential Questions: Why are graphs useful?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 3 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in	Students will know: ❑ Definitions of the following terms: ❑ linear equation ❑ standard form ❑ constant ❑ x-intercept ❑ y-intercept ❑ linear function ❑ parent function ❑ family of graphs ❑ root ❑ rate of change ❑ slope	Students will be able to: ● Identify linear equations, intercepts, and zeros ● Graph linear equations ● Solve linear equations by graphing ● Estimate solutions to a linear equation by graphing ● Use rate of change to solve problems ● Find the slope of a line	3-1 Algebra Lab: Analyzing Linear graphs 3-2 Graphing Technology Lab: Graphing Linear Functions 3-3 Algebra Lab: Rate of Change of a Linear Functions 3-5 Algebra Lab: Inductive and Deductive Reasoning Explain to students that *f*(*x*) is a special notation, and is not "*f* " times "*x*." Advise students to look for key words that describe situations in which it may be necessary to round an estimate up or down. For example, if you do not want	Mid-Chapter Quiz: Lessons 3-1 to 3-3 Pg. 181 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 203 - 205 Ch. 3 Practice Test Pg. 207 Ch. 3 Preparing for Standard Tests Pgs. 208 - 211 Ticket Out the Door

formulas; choose and interpret the scale and the origin in graphs and data displays. F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.* F.LE.1a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.	❑ direct variation ❑ constant of variation	• Write and graph direct variation equations • Solve problems involving direct variation	to have *too few*, you need to round up. If you do not want to have *too much*, you round down. A slope of 0 does not mean there is no slope. It means that the line has no steepness—that is, the line is horizontal. Explain to students that linear functions have a constant rate of change or slope, regardless of which pair of points is used in the calculation, due to the properties of similar triangles. Demonstrate the idea by calculating the slopes of the sides of two triangles that can be formed from a line. Remind students that they have studied similar triangles in previous math courses.	Make several copies of five different lines graphed on a coordinate plane. Give one graph to each student. As the students leave the room, ask them to tell you the slopes of the lines they possess.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 3. This study tool can also be used to review for the chapter test. Preventing Errors Be sure students do not interchange the values of *x* and *y* when substituting them into an equation.

Unit Title: Chapter 4 Equations of Linear Functions

Targeted Standards: Algebra: Creating Equations, Functions: Interpreting Functions, Building Functions, Linear, Quadratic, and Exponential Models, Statistics and Probability: Interpreting Categorical & Quantitative Data

Unit Objectives/Conceptual Understandings: Write and graph linear equations in various forms; Use scatter plots and lines of fit, and write equations of best-fit lines using linear regression; Find inverse linear functions

Essential Questions: Why is math used to model real-world situations?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 4 Test Form 3

	Core Content Objectives		**Instructional Actions**	
Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima. S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in context of the data. F.BF.1 Write a function that describes a relationship between two quantities. F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a	Students will know: ❑ Definitions of the following terms: ❑ slope-intercept form ❑ linear extrapolation ❑ point-slope form ❑ parallel lines ❑ perpendicular lines ❑ scatter plot ❑ line of fit ❑ linear interpolation ❑ best-fit line ❑ linear regression ❑ correlation ❑ coefficient ❑ inverse relation ❑ inverse function	Students will be able to: ● Write and graph linear equations in slope-intercept form ● Model real-world data with equations in slope-intercept form ● Write an equation of a line in slope-intercept form given the slope and one point ● Write an equation of a line in slope-intercept form given two points ● Write equations of lines in point-slope form	4-1 Graphing Technology Lab: Investigating Slope-Intercept Form/The Family of Linear Graphs 4-5 Algebra Lab: Correlation and Causation 4-7 Algebra Lab: Drawing Inverses Explain to students that when given two points on a line, they may select either point to be (x_1,y_1). Be sure to remain consistent throughout the problem. If the (x_1,y_1) coordinates are negative, be sure to	Mid-Chapter Quiz: Lessons 4-1 to 4-4 Page 246 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pages 272-276 Ch. 4 Practice Test Page 277 Ch. 4 Preparing for Standardized Tests Pages 278 - 281 Name the Math Prepare two paper bags containing pieces of paper. One bag will

relationship, or two input-output pairs (include reading these from a table). F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals. S.ID.6c Fit a linear function for a scatter plot that suggests a linear association. S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. A.CED.2		• Write linear equations in different forms • Write an equation of a line that passes through a given point, parallel to a given line • Write an equation of the line that passes through a given point, perpendicular to a given line • Investigate relationships between quantities by using points on scatter plots • Use lines of fit to make and evaluate predictions • Find the inverse of a relation • Find the inverse of a linear function	account for both the negative signs and the subtraction symbols in the Slope Formula. Advise students that the slope of the line remains unchanged throughout the line. They can go in either direction along the line using the same rise over run and they will always end at a point on the line. <u>Interactive Whiteboard</u> Drag a coordinate plane onto the whiteboard. Plot two points on the plane and ask students to find the equation of the line that goes through these two points. Then, drag the points to other locations on the plane and repeat.	contain a value for the slope on each slip of paper; the other will contain an ordered pair on each slip of paper. Have students select both a slope and an ordered pair or two ordered pairs. Ask students to write equations in the three forms discussed in this lesson. <u>Ticket Out the Door</u> Ask students to write and graph an equation of the form Ax + By = C. Have them draw two lines parallel to this line and describe those lines in terms of A, B, and C.

Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. F.BF.4a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.				

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2: Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 4. This study tool can also be used to review for the chapter test. Preventing Errors: Remind students that b can be negative, so equations may not always have positive constants.

Unit Title: Chapter 5 Linear Inequalities

Targeted Standards: Algebra: Reasoning with Equations and Inequalities, Creating Equations

Unit Objectives/Conceptual Understandings: Solve one-step and multi-step inequalities; Solve compound inequalities and inequalities involving absolute value; Graph inequalities in two variables

Essential Questions: How are symbols useful in mathematics? What mathematical symbols do you know?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 5 Test Form 3

	Core Content Objectives		**Instructional Actions**	
Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
A.CED.1 Create equations and inequalities in one variable and use them to solve problems. A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. A.REI.12	Students will know: ❑ Definitions of the following terms: ❑ inequality ❑ set-builder notation ❑ compound inequality ❑ intersection ❑ union ❑ boundary ❑ half-plane ❑ closed half-plane ❑ open half-plane	Students will be able to: ● Solve linear inequalities by using addition, subtraction, multiplication, and division ● Solve linear inequalities involving more than one operation ● Solve linear inequalities involving the Distributive Property ● Solve compound inequalities containing the word *and*, *or*, and graph their solution set. ● Solve and graph absolute value	5-2 Algebra Lab: Solving Inequalities 5-4 Algebra Lab: Reading Compound Statements 5-6 Graphing Technology Lab: Graphing Inequalities Interactive Whiteboard Display a number line on the board. Give the class several exercises, and select students to come to the board to graph their solutions on the number line. Student Misconceptions Students may incorrectly assume that the solution of all inequalities in which the	Mid-Chapter Quiz: Lessons 5-1 to 5-3 Page 304 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pages 324-326 Ch. 5 Practice Test Page 327 Ch. 5 Preparing for Standardized Tests Pages 328 - 331 Ticket Out the Door Have students write a short statement about what they think is the most important thing to

Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		inequalities (>) and (<) ● Graph linear inequalities on the coordinate plane ● Solve inequalities by graphing	variable has been eliminated is the empty set. Remind students that they must simplify the inequality to determine whether it is a true statement. If the inequality is true, the solution set is the set of all real numbers. Only when the inequality is untrue is the solution the empty set.	remember about solving inequalities by multiplication and division. Ticket Out the Door Ask students to write, on a slip on paper, whether the boundary of the graph of $y < 2x + 1$ has a dashed or solid line and what this means.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 5. This study tool can also be used to review for the chapter test. Preventing Errors: Point out to students that an inequality is easier to solve using division when the inequality involves whole numbers and easier to solve using multiplication by reciprocals when the inequality involves fractions. Preventing Errors: Point out that the rules for the Division Property of Inequalities state that each side of an inequality can be divided by a positive or negative number. In neither case is zero included because division by zero is an undefined operation.

Unit Title: Chapter 6 Systems of Linear Equations and Inequalities

Targeted Standards: Algebra: Reasoning with Equations and Inequalities, Creating Equations

Unit Objectives/Conceptual Understandings: Solve systems of linear equations by graphing, substitution, and elimination; Solve systems of linear inequalities by graphing

Essential Questions: How can you find the solution to a math problem?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 6 Test Form 3

	Core Content Objectives		**Instructional Actions**	
Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Students will know: ❑ Definitions of the following terms: ❑ system of equations ❑ consistent ❑ independent ❑ dependent ❑ inconsistent ❑ substitution ❑ elimination ❑ matrix ❑ element ❑ dimension ❑ augmented matrix ❑ row reduction ❑ identity matrix ❑ system of inequalities	Students will be able to: ● Determine the number of solutions a system of linear equations has ● Solve systems of linear equations by graphing ● Solve systems of equations by using substitution ● Solve real-world problems involving systems of equations by using substitution ● Solve systems of equations by using elimination with addition, subtraction, and multiplication	6-1 Graphing Technology Lab: Systems of Equations 6-5 Algebra Lab: Using Matrices to Solve Systems of Equations 6-6 Graphing Technology Lab: Systems of Inequalities Interactive Whiteboard Create a table with columns: no solutions, 1 solution, and infinitely many solutions. Write several systems of equations on the board. Have students drag each system to the correct column.	Mid-Chapter Quiz: Lessons 6-1 to 6-4 Page 363 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pages 378-382 Ch. 6 Practice Test Page 383 Ch. 6 Preparing for Standardized Tests Pages 384 - 387 Ticket Out the Door Give students a small piece of grid paper. Have them draw a graph that

A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		• Determine the best method for solving systems of equations • Apply systems of equations • Solve systems of linear inequalities by graphing • Apply systems of linear in equalities	If students have difficulty graphing systems of inequalities, then suggest that they graph each inequality on a separate coordinate graph and then put the two graphs together on the same coordinate graph by copying them over or tracing them.	represents a system of equations that is consistent and dependent. <u>Name the Math</u> Write a system of equations on the board. Have students pair up and tell each other how they would solve the system.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student-Built Glossary, pp. 1–2 Students should complete the chart by providing the definition of each term and an example as they progress through Chapter 6. This study tool can also be used to review for the chapter test. Preventing Errors: Point out that if neither of the equations gives one variable in terms of the other, you must solve for one variable first. The easiest choice in Example 2 is to solve the first equation for x by subtracting 2y from both sides. Preventing Errors: When using elimination with subtraction to solve systems of equations, many students forget to distribute the negative sign over every term of the equation that is subtracted. Since subtraction is the same as adding the inverse, you might suggest that students change the signs of the terms and then add to eliminate the variable.

Unit Title: Chapter 7 Exponents and Exponential Functions

Targeted Standards: Number and Quantity: The Real Number System, Algebra: Seeing Structure in Expressions, Functions: Interpreting Functions, Building Functions, Linear, Quadratic, and Exponential Models

Unit Objectives/Conceptual Understandings: Simplify and perform operations on expressions involving exponents, extend the properties of integer exponents to rational exponents, Use scientific notation

Essential Questions: How can you make good decisions? What factors can affect good decision making?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 7 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
A.SSE.2 Use the structure of an expression to identify ways to rewrite it. F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. N.RN.2	Students will know: ❑ Definitions of the following terms: ❑ monomial ❑ constant ❑ zero exponent ❑ negative exponent ❑ order of magnitude ❑ rational exponent ❑ cube root ❑ nth root ❑ exponential equation ❑ scientific notation	Students will be able to: ● Multiply monomials using the properties of exponents ● Simplify expressions using the multiplication properties of exponents ● Divide monomials using the properties of exponents ● Simplify expressions containing negative and zero exponents ● Evaluate and rewrite expressions involving rational exponents ● Solve equations involving expressions	7.5 Graphing Technology Lab: Family of Exponential Functions Remind students that there is often more than one strategy that can be used to simplify an expression Interactive Whiteboard Write a number not in scientific notation on the board. Grab the decimal point and drag it to the left or right as you count the number of places you have moved it.	Mid-Chapter Quiz: Lessons 7.1 - 7.4 Pg. 421 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 451-453 Ch. 7 Practice Test Pg. 455 Ch. 7 Preparing for Standard Tests Pgs. 456-459 Ticket Out the Door

Rewrite expressions involving radicals and rational exponents using the properties of exponents. F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	❑ exponential function ❑ exponential growth ❑ exponential decay	with rational exponents ● Express numbers in scientific notation ● Find products and quotients of numbers expressed in scientific notation ● Graph exponential functions ● Identify data that display exponential behavior		Make several copies each of five monomial expressions that need to be simplified. Give one expression to each student. As students leave the room, ask them to tell you the simplified versions of the expressions they possess.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Student Misconceptions Students may simplify an expression such as $(4/6)(x^2y^5)^3\ [2(xy)^7]$ into $(8/6)x^{13}y^{22}$, not realizing that the simplification is incomplete because the fraction is not in the simplest form. If students have trouble keeping track of a moving decimal point, then have students write each digit in the number 201,000,000, for example, on an index card. Using an object such as a paper clip or penny as the decimal point, students can actually move the decimal point and count the number of places it moved. Repeat using other numbers from the examples, such as 0.000051. Student Misconceptions Make sure students understand that the graphs of exponential functions never actually touch the *x*-axis. It is acceptable for hand-drawn graphs to show the graph just above and about parallel to the *x*-axis as long as students understand that the graph gets infinitely close to the axis without touching it.

Unit Title: Chapter 8 Radical Functions, Rational Functions, and Geometry

Targeted Standards: Number and Quantity: The Real Number System, Algebra: Creating Equations, Reasoning with Equations and Inequalities, Functions: Interpreting Functions

Unit Objectives/Conceptual Understandings: Graph and transform radical functions, Simplify, add, subtract, and multiply radical expressions, Solve radical equations, Use the Pythagorean Theorem, Find trigonometric ratios

Essential Questions: How can you choose a model to represent a real-world situation?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 8 Test Form 3

	Core Content Objectives		**Instructional Actions**	
Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. A.REI.4a Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form (*x* - *p*)2 = *q*	Students will know: ❑ Definitions of the following terms: ❑ square root function ❑ radicand ❑ radical function ❑ radical expression ❑ conjugate\ rationalize the denominator ❑ closed ❑ radical equations ❑ extraneous solutions ❑ inverse variation	Students will be able to: ● Graph and analyze dilations of radical functions. ● Graph and analyze reflections and translations of radical functions. ● Simplify radical expressions by using the Product Property of Square Roots. ● Simplify radical expressions by using the Quotient Property of Square Roots. ● Add, subtract, and multiply radical expressions. ● Solve radical equations.	8-1 Graphing Technology Lab: Graphing Square Root Functions 8-2 Algebra Lab: Rational and Irrational Numbers 8-7 Graphing Technology Lab: Solving Rational Equations In order to simplify square roots with the Product Property of Square Roots, students need to be able to find the prime factorization of the radicand. Take a few minutes to review finding prime factorizations so that students can focus on	Mid-Chapter Quiz: Lessons 8.1 - 8.4 Pg. 487 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 511 - 514 Ch. 8 Practice Test Pg. 515 Ch. 8 Preparing for Standard Tests Pgs. 516 - 519 Ticket Out the Door Ask students to write radical expressions in which they need to use a conjugate to rationalize

that has the same solutions. Derive the quadratic formula from this form. N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.REI.11 Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	❑ product rule ❑ rational equation ❑ work problem ❑ rate problem	• Solve radical equations with extraneous solutions. • Identify and use inverse variations. • Graph inverse variations. • Solve rational equations. • Use rational equations to solve problems.	learning the new concept rather than trying to recall earlier material. Extraneous Roots It is always important to check a solution to an equation in the original equation, but it is especially important when each side of an equation has been multiplied by a variable. If your solution is an approximation, it is sometimes difficult to determine whether a discrepancy is due to rounding or if it is an incorrect solution.	the denominators. Have students simplify the expressions.

Resources:
Teachers will incorporate textbook resources as needed.

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The Geometer's Sketchpad®

Instructional Adjustments:

Auditory Discuss with your class the parts of a right triangle that are used to define the sine, cosine, and tangent ratios. As a class, determine which side is opposite and which is adjacent to each of the acute angles of a right triangle. Ask students to refer to the Study Tip on p. 657. Explain how SOH-CAH-TOA (pronounced soa • kuh • TOE • uh) can be used to help them remember the definitions for sine, cosine, and tangent.

Visual/Spatial Perfect squares can be removed from under a radical sign and written as a square root. For example, because $\sqrt{25}=5$ $\sqrt{50}=\sqrt{25\cdot 2}=5\sqrt{2}$, Suggest that groups make a colorful poster of all the perfect squares from 0 to 400.

Logical One of the conceptually challenging ideas in working with translations of parent graphs is understanding why $y=\sqrt{x-4}$ moves a graph right (in the positive direction) and $y=\sqrt{x+4}$ moves a graph left (in the negative direction). Ask students to develop an explanation using examples to show why this happens.

Unit Title: Chapter 9 Statistics and Probability

Targeted Standards: Statistics and Probability: Interpreting Categorical & Quantitative Data

Unit Objectives/Conceptual Understandings: Design surveys and evaluate results, Use permutations and combinations, Find probabilities of compound events, Design and use simulations

Essential Questions: How are statistics and probability used in the real world?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 9 Test Form 3

	Core Content Objectives		**Instructional Actions**	
Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Students will know: ❑ Definitions of the following terms: ❑ statistical inference ❑ statistic ❑ parameter	Students will be able to: ● Identify sample statistics and population parameters ● Analyze data sets using statistics ● Describe the shape of distribution ● Use the shapes of distributions to select appropriate statistics ● Determine the effect that transformations of data have on measures of central tendency and variation ● Compare data using measures of central	9-3A Algebra Lab: Two-Way Frequency Tables 9-3B Graphing Technology Lab: The Normal Curve Interactive Whiteboard Use a spreadsheet or other software program to calculate various statistics from data collected from a survey. Keep this information displayed on the board as you teach students what it means and how to interpret it.	Mid-Chapter Quiz: Lesson 9-1 to 9-3 Pg. 545 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 550-552 Ch. 9 Practice Test Pg. 553 Ch. 9 Preparing for Standard Tests Pgs. 554 - 557 Ticket Out the Door

		tendency and variation		Have students explain the difference between positively skewed, negatively skewed, and symmetric sets of data and give an example of each. Have students write a sentence on how yesterday's lesson on summarizing and analyzing survey results helped with today's lesson on sample statistics and population parameters.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Interpersonal Learners Have students work in pairs to think of ways to help them remember how to recognize the different shapes of the distributions from histograms and box-and-whisker plots.

Unit Title: Chapter 10 Tools of Geometry

Targeted Standards: Geometry: Congruence, Expressing Geometric Properties with Equations, Modeling with Geometry

Unit Objectives/Conceptual Understandings: Find distances between points and midpoints of line segments, Identify angle relationships, Find perimeters, areas, surface areas, and volumes

Essential Questions: Why do we measure?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 10 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).* G.CO.12 Make formal geometric constructions with a variety of	Students will know: ❑ Definitions of the following terms: ❑ collinear ❑ coplanar ❑ congruent ❑ midpoint ❑ segment bisector ❑ angle ❑ vertex ❑ angle bisector ❑ polygon ❑ perimeter	Students will be able to: ● Identify and model points, lines, and planes ● Identify intersecting lines and planes ● Measure segments ● Calculate with measures ● Find the distance between two points ● Find the midpoint of a segment ● Measure and classify angles	10-1 Geometry Lab: Describing what you see 10-2 Extension Lesson: Precision and Accuracy 10-5 Geometry Lab: Constructing Perpendiculars 10-6 Geometry Software Lab: Two-Dimensional Figures Name the Math Discuss how points, lines, and planes are modeled by the objects students see and use every day.	Mid-Chapter Quiz: Lessons 10-1 to 10-4 Pg. 601 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 630-634 Ch. 10 Practice Test Pg. 635 Ch. 10 Preparing for Standard Tests Pgs. 636 - 639 Have students write a paragraph that explains

tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*		• Identify and use congruent angles and the bisector of an angle • Identify and name polygons • Find perimeter, circumference, and area of 2-D figures	<u>Finding Distance</u> Encourage students to use the Pythagorean Theorem to find the distance between two points several times before introducing the Distance Formula. Students tend to have difficulty remembering the Distance Formula, and this affords them an alternative to find the distance between two points. <u>Unlocking Misconceptions</u> A common mistake is that students subtract the coordinates in the Midpoint Formula because subtraction is used in the distance and the slope formulas. Remind students that the midpoint is the mean of each coordinate and to find the mean or average, the sum is divided by the number of terms.	how the lesson about linear measures helped them in the lesson about the Distance Formula, the Pythagorean Theorem, and the Midpoint Formula. <u>Ticket out the Door</u> Distribute a sheet of paper with several polygons on it. Have the students label each figure, classify it, use a ruler to measure the lengths of the sides, and calculate the perimeter. Have students turn in their results before they leave the classroom.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Visual/Spatial Learners: Hold a meter stick up for students to see so that the marked side is facing away from them. Ask a volunteer to mark on the back of the stick about where they visualize the middle of the meterstick to be. Have a second volunteer verify the first student's mark or add another mark. Place a pen upright on the 50-cm mark so that it shows exactly where the midpoint of the meterstick is and compare to the students' marks. Explain how people can use spatial skills to very closely identify the exact middle of many objects. If students have difficulty using or remembering the formulas for perimeter; Then have them build their intuition by measuring cut outs of triangles, squares, and rectangles. To measure the circumference of a circle, have students use a piece of string that they can measure.

Unit Title: Chapter 11 Parallel and Perpendicular Lines

Targeted Standards: Geometry: Congruence, Expressing Geometric Properties with Equations, Modeling with Geometry

Unit Objectives/Conceptual Understandings: Identify and prove angle relationships that occur with parallel lines and a transversal, Use slope to analyze a line and to write its equation, Find the distance between a point and a line and between two parallel lines

Essential Questions: Why do we have undefined terms such as *point* and *line*?; How can we use undefined terms?

Unit Assessment: Teacher-generated assessments; Connect-Ed Chapter 11 Test Form 3

	Core Content Objectives	**Instructional Actions**

Cumulative Progress Indicators	**Concepts**	**Skills**	**Activities/Strategies**	**Assessment Check Points**
G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). G.GPE.5	Students will know: ❑ Definitions of the following terms: ❑ parallel lines ❑ skew lines ❑ parallel planes ❑ transversal ❑ interior angles ❑ exterior angles ❑ corresponding angles ❑ slope ❑ rate of change ❑ slope-intercept form	Students will be able to: ● Identify the relationships between two lines and two planes ● Name angle pairs formed by parallel lines and transversals	11-2 Geometry Software Lab: Angles and Parallel Lines 11-3 Graphing Technology Lab: Investigating Slope 11-4 Geometry Lab: Equations of Perpendicular Bisectors Interactive Whiteboard Draw a three-dimensional figure on the board (such as a rectangular prism or square pyramid). Choose students to come to the board and highlight the	Mid-Chapter Quiz: Lessons 11-1 to 11-3 Pg. 667 H.O.T. Problems: Higher Order Thinking Skills Study Guide and Review Pgs. 695 - 698 Ch. 11 Practice Test Pg. 699 Ch. 11 Preparing for Standard Tests Pgs. 700-703 Ticket Out the Door

Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). G.CO.9 Prove theorems about lines and angles. G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*	❑ point-slope form ❑ equidistant		edges that are parallel to each other. When deciding if line segments intersect, do not extend the lines to decide if they would intersect if they continued further. Line segments have a fixed length. Tell students to be careful when calculating slope of points that contain negative coordinates. Students should write the complete formula for slope, substitute the coordinates, and then simplify.	As the students leave the room, ask them to identify intersecting lines in the classroom, and classify pairs of angles formed when a transversal intersects two other lines.

Resources: Teachers will incorporate textbook resources as needed. www.connected.mcgraw-hill.com The Geometer's Sketchpad®	**Instructional Adjustments:** Interpersonal Have each student write a fraction on an index card to represent the slope of a line. Then have each student trade cards with another student. Each student should write the slope of a line that is either parallel to or perpendicular to the slope of the first line on the other student's card. Have students return the card to the original owner, who will then label the relationship of the lines as either parallel or perpendicular and construct an accurate drawing of the two lines. Intrapersonal Have students construct a drawing of two or three parallel lines cut by a transversal and number each angle. Then have them classify the relationship between each pair of angles as alternate interior, alternate exterior, corresponding, or consecutive interior and complementary or supplementary. Explain to students that when they find the equation of a graph they should always check their work. Working independently, have students look at the examples in this lesson and substitute points on the line into the final equation. They should see that the substitution results in a true equation.