Math 8

Unit Title: Unit 1: Review Material and Equations in One and Two Variables(41 Days)

Stage 1: Desired Results

Standards & Indicators:

8.EE.C.7: Solve linear equations in one variable.

8.EE.C.7a: Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming given equation into simpler forms until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).

8.EE.C.7b: Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

8.EE.B.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

8.F.A.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

8.F.B.4: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.A.3: Interpret the equation y=mx+b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.EE.C.8: Analyze and solve pairs of simultaneous linear equations.

8.EE.C.8a: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

8.EE.C.8b Solve systems of two linear equations in two variables using the substitution method and

estimate solutions by graphing the equations. Solve simple cases by inspection. For example: by inspection,

Math 8

conclude that $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and

6. Solve $3x + y = 30$ and $y = 2x$ using the substitution method

8.EE.C.8c: Solve real-world and mathematical problems leading to two linear equations in two variables.

Mathematical Practices
MP.1 Make sense of problems and persevere in solving them
MP. 2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others
MP. 4 Model with mathematics
MP. 5 Use appropriate tools strategically
MP. 6 Attend to precision
MP. 7 Look for and make use of structure
MP. 8 Look for and express regularity in repeated reasoning

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).	
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.

Math 8

Central Idea/Enduring Understanding: **Chapter 2:** **Lessons 1-3**: The numerical factor of a term that contains a variable is called the coefficient of the variable. When the coefficient is a fraction, multiply each side by the multiplicative inverse of the fraction. A two-step equation is an equation that contains two operations. To solve two-step equations, use inverse operations to undo each operation in reverse order of the order of operations. **Lessons 4-5**: Solving equations sometimes requires several steps. **Chapter 3:** **Lessons 1-3**: A linear relationship has a constant rate of change. In a proportional linear relationship between two quantities a and b: the ration b/a is constant, the change in b / change in a is constant, and the graph passes through the origin. The slope of a line is the ratio of the vertical change (rise) between any two points on a line and the horizontal change (run) between the same two points. The slope formula can be used to find the slope of the line between any two points on the line. A linear equation that describes a constant rate of change is called direct variation, In a direct variation relationship, the ratio of t/x is a constant k. The variable y is said to vary directly with x. This relationship can be represented as $y/x = k$ or $y = kx$.	**Essential/Guiding Question**: At the end of the Unit, students should be able to answer the Essential Questions: **Chapter 2: What is equivalence?** 1. How is the multiplicative inverse used to solve an equation that has a rational coefficient? 2. How can you use the work backward problem-solving strategy to solve a two-step equation? 3. Why is it important to define a variable before writing an equation? 4. How is solving an equation with the variable on each side similar to solving a two step equation? 5. How many possible solutions are there to a linear equation in one variable? **Chapter 3: Why are graphs helpful?** 1. How can you use a table to determine if there is a proportional relationship between two quantities? 2. In any linear relationship, why is the slope always the same? 3. What is the relationship among the unit rate, slope, and constant rate of change of a proportional linear relationship?
Content: **Review Material**: Integer Skills Order of Operations Fraction & Decimal Operations **Chapter 2:** 2.1: Solve Equations with Rational Coefficients 2.2: Solve Two-Step Equations 2.3: Write Two Step Equations	**Skills**(Objectives): **Review Material:** Simplify expressions with integers and fractions. **Chapter 2:** 2.1: Solve equations with rational coefficients. 2.2: Solve two-step equations. 2.3: Write two-step equations that represent situations. 2.4: Solve equations with variables on each side. 2.5: Solve multi-step equations. **Chapter 3:**

Math 8

2.4: Solve Equations with Variables on Each Side 2.5: Solve Multi-Step Equations **Chapter 3:** 3.1: Constant Rate of Change 3.2: Slope 3.3: Equations in y=mx Form	3.1: Identify proportional and nonproportional linear relationships by finding a constant rate of change. 3.2: Use tables and graphs to find the slope of a line. 3.3: Use direct variation to solve problems.

Interdisciplinary Connections:
Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
Unit 1 Activities/Videos: 8.EE.C.7: Solving Equations 8.EE.C.7: The Sign of Solutions 8.EE.C.7: Sammy's Chipmunk and Squirrel Observations 8.EE.B.5: Coffee by the Pound 8.EE.B.5: Who Has the Best Job? 8.EE.B.5: Peaches and Plums 8.EE.B.6: Slopes Between Points on a Line 8.F.A.2: Battery Charging 8.F.B.4: Baseball Cards 8.F.B.4: Video Streaming 8.F.A.3: Introduction to Linear Functions 8.EE.C.8: Kimi and Jordan 8.EE.C.8: Fixing the Furnace 8.EE.C.8a: The Intersection of Two Lines 8.EE.C.8c: Summer Swimming	Online and Written Assignments Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments Exit Cards CFA

Stage 3: Learning Plan

Learning Opportunities/Strategies:	**Resources:**
Use various Think-Pair-Share strategies provided by Glencoe for each lesson. **Lesson 2.1:** Have students work in teams. Each student should write down 2 facts about multiplicative inverses and 1 fib, or 2 pairs of numbers that are multiplicative inverses and 1 pair that is not. The job of the team is to identify the fib. **Lesson 2.2:** Have students work with a partner to decode the operation that is used in each equation to help identify the problem.	Glencoe Math Course 3 Textbook (Chapters 2-3) IXL Kahoot Khan Academy Lesson Presentations Graphing Calculator Google Forms and Sheets ALEKS Gimkit Google apps for education Desmos Woot Math

Math 8

Lesson 2.3: Have students write a sentence that can be translated into a two-step equation. Then have them trade their sentences with a partner. Each partner writes and solves the equation the other student wrote.

Lesson 2.4: Have students complete 2 of 5 exercises in a small heterogeneous team. Then have students work in pairs to complete 2 more of the five problems. Have students answer the last problem on their own.

Lesson 2.5: Have students work in pairs to create a flowchart of the steps involved in solving a multi-step equation. Then have them use their flowchart to complete 2 exercises.

Lesson 3.1: Have students create their own real-world problem involving a constant rate of change. Have them trade their problems with a

partner. Each partner generates a list of ordered pairs that represent the problem and graph them on a coordinate plane. Have them use the graph to verify whether the relationship demonstrates a constant rate of change. Then have them use the graph to determine whether the relationship is proportional. Have them justify their response.

Lesson 3.2: Have students prepare a chart of words or phrases that have similar meanings as slope. Display this chart in the class.

Lesson 3.3: Have students work in pairs to explain the similarities and differences of the following terms: slope, unit rate, constant rate of change, and constant of variation.

Quizizz
Quizalize
Flocabulary
Brain Pop
Mash-Up Math
Easel by Teachers Pay Teachers
Classkick
Edulastic

Math Literacy
- I can solve a word problem graphic organizer
- Think pair share graphic organizer
- Vocabulary Word Map
- Frayer Model
- Collection of Graphic Organizers

LGBT and Disabilities Resources:
- LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth
- LGBTQ+ Books
- Inclusive Math Class

DEI Resources:
- Learning for Justice
- GLSEN Educator Resources
- Supporting LGBTQIA Youth Resource List
- Respect Ability: Fighting Stigmas, Advancing Opportunities
- NJDOE Diversity, Equity & Inclusion Educational Resources
- Diversity Calendar

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative	Provide a highly structured, predictable learning environment Provide organizers/study guides	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several

Math 8

Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice	Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction	channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 2: Linear Equations and Linear/Nonlinear Functions (40 Days)

Stage 1: Desired Results

Standards & Indicators:

8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y=mx for a line through the origin and the equation y=mx+b for a line intercepting the vertical axis at b.

8.F.A.3: Interpret the equation y=mx+b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.F.B.4: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.EE.C.8c: Solve real-world and mathematical problems leading to two linear equations in two variables.

8.EE.C.8: Analyze and solve pairs of simultaneous linear equations.

8.EE.C.8a: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

Math 8

8.EE.C.8b: Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.

8.F.A.1: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

8.F.A.2: Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically,numerically in tables, or by verbal descriptions).

8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g. where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Mathematical Practices
MP.1 Make sense of problems and persevere in solving them
MP. 2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others
MP. 4 Model with mathematics
MP. 5 Use appropriate tools strategically
MP. 6 Attend to precision
MP. 7 Look for and make use of structure
MP. 8 Look for and express regularity in repeated reasoning

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).	
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting

Math 8

		information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.

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<u>**Central Idea/Enduring Understanding**</u>:
Chapter 3
Lessons 4-6: The slope-intercept form of a linear equation is y=mx+b where m is the slope and b is the y-intercept. To grade an equation in slope intercept form using the slope and y-intercept: 1) graph the y-intercept, 2) from the y-intercept use the slope to find the next point, 3) draw a line passing through both points. To graph functions using the x- and y-intercepts: 1) Find the x-intercept by replacing y with 0 and solving for x, 2) find the y-intercept by replacing x with 0 and solving for y, 3) Locate the two intercepts on a coordinate plane and draw a line passing through both points.
Lessons 7-8: A system of equations is a collection of two or more equations with the same variables. A system of equations can have the following: 1) one solution - lines intersect at a point, 2) no solution- parallel lines, or 3) infinitely many solutions - same line. A system can also be solved algebraically using substitution.

Chapter 4
Lessons 1-2: A relation is a set of ordered pairs that can be represented as a table or a graph.
Lessons 3-6: A function is a special type of relation in which each member of the domain is paired with exactly one member in the range.
Lesson 7-9: Some functions are linear and others are nonlinear. You can use a table or a graph to make the determination. If a function is linear, its graph is a straight line and a table of values for the function exhibits a constant rate of change. A nonlinear function is a function whose graph is not a straight line and

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<u>**Essential/Guiding Question**</u>:
At the end of the Unit, students should be able to answer the Essential Questions:

Chapter 3: Why are graphs helpful?
1. How does the y-intercept appear in these three representations: table, equation, and graph?
2. How can the x-intercept and y-intercept be used to graph a linear equation?
3. How does using the point-slope form of a linear equation make it easier to write the equation of a line?
4. How can you use a graph to solve a system of equations?
5. How can you solve a system of equations?

Chapter 4: How can we model relationships between quantities?
1. How can you use a graph to write an equation?
2. How do tables and graphs represent relations?
3. How does the domain affect the range in a function?
4. How can functions be used to solve real-world situations?
5. What are the advantages and disadvantages to representing a function as an equation instead of a graph?
6. How is the initial value of a function represented in a table and in a graph?
7. How can you use a table or a graph to determine if a function is linear or nonlinear?
8. When does the graph of a quadratic function open upward or downward?
9. What are some advantages of displaying the relationship between two quantities using a qualitative graph?

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a table of values for the function displays a rate of change that is not constant.	
Content: **Chapter 3:** 3.4: Slope-Intercept Form 3.5: Graph a Line Using Intercepts 3.6: Write Linear Equations 3.7: Solve Systems of Equations by Graphing 3.8: Solve Systems of Equations Algebraically **Chapter 4:** 4.1: Represent Relationships 4.2: Relations 4.3: Functions 4.4: Linear Functions 4.5: Compare Properties of Functions 4.6: Construct Functions 4.7: Linear and NonLinear Functions 4.8: Quadratic Functions 4.9: Qualitative Graphs	**Skills**(Objectives)**:** **Chapter 3:** 3.4: Graph linear equations using the slope and y-intercept. 3.5: Graph an equation using the x- and y-intercepts. 3.6: Write an equation of a line. 3.7: Solve systems of linear equations by graphing. 3.8: Solve systems of equations algebraically. **Chapter 4:** 4.1: Translate tables and graphs into linear equations. 4.2: Represent relations using tables and graphs. 4.3: Find function values and complete function tables. 4.4: Represent linear functions using tables and graphs. 4.5: Compare properties of functions represented in different ways. 4.6: FInd and interpret the rate of change and initial value of a function. 4.7: Determine whether a function is linear or nonlinear. 4.8: Graph quadratic functions. 4.9: Sketch and describe qualitative graphs.
Interdisciplinary Connections: Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.	

Stage 2: Assessment Evidence

Performance Task(s):	**Other Evidence:**
8.EE.B.6: Slopes Between Points on a Line 8.F.A.3: Introduction to Linear Functions 8.F.B.4: Baseball Cards 8.F.B.4: Video Streaming 8.EE.C.8c: Summer Swimming 8.EE.C.8: Cell Phone Plans 8.EE.C.8: Kimi and Jordan 8.EE.C.8a: The Intersection of Two Lines 8.F.A.1: Function Rules 8.F.A.1: Introducing Functions 8.F.A.2: Battery Charging	Online and Written Assignments Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments CFA Exit Cards

Stage 3: Learning Plan

Learning Opportunities/Strategies:	**Resources:**
Use various Think-Pair-Share strategies provided by Glencoe for each lesson.	Glencoe Math Course 3 Textbook (Chapters 3-4) IXL

Math 8

Lesson 3.4: Have students work in pairs. Have them discuss one exercise with student 1 leading the discussion. After everyone agrees on the solution, each student individually records their answer. Repeat the process with another exercise with student 2 leading the discussion. Continue rotating the leader role until all of the exercises have been completed. **Lesson 3.5:** Have students generate their own problem involving an equation expressed in standard form. Have students trade their problem with a partner, solve each other's problem and graph each other's equation, and discuss any differences in solutions. **Lesson 3.6:** Give them about two minutes of "think time." Then have them work with a partner to complete 2 exercises and discuss their responses. Then have them work individually to complete four more exercises. Upon completion, have them discuss their solutions with their partner and resolve any differences. **Lesson 3.7:** Have students work in small teams to complete one exercise, in pairs to complete exercise another exercise, and independently to complete a third exercise. Then have the original teams discuss their responses to the third exercise. **Lesson 3.8:** Have students work in pairs to compare and contrast solving a system of equations graphically and solving a system of equations algebraically. Then they should compile a list of pros and cons for each method. **Lesson 4.1:** Have students write a real-world problem and trade their partners with a partner. Each partner should create a table of values, create a graph, and write an equation that represents the relationship. Have students check each other's work, and discuss and resolve any differences. **Lesson 4.2:** Have students work in groups of 3-4 to label a copy of the coordinate plane with at least one error. Then have students	Kahoot Khan Academy Lesson Presentations Graphing Calculator Google Forms and Sheets ALEKS Gimkit Google apps for education Desmos Woot Math Quizizz Quizalize Flocabulary Brain Pop Mash-Up Math Easel by Teachers Pay Teachers Classkick Edulastic Math Literacy - I can solve a word problem graphic organizer - Think pair share graphic organizer - Vocabulary Word Map - Frayer Model - Collection of Graphic Organizers LGBT and Disabilities Resources: - LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth - LGBTQ+ Books - Inclusive Math Class DEI Resources: - Learning for Justice - GLSEN Educator Resources - Supporting LGBTQIA Youth Resource List - Respect Ability: Fighting Stigmas, Advancing Opportunities - NJDOE Diversity, Equity & Inclusion Educational Resources - Diversity Calendar

trade papers with another group. Each group should find and correct the error(s). **Lesson 4.3:** Have students create their own problem. Students trade their problems, solve each other's problems, and compare solutions If the solutions do not agree students work together to find the errors. **Lesson 4.4:** For each exercise, have students create a different representation than the one given. **Lesson 4.5:** Assign students to 3 person teams. Each team completes 4 exercises with a different team member leading each exercise and making sure each team member understands the problem before moving on. **Lesson 4.6:** Have students work in pairs. Give them one minute to think through their responses to one exercise. Then have them share their responses with their partner and discuss any differences in their solutions. Have them repeat this process for 3 more exercises. **Lesson 4.7:** Students write down two facts and one fib about linear functions or nonlinear functions. Students then form teams of 3. The job of the team is to identify the fib in each group of statements. **Lesson 4.8:** Have students work in pairs to complete the graphic organizer, and write a definition of quadratic function in their own words. Have them trade their definition with another pair and discuss any differences. **Lesson 4.9:** Have students create their own problem and challenge them to have at least 4 changes in their graphs. Students trade their problems, create a graph for each other's problem, and compare graphs.	

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of	Tutoring Tables Graphic organizers Differentiation of learning strategies:	Provide a highly structured, predictable learning environment	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but

difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring Pair student with a high achieving student	are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 3: Exponents, Triangles, and Transformations (45 Days)

Stage 1: Desired Results

Standards & Indicators:

8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^2 = p$, where p is a positive rational number.

8.EE.A.2a Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational

8.EE.A.2b Simplify numerical radicals, limiting to square roots (i.e. nonperfect squares). For example, simplify $\sqrt{8}$ to $2\sqrt{2}$.

 8.NS.A.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

Math 8

8.NS.A.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.

8.NS.A.3 Understand that 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

8.G.A.5: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.G.B.6: Explain a proof of the Pythagorean Theorem and its converse.

8.G.B.7: Apply the Pythagorean Theorem to determine unknown-side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.B.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

8.G.A.1: Verify experimentally the properties of rotations, reflections, and translations.

8.G.A.3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Mathematical Practices
MP.1 Make sense of problems and persevere in solving them
MP. 2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others
MP. 4 Model with mathematics
MP. 5 Use appropriate tools strategically
MP. 6 Attend to precision
MP. 7 Look for and make use of structure
MP. 8 Look for and express regularity in repeated reasoning

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).	

		diverse solutions are needed.
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.

<u>Central Idea/Enduring Understanding</u>:	<u>Essential/Guiding Question</u>:
Chapter 1:	At the end of the Unit, students should be able to answer the Essential Questions:
Lesson 1: Rational numbers are numbers that can be written as fractions. Both terminating and repeating decimals can be written as fractions, but non-terminating, non-repeating numbers such as π and $\sqrt{2}$ cannot be written as fractions. So, these numbers are not rational. The rules and properties for adding, subtracting, multiplying, and dividing rational numbers are the same as those for integers and fractions.	**Chapter 1: Why is it helpful to write numbers in different ways?**
	1. How can you determine if a number is a rational number?
	2. How can I write repeated multiplication using powers?
	3. How can I use the properties of integer exponents to simplify algebraic and numeric expressions?
Lessons 2-4: A product of repeated factors can be expressed as a power, using an exponent and a base. From this definition comes the Laws and Exponents, which include: Product of Powers, Quotient of Powers, Power of a Power, and Power of a Product.	4. How does the Product of Powers law apply to finding the power of a power?
	5. How are negative exponents and positive exponents related?
Lesson 5: By definition, any nonzero number to the zero power is 1 and any nonzero number to a negative power, n, is the multiplicative inverse of its nth power.	6. Why would I need to use square roots and cube roots?
	7. How can I estimate the square root of a non-perfect square?
Lessons 8-10: Squaring a number and finding a square root are inverse operations. Cubing a number and finding a cube are inverse operations.	8. How are real numbers different from irrational numbers?
	Chapter 5: How can algebraic concepts be applied to geometry?
Chapter 5:	1. How are the measures of angles related when parallel lines are cut by a transversal?
	2. How is deductive reasoning used in algebra and geometry proofs?

Math 8

Lessons 1-2: Parallel lines are lines in the same plane which never intersect. A line that intersects two or more lines is called a transversal. When a transversal intersects two parallel lines angle relationships form such as alternate interior angles, alternate exterior angles, and corresponding angles.

Lessons 3-4: Triangles are classified according to their angle measures or their number of congruent sides. The best way to classify a quadrilateral is by using the most specific description of its sides and angles. Since the angle sum of any triangle is 180°, the angle sum of any quadrilateral is 360°. A polygon is a closed figure formed by three or more line segments Polygons are classified by their number of sides.

Lessons 5-7: The Pythagorean Theorem describes the relationship between the legs and the hypotenuse for any right triangle. The converse of the Pythagorean Theorem is also true. The Distance Formula can also be used to find the distance between two points on the coordinate plane.

Chapter 6:
Lesson 1: A transformation is an operation that maps an original geometric figure, the pre-image, onto a new figure called the image. When a transformation maps one figure onto another using a sliding motion, without turning, it is called a translation. When an original figure is translated, the coordinates of the image are related to the horizontal and vertical changes.
Lesson 2: A reflection is a transformation produced by flipping a figure over the line of symmetry.
Lesson 3: A rotation is a transformation produced by turning a figure about a fixed point called the center of rotation.
Lesson 4: A dilation is a transformation produced by enlarging or reducing an original figure by a scale factor.

3. How can you find the missing measure of an angle in a triangle if you know two of the interior angles?
4. How can I find the sum of the interior angle measures of a polygon?
5. What is the relationship among the legs and the hypotenuse of a right triangle?
6. How do you solve a right triangle?
7. How can you use the Pythagorean Theorem to find the distance between two points on the coordinate plane?

Chapter 6: How can we best show or describe the change in position of a figure?
1. How are figures translated on the coordinate plane?
2. How can you determine the coordinates of a figure after a reflection over either axis?
3. What is the difference between rotating a figure about a given point that is a vertex and rotating the same figure about the origin if the rotation is less than 360°?
4. How are dilations similar to scale drawings?

Math 8

Skills(Objectives):
Chapter 1:
1.1: Write fractions as decimals and decimals as fractions.
1.2: Write and evaluate expressions involving powers and exponents.
1.3: Simplify real number expressions by multiplying and dividing monomials.
1.4: Use the Laws of Exponents to find powers of monomials.
1.5: Simplify expressions involving negative exponents.
1.8: Find square roots and cube roots.
1.9: Estimate square and cube roots.
1.10: Compare mathematical expressions.

Chapter 5:
5.1: Identify relationships of angles formed by two parallel lines cut by a transversal.
5.2: Write geometric proofs.
5.3: Find missing angle measures in triangles.
5.4: FInd the sum of the angle measures of a polygon and the measure of one interior angle of a regular polygon.
5.5: Use the Pythagorean Theorem.
5.6: Solve problems using the Pythagorean Theorem.
5.7: Find the distance between two points on the coordinate plane.

Chapter 6:
6.1: Graph translations on the coordinate plane.
6.2: Graph reflections on the coordinate plane.
6.3: Graph rotations on the coordinate plane.
6.4: Use scale factors to graph dilations.

Interdisciplinary Connections:
Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

Stage 2: Assessment Evidence

Performance Task(s):
8.EE.A.1: Raising to the Zero and Negative Powers
8.G.A.5: Street Intersections
8.G.B.6: Converse of the Pythagorean Theorem
8.G.B.7: Running on the Football Field
8.G.B.8: Finding Isosceles Triangles
8.G.A.3: Reflecting Reflections
8.NS.A.1: Identifying Rational Numbers

Other Evidence:
Online and Written Assignments
Mid Chapter Quizzes
End of Chapter Assessments
End of Unit Common Assessments
CFA
Exit Cards

Math 8

8.NS.A.2: [Placing a Square Root on the Number Line](#)	

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Stage 3: Learning Plan

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Learning Opportunities/Strategies:	**Resources:**
Use various Think-Pair-Share strategies provided by Glencoe for each lesson.	Glencoe Math Course 3 Textbook (Chapters 1,5,6)
Lesson 1.1: Make up sets of index cards with different types of number sets, such as odd and even, fractions, and decimals. Each set of cards should have 10-20 different numbers. Divide students into small groups and give each group a set of cards. Ask them to classify each number in as many ways as you can.	IXL

Use various Think-Pair-Share strategies provided by Glencoe for each lesson.
Lesson 1.1: Make up sets of index cards with different types of number sets, such as odd and even, fractions, and decimals. Each set of cards should have 10-20 different numbers. Divide students into small groups and give each group a set of cards. Ask them to classify each number in as many ways as you can.
Lesson 1.2: Have students work in a group to make and complete a table similar to the one shown using a factor other than 3.
Lesson 1.3: Have students work in pairs to complete the Enrich worksheet. Have them trade their solutions with another pair of students and discuss any differences.
Lesson 1.4: Remind students how to find the volume of a cube. First have them write the side length three times. Then, have them rewrite the expression without exponents. Finally, have them write the expression using only one base and one exponent.
Lesson 1.5: Think-Pair-Share: Ask students: How is 100 written as a power of 10? 1,000?
Lesson 1.8: Ask students if it matters whether the factors are both positive or both negative when dealing with perfect squares.
Lesson 1.9: Designate a leader to call out each of the following numbers one at a time: 100, 9, 36, 64, 49, 4, 25, 81, and 16. Ask students to hold up the square root of the number using their fingers.
Lesson 1.10: First give each member of the pair two index cards and have them write the definition of rational numbers and give some examples on one card. Then ask them to write a definition of irrational numbers based on their definition or rational numbers. Have

Resources:
Glencoe Math Course 3 Textbook (Chapters 1,5,6)
IXL
Kahoot
Khan Academy
Lesson Presentations
Graphing Calculator
Google Forms and Sheets
ALEKS
Gimkit
Google apps for education
Desmos
Woot Math
Quizizz
Quizalize
Flocabulary
Brain Pop
Mash-Up Math
Easel by Teachers Pay Teachers
Classkick
Edulastic
Math Literacy
- I can solve a word problem [graphic organizer](#)
- Think pair share [graphic organizer](#)
- Vocabulary [Word Map](#)
- [Frayer Model](#)
- Collection of [Graphic Organizers](#)

LGBT and Disabilities Resources:
- [LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth](#)
- [LGBTQ+ Books](#)
- [Inclusive Math Class](#)

DEI Resources:
- [Learning for Justice](#)
- [GLSEN Educator Resources](#)
- [Supporting LGBTQIA Youth Resource List](#)
- [Respect Ability: Fighting Stigmas, Advancing Opportunities](#)

Math 8

them share with a partner to verify their definitions.

Lesson 5.1: Have students write parallel lines and perpendicular lines written on the front of two index cards. On the back, have them draw an example and write the definition. Have them use these cards as a reference throughout the lesson.

Lesson 5.2: Have pairs write inductive reasoning and deductive reasoning on two index cards. Have them write the attributes of each kind of reasoning on the back of each card. Have them use their index cards to determine which type of reasoning was used for each situation in the graphic organizer.

Lesson 5.3: Have students research or look for a real-world example of a triangle formed by transversals crossing parallel lines. Have them explain how known angle measures can help to find unknown angles in the triangle.

Lesson 5.4: Have students work in pairs. Give each pair an index card. On the card, they should list the names of polygons and corresponding number of sides from triangle to decagon. Have students refer to their cards when completing 5 exercises. Then have them compare their answers with another pair.

Lesson 5.5: Have students work in a team to complete two exercises. Then have them work in pairs to complete two exercises. Finally have them work alone to complete one exercise. Compare answers when finished.

Lesson 5.6: Have students work in pairs to create a real-world problem in which the Pythagorean Theorem must be used to solve the problem. They should create a drawing and post it around the room. Pairs of students pick a problem and return to their seats to solve it.

Lesson 5.7: Have students work with a partner to prepare a brief oral presentation about how the Distance Formula is derived from the Pythagorean Theorem. Their presentations should include illustrations. Have them present to the class.

- NJDOE Diversity, Equity & Inclusion Educational Resources
- Diversity Calendar

Math 8

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Lesson 6.1: Have students draw an image on a coordinate grid. Then have them write instructions in coordinate form for how to translate the image. Trade the graph paper and translate each other's images.

Lesson 6.2: Have students draw their own figure in one quadrant of the coordinate grid and plot at least 4 points. Have students trade the grid and reflect each other's figure over the x-or y- axis. Then have them work together to write the algebraic notations that explain the effect of the reflections.

Lesson 6.3: For two exercises, have students predict the coordinates of the image after the rotation without graphing. Then have them compare the coordinates after graphing to see if their prediction was correct.

Lesson 6.4: Complete one exercise together as a class. Ask a student to volunteer to write the directions for each step on the board and the remaining students copy the notes on the side of the page in their texts. Direct them to follow the same steps for two more exercises.

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Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions

Math 8

Puzzle time activities Record and practice journal	Lesson tutorials Skills review handbook	Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring Pair student with a high achieving student	Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Unit Title: Unit 4: Congruence & Similarity, Volume & Surface Area, Scatter Plots, & Financial Literacy

Stage 1: Desired Results

Standards & Indicators:

8.G.A.1: Verify experimentally the properties of rotations, reflections, and translations.

8.G.A.1a: Lines are transformed to lines, and line segments to line segments of the same length.

8.G.A.1b: Angles are transformed to angles of the same measure.

8.G.A.2: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

8.G.A.4: Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations;given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

8.G.A.5: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y=mx for a line through the origin and the equation y=mx+b for a line intercepting the vertical axis at b.

8.EE.A.4: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for

measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.

8.EE.A.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

8.G.C.9: Know the formula for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

8.SP.A.1: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

8.SP.A.2: Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.

Integration of Climate Change:
- 8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. 🌿
  Climate Change Example: Students may use the formula for the volume of a sphere to approximate the volume of hailstones to consider how climate change may affect the size of hailstones over time.
- 8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. 🌿
  Climate Change Example: Students may construct and interpret scatterplots of measurement data to investigate patterns of association in bivariate data involving the amount of a greenhouse gas in the atmosphere and its effect on temperature.

Mathematical Practices
MP.1 Make sense of problems and persevere in solving them
MP. 2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others
MP. 4 Model with mathematics
MP. 5 Use appropriate tools strategically
MP. 6 Attend to precision
MP. 7 Look for and make use of structure
MP. 8 Look for and express regularity in repeated reasoning

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.1.8.PB.1	Predict future expenses or opportunities that should be included in the budget planning process.	A budget aligned with an individual's financial goals can help prepare for life events.

Math 8

9.1.8.CP.3	Explain the purpose of a credit score and credit record, the factors and impact of credit scores.	There are strategies to build and maintain a good credit history.
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2	Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).	
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specific task (e.g., W.11-12.6.).	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.	Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others.

Central Idea/Enduring Understanding:	Essential/Guiding Question:
Chapter 7:	At the end of the Unit, students should be able to answer the Essential Questions:
Lesson 1-2: In two congruent figures, you can determine the transformation, or series of transformations, that maps one figure onto the other by analyzing the orientation or relative position of the figures. If two figures are congruent, their corresponding sides are congruent and their corresponding angles are congruent.	**Chapter 7: How can you determine congruence and similarity?**
Lessons 3-4: Two figures are similar if the second can be obtained from the first by a sequence of transformations and dilations. Similar figures have the same shape, but may have different sizes. The sizes of the two figures are related to the scale factor of the dilation. Two polygons are similar if their corresponding angles are congruent and the	1. Why do translations, reflections, and rotations 2. How can the coordinate plane help you determine that corresponding sides are congruent? 3. What is the difference between using transformations to create similar figures versus using transformations to create congruent figures? 4. How does the scale factor of a dilation relate to the ratio of two of the corresponding sides of the preimage and the image? 5. How do similar triangles make it easier to measure very tall objects?

measures of their corresponding sides are proportional. The ratio of the lengths or corresponding sides is called the scale factor.
Lessons 5-7: Indirect measurement uses the properties of similar polygons to find lengths that are difficult to measure directly. In similar figures, the ratio of the perimeters of two similar figures is equal to the ratio of the corresponding sides and the ratio of the areas of two similar figures is equal to the square of the ratio of the corresponding sides.

Chapter 8:
Lessons 1-3: Volume is the measure of space occupied by a three-dimensional region. It is measured in cubic units.
Lessons 4-6: The lateral area of a prism is the sum of the areas of the lateral faces. The surface area is the sum of the lateral area and the area of the base(s). Similar solids are 3D figures that have the same shape and whose corresponding linear measures are proportional. The scale factor of similar solids is how much larger or smaller one solid is than another. It is written as a ratio in simplest form.

Chapter 9:
Lessons 1-3: A scatter plot is used to explore possible relationships between a data set with two variables. The data may have a positive, negative or no relationship. A line of best fit is a line that is very close to most of the data points. A two-way table shows data from one sample group as it relates to two different categories.
Lessons 4-6: Data with one variable are called univariate data and can be described by a measure of center, such as mean, median, mode, or range. Quantitative data are data that can be measured. The data can be divided into four equal parts, called quartiles. The five-number summary provides a numerical way of characterizing a set of data. The mean absolute deviation of a set of data is the

6. How is the slope of a line related to the similar slope triangles formed by the line?
7. If you know two figures are similar and you are given the area of both figures, how can you determine the scale factor of the similarity?

Chapter 8: Why are formulas important in math and science?
1. How is the formula for the volume of a cylinder to the formula for the volume of a rectangular prism?
2. What would have a greater effect on the volume of a cone: doubling its radius or doubling its height?
3. True or False: The volume of a sphere is ⅔ the volume of a cylinder with the same radius r and height of 2r?
4. How is a calculation affected if you round n to 3.14 or use the pi key on your calculator?
5. How does the volume of a three dimensional figure differ from its surface area?
6. How is the volume of a prism affected when its dimensions are tripled?

Chapter 9: Why is learning mathematics important?
1. What are the inferences that can be drawn from sets of data points having a positive association and a negative association?
2. Why do we estimate a line of best fit for a scatter plot?
3. How is a two-way table used when determining possible associations between two different categories from the same sample group?
4. What does the length of the "whiskers" in a box plot say about the data?
5. How does the mean absolute deviation describe the variation of a set of data?
6. Why is the median used to describe the center of non-symmetric distribution instead of the mean?

Chapter 1: Why is it helpful to write numbers in different ways?
1. How is scientific notation useful in the real world?
2. How does scientific notation make it easier to perform computations with very large or very small numbers?

Financial Literacy

Math 8

average distance between each data value and the mean. The standard deviation of a set of data is a calculated value that shows how the data deviates from the mean of the data.

Chapter 1:
Lessons 6-7: It is often helpful to express very large numbers and very small numbers in scientific notation, where a number is written as the product of a number and a power of 10. When the exponent of the power of 10 is positive, the number is greater than 1. When the exponent of the power of 10 is negative, the number is between 0 and 1.

Financial Literacy:
To support the path towards postsecondary success, students require opportunities to understand and develop both career awareness and personal financial literacy. Standard 9.1 Personal Financial Literacy outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance.

1. How can we create and plan a budget based on income, education, etc?
2. What are strategies to build credit?
3. What is a credit score?

Content:
Chapter 1:
1.6: Scientific Notation
1.7: Compute with Scientific Notation

Chapter 7:
7.1: Congruence and Transformations
7.2: Congruence
7.3: Similarity and Transformations
7.4: Properties of Similar Polygons
7.5: Similar Triangles and Indirect Measurement
7.6: Slope and Similar Triangles
7.7: Area and Perimeter of Similar Figures

Chapter 8:
8.1: Volume of Cylinders
8.2: Volume of Cones
8.3: Volume of Spheres
8.4: Surface Area of Cylinders

Skills(Objectives):
Chapter 7:
7.1: Use a series of transformations to create congruent figures.
7.2: Write congruence statements for congruent figures.
7.3: Use transformations to create similar figures.
7.4: Identify similar polygons and find missing measures of similar polygons.
7.5: Solve problems involving similar triangles.
7.6: Relate the slope of a line to similar triangles.
7.7: Find the relationship between perimeters and areas of similar figures.

Chapter 8:
8.1: Find the volume of cylinders.
8.2: Find the volume of cones.
8.3: Find the volume of spheres.
8.4: Find the surface area of cylinders.
8.5: Find the surface area of cones.
8.6: Solve problems involving similar solids.

Math 8

8.5: Surface Area of Cones 8.6: Changes in Dimensions **Chapter 9:** 9.1: Scatter Plots 9.2: Lines of Best Fit 9.3: Two-Way Tables 9.4: Descriptive Statistics 9.5: Measures of Variation 9.6: Analyze Data Distributions **Financial Literacy** Occupation research Monthly Income & Budgeting Savings	**Chapter 9:** 9.1: Construct and make conjectures about scatter plots. 9.2: Draw lines of best fit and use them to make predictions about data. 9.3: Construct and interpret two-way tables. 9.4: Find the measures of center and variation. 9.5: Find and interpret the mean absolute deviation for a set of data. 9.6: Analyze data distributions. **Chapter 1:** 1.6: Use scientific notation to write large and small numbers. 1.7: Compute with numbers written in scientific notation.

Interdisciplinary Connections:
Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

Stage 2: Assessment Evidence

Performance Task(s): 8.G.A.2: Triangle Congruence with Coordinates 8.G.A.4: Are They Similar? 8.G.A.5: Similar Triangles 1	**Other Evidence:** Online and Written Assignments Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments CFA Exit Cards

Stage 3: Learning Plan

Learning Opportunities/Strategies: **Lesson 7.1:** Give pairs of students tracing paper. Have them trace both figures from an exercise and cut them out. Then have them use the cut outs to try different transformations, keeping a record of which transformations they tried, until they determine if the figures are congruent. Have them write down which set of transformations worked. Then have them complete two more. **Lesson 7.2:** Have students work with a partner to trace the triangles on separate pieces of paper and label the sides and angles on the inside of the triangles. Have one student place the triangles on top of each other and match up segments and angles while the other student confirms the matched parts in an exercise.	**Resources:** Glencoe Math Course 3 Textbook (Chapters 7-9, 1) IXL Kahoot Khan Academy Lesson Presentations Graphing Calculator Google Forms and Sheets ALEKS Gimkit Google apps for education Desmos Woot Math Quizizz Quizalize Flocabulary Brain Pop

Math 8

Lesson 7.3: Have students work in teams. Each student writes down two facts and one fib about one of the following: dilation, scale factor, or similar figures. The job of the team is to identify the fib.	Mash-Up Math
	Easel by Teachers Pay Teachers
	Classkick
	Edulastic
	Math Literacy

Lesson 7.3: Have students work in teams. Each student writes down two facts and one fib about one of the following: dilation,scale factor, or similar figures. The job of the team is to identify the fib.

Lesson 7.4: Place students in pairs to complete the activity and three exercises. Then have pairs check results with other pairs and resolve any discrepancies.

Lesson 7.5: Give pairs of students 6 straws that have been cut into different lengths and have them make different sized triangles. Students should measure all 3 angles in each triangle, add the angle measures for each triangle, and record their measurements in a table. They should notice that the three angles always add up to 180 degrees.

Lesson 7.6: Have students work in pairs. For the first exercise, student A completes the problem while student B watches, listens, coaches, and praises. Students trade roles for each exercise.

Lesson 7.7: Give students centimeter tiles and have them set up the given scenario. Then have them double the dimensions and count the squares for the new perimeter and area. Record the results in a table before completing three exercises.

Lesson 8.1: Have students work with a partner to complete two exercises. Have them use the following template to find the volume of each cylinder: volume=area of base x height of cylinder. If they are still struggling, have them replace area of base with pi x r x r.

Lesson 8.2: Have students work in small groups to complete 5 exercises. Provide each student with 6 chips. Each student must place a chip in the center of the table after contributing to the discussion. After all of their chips are gone, they may no longer talk and all students must use all of their chips.

Lesson 8.3: Have pairs complete the graphic organizer. Have them come up with as many real world examples of spheres as possible or objects that are approximately spheres.

Mash-Up Math
Easel by Teachers Pay Teachers
Classkick
Edulastic
Math Literacy
- I can solve a word problem graphic organizer
- Think pair share graphic organizer
- Vocabulary Word Map
- Frayer Model
- Collection of Graphic Organizers

LGBT and Disabilities Resources:
- LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth
- LGBTQ+ Books
- Inclusive Math Class

DEI Resources:
- Learning for Justice
- GLSEN Educator Resources
- Supporting LGBTQIA Youth Resource List
- Respect Ability: Fighting Stigmas, Advancing Opportunities
- NJDOE Diversity, Equity & Inclusion Educational Resources
- Diversity Calendar

Lesson 8.4: Have students work in a small group to complete 4 exercises. Each student is responsible for leading the discussion for one of the exercises.

Lesson 8.5: Have students work in teams. Each student writes down two facts and one fib about the surface area of volume of a cone. The job of the team is to identify the fib.

Lesson 8.6: Have students work with a partner to write a real world problem involving two similar solids. Have them trade problems with another pair of students to solve each other's problem.

Lesson 9.1: Before constructing the scatter plot for an exercise, have students study the data in the table and make a conjecture about the association. Have them explain why their association makes sense in the real world context of the problem.

Lesson 9.2: Have students work in pairs and write down two facts and one fib about scatter plots, associations, and lines of best fit. Call on individuals to read their facts and fib and have the class vote to decide which statement is the fib.

Lesson 9.3: Have students work in pairs to complete two exercises. Have them trade their solutions with another pair of students and discuss any differences.

Lesson 9.4: Have students work with a partner to explain the different meanings of the word mean.

Lesson 9.5: Have students work in teams of three. Each team member is to pick one of the following topics to research: normal distribution, standard deviation, or variance. Students in the class working on the same topic get together to decide what is important and how to teach it to the rest of the team. Each expert returns to the team to teach the team members about their researched topic.

Lesson 9.6: Have students work with a partner to complete the vocabulary start up. Have each student read the terms aloud and decide upon the best description, reading each description

aloud. Call on one set of pairs to share their responses with the class.

Lesson 1.6: In teams, have students answer the following question orally: List 5 examples of places where scientific notation might be used. Students listen to ideas and respond.

Lesson 1.7: Have students work in pairs. Pairs should summarize the Laws of Exponents, including calculations with scientific notation, through a poem, a rap, or song. They can record the presentations using a camera or create a small book on the computer.

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing

ELL supports should include, but are not limited to, the following::
Extended time
Provide visual aids
Repeated directions
Differentiate based on proficiency
Provide word banks
Allow for translators, dictionaries |

Math 8

		Pair student with a high achieving student	

Pacing Guide

Course Name	Content/Resources	Standards
UNIT 1:		
Review Material and Equations in One and Two Variables (40 Days)	**CHAPTERS** **2: 28 days** **3: 10 days** Unit Assessment: 2 days	8.EE.C.7 8.EE.C.7a 8.EE.C.7b 8.EE.B.5 8.EE.B.6 8.F.A.2 8.F.B.4 8.F.A.3 8.EE.C.8 8.EE.C.8a 8.EE.C.8b 8.EE.C.8c
UNIT 2:		
Linear Equations and Linear/Nonlinear Functions (40 Days)	**CHAPTERS:** **3: 10 days** **4: 28 days** Unit Online Assessment: 2 days	8.EE.B.6 8.F.A.3 8.F.B.4 8.EE.C.8c 8.EE.C.8 8.EE.C.8a 8.EE.C.8b 8.F.A.1 8.F.A.2 8.F.B.5
UNIT 3:		
Exponents, Triangles, and Transformations (45 Days)	**CHAPTERS:** **1: 15 days** **5: 15 days** **6: 13 days** Unit Online Assessment: 2 days	8.EE.C.7 8.EE.B.5: 8.EE.B.6: 8.F.A.2: 8.F.B.4: 8.F.A.3: 8.EE.C.8 8.F.A.1 8.F.B.5 8.NS.A.1

Math 8

		8.NS.A.2
UNIT 4:		
Congruence & Similarity, Volume & Surface Area, Scatter Plots, & Financial Literacy (40 days)	**CHAPTERS:** **1: 4 days** **7: 12 days** **8: 12 days** **9: 10 days** Unit Online Assessment: 2 days	8.G.A.1 8.G.A.1a 8.G.A.1b 8.G.A.2 8.G.A.4 8.G.A.5 8.EE.B.6 8.EE.A.4 8.EE.A.3 8.G.C.9 8.SP.A.1 8.SP.A.2