8th Grade Math Curriculum

Egg Harbor Township School District

State Board Adoption Date of Standards: 5/2016

Unit Overview (Standards Coverage)				
Unit	**Standards**	**Unit Focus**	**Standards for Mathematical Practice**	**Open Educational Resources**
Unit 1 **Exponents, Expressions, and Equations** **(7 Weeks)**	8.EE.A.1 8.EE.A.3 8.EE.A.4 8.NS.A.1 8.NS.A.2	● Work with integer exponents. ● Solve real-world and mathematical problems. ● Know that there are numbers that are not rational, and approximate them by rational numbers.	● MP.1 Make sense of problems and persevere in solving them. ● MP.2 Reason abstractly and quantitatively. ● MP.3 Construct viable arguments & critique the reasoning of others. ● MP.4 Model with mathematics. ● MP.5 Use appropriate tools strategically.	● 8.EE.A.1 Extending the Definitions of Exponents ● 8.G.C.9 A Canister of Tennis Balls ● 8.EE.A.3 Ant and Elephant ● 8.EE.A.4 Giantburgers ● 8.NS.A.1 Converting Decimal Representations of Rational Numbers to Fraction Representations ● 8.NS.A.2 Irrational Numbers on the Number Line ● 8.EE.B.5 Who Has the Best Job? ● ● 8.EE.B.6 Slopes Between Points on a Line
Unit 2 **Functions, Equations, and Solutions** **(11 Weeks)**	● 8.F.A.1 ● 8.F.A.2 ● 8.F.A.3 ● 8.F.B.4* ● 8.F.B.5 ● 8.EE.B.5 ● 8.EE.B.6 ● 8.EE.C.7 ● 8.EE.C.8*	● Understand the connections between proportional relationships, lines, and linear equations. ● Define, evaluate, and compare functions. ● Use functions to model relationships between quantities. ● Analyze and solve linear equations and simultaneous linear equations.	● MP.6 Attend to precision. ● MP.7 Look for and make use of structure. ● MP.8 Look for and express regularity in repeated reasoning.	● 8.F.A.1 Function Rules ● 8.F.A.2 Battery Charging ● 8.F.A.3 Introduction to Linear Functions ● 8.F.B.4 Chicken and Steak, Variation 1 ● 8.F.B.4 Baseball Cards ● 8.EE.C.7 The Sign of Solutions ● 8.EE.C.7 Coupon versus discount ● 8.EE.C.8a Intersection of Two Lines ● 8.EE.C.8 How Many Solutions

Unit 3 **Geometry: Pythagorean Theorem, Congruence and Similarity Transformations** **(8 weeks)**	● 8.EE.A.2 ● 8.G.C.9 ● 8.G.B.6 ● 8.G.B.7 ● 8.G.B.8* ● 8.G.A.1 ● 8.G.A.2 ● 8.G.A.3 ● 8.G.A.4 ● 8.G.A.5	● Work with radicals and integer exponents. ● Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. ● Understand and apply the Pythagorean Theorem. ● Understand congruence and similarity using physical models, transparencies, or geometry software.		● 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.1 Reflections, Rotations, and Translations ● 8.G.A.2 Congruent Triangles ● 8.G.A.3 Effects of Dilations on Length, Area, and Angles ● 8.G.A.4 Are They Similar ● 8.G.A.5 Street Intersections ● 8.G.A.5 Similar Triangles II ● 8.G.A.5 Triangle's Interior Angles
Unit 4 **Statistics and Probability: Scatter Plots and Association** **(3 Weeks)**	● 8.SP.A.1 ● 8.SP.A.2 ● 8.SP.A.3 ● 8.SP.A.4 ● 8.F.B.4*	● Investigate patterns of association in bivariate data. ● Use functions to model relationships between quantities. ● Analyze and solve linear equations.		● 8.SP.A.1 Texting and Grades 1 ● 8.SP.A.2 Animal Brains ● 8.SP.A.3 US Airports ● 8.SP.A.4 What's Your Favorite Subject ● 8.SP.A.4 Music and Sports ● 8.F.B.4 Delivering the Mail ● 8.G.B.8 Finding the distance between points ● 8.EE.C.8 Kimi and Jordan

This document outlines in detail the answers to following four questions:

1. **What do we want our students to know?**

2. **How do we know if they learned it?**

3. **What do we do if they did not learn it?**

4. **What do we do when they did learn it?**

Unit 1 MATH 8TH GRADE		
Content & Practice Standards	**Interdisciplinary Standards**	**Critical Knowledge & Skills**
8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 × 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. 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. For example, estimate the population of the United States as $3 × 10^8$ and the population of the world as $7 × 10^9$, and determine that the world population is more than 20 times larger. 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 (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. 8.NS.A.1. Know that numbers that are not rational are called irrational. Understand informally that every	- W.6.10 Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. - TECHNOLOGY STANDARDS and APPLY explicit standards as appropriate. 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information. F: Critical thinking, problem solving, and decision making: Students use critical thinking	- Solve Simple Equations - Solving Equations with Variables on both sides - Solving Multi-step Equations - Exponents - Product of Powers Property - Quotient of Powers Property - Zero & Negative Exponents - Reading Scientific Notation - Writing Scientific Notation - Operations in Scientific Notation - The Real # System - Finding & Estimating Square & Cube Roots - Operations with Square & Cube Roots

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.

- 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 (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

- 21st Century Themes/Careers: Through instruction in life and career skills, all students acquire the knowledge and skills needed to prepare for life as citizens and workers in the 21st century. For further clarification see NJ World Class Standards at www.NJ.gov/education/aps/cccs/career/ CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES
- Students will know that there are numbers that are not rational, and approximate them by rational numbers. - Student will be able to work with radicals and integer exponents. Understand the connections between proportional relationships, lines, and linear equations. Analyze and solve linear equations and pairs of simultaneous linear equations. - Students will gain knowledge of linear relationships and solve equations involving variables.	8.EE.A.1 Extending the Definitions of Exponents 8.EE.A.3 Ant and Elephant 8.EE.A.4 Giantburgers 8.NS.A.1 Converting Decimal Representations of Rational Numbers to Fraction Representations 8.NS.A.2 Irrational Numbers on the Number Line 8.EE.B.5 Who Has the Best Job?

●
● <u>8.EE.B.6 Slopes Between Points on a Line</u>

UNDERSTANDINGS
● Work with radical and integer exponents. ● Understand the connections between proportional relationships, lines, and linear equations. ● Analyze and solve linear equations and pairs of simultaneous linear equations.

Students will know…	Students will be able to…
● Solve problems by using the four-step plan. ● Evaluate expressions and identify properties. ● Compare and order integers and find absolute value. ● Add, subtract, multiply, divide integers. ● Express rational numbers as decimals and decimals as fractions. ● Compare and order rational numbers. ● Multiply, divide, add, and subtract fractions of all types. ● Identify and classify numbers in the real number system. ● Use powers and exponents in expressions ● Express numbers in scientific notation ● Find square roots of perfect squares and cube roots ● Estimate square roots and cube roots ● Write algebraic equations from verbal sentences and problem situations. ● Solve one-step equations with integers and fractions using different operations. ● Use the distributive property to simplify algebraic expressions. ● Express ratios as fractions in simplest form and determine unit rates.	● Changes in quantities can be used to predict outcomes, solve problems, and generalize patterns in mathematics. ● How to express numbers of the same value in various forms. ● The process involved in evaluating algebraic expressions and equations.

- Find rates of change and constant rates of change (refer to Slope 9.4).
- Solve Systems of Equations by graphing and algebraically.
- Solve inequalities using addition, subtraction, multiplication, and division properties of inequality.

Stage 2 – Assessment Evidence

Performance Tasks:

What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?

Performance Tasks/Use of Technology

- Manipulatives (integer chips, algebra tiles, number lines, flash cards)
- Fraction strips for addition of unlike fractions
- Number line on desks
- How-to Fraction Books
- Solve equations using Algebra Tiles
- Perfect Square/ Cube Roots flashcards
- Estimating Perfect Square/ Cube Roots number line

Formative

- Teacher observation
- Exit slip/check for understanding
- games
- oral assessments/conferencing
- portfolio/math journal
- Daily classwork
- pre-assessment
- fluency check
- quick quiz
- student activity pages

Summative

- quick quiz
- performance task
- unit test
- benchmark assessment
- alternative assessment/choice boards
- MobyMax/fact fluency
- Linkit

Stage 3 – Learning Plan

• Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)
  - The Real Number System (Irrational, Rational, Integers, Whole, Natural numbers)

- ○ Powers & Exponents: Students explored writing numbers with exponents. In the Lesson, students will write expressions involving exponents and evaluate powers.
- ○ Scientific Notation: Students explore very large and very small numbers written in standard form. Students explore how to use properties to perform operations with numbers written in scientific notation. Previous Learning: Students have written numbers in scientific notation.
- ○ Square & Cube Roots: Students explore square & cube roots. Previous Learning: Students have found squares and cubes of numbers. They have also found areas of squares and circles. Vocabulary: square root, perfect square, radical sign, radicand.
- ○ One & Two-Step Equations: Students will use the sum of the angle measures of a triangle to explore simple equation solving. Previous Learning: Students should know the vocabulary of angles, such as ray, vertex, acute, obtuse, right, and straight.
- ○ Equations with Variables on Each Side: Students will develop an intuitive understanding of solving equations with variables on both sides. Previous Learning: Students should know common formulas for perimeter, area, surface area, and volume.
- ○ Multi-Step Equations: Students will develop an intuitive understanding about solving multi-step equations. Previous Learning: Students should know how to use inverse operations to solve one-step equations.
- ○ Constant Rate of Change
- ○ Slope: Students explore slopes of lines. Vocabulary: slope, rise, run Previous Learning: Students should know the relationship between corresponding sides of similar triangles
- ○ Slope-Intercept Form: Students explore the connection between the equation of a line and its graph. Vocabulary: x-intercept, y-intercept, slope-intercept form Previous Learning: Students should know how to graph linear equations and find slopes of lines.
- ○ Graph a Line Using Intercepts: Students explore the graphs of linear equations. Vocabulary: linear equation, solution of a linear equation Previous Learning: Students should know how to plot ordered pairs from a table.
- ○ Systems of Equations: Students explore the graphs of two special systems of linear equations. Previous Learning: Students should know how to solve linear equations with variables on both sides.

• Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.

• Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.

•Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, SPED, and Gift & Talented Students

• Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.

• Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.

•Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.

Gifted & Talented:
- "Differentiating the Lesson" in Big Ideas online resources for all sections
- "Additional Topics" in Big Ideas online resources to extend and enhance instruction
- Big Ideas Game Closet
- Big Ideas Differentiated Instruction options
- Big Ideas Mini-Assessments
- Design Challenges
- Student Choice/Driven Activities
- Group Projects
- MobyMax
- LinkIt!
- Rocket Math
- Intervention Central
- Do to Learn
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Math Fact Fluency

Tier I:
- "Differentiating the Lesson" in Big Ideas online resources for all sections
- Big Ideas MATH Pyramid of Tiered Interventions for additional resources
- Record and Practice Journal
- Differentiated Instruction options
- Fair Game Review
- Vocabulary Support Glossary resources
- Mini-Assessments
- Game Closet
- Lesson Tutorials
- Flash Cards
  Extended Time

- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Math Tutoring Center (HS only)
- Math Lab/Tutorial
- MobyMax
- LinkIt!
- Rocket Math
- Intervention Central
- Do to Learn
- Learning Ally
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Flash Card Math
- Math Fact Fluency

Tier II:
- Lesson Tutorials
- Basic Skills Handbook
- Skills Review Handbook
- Differentiated Instruction Big Ideas resources
- Game Closet
- Centers/Small Group Instruction
- Math Tutoring Center (HS only)
- Math Lab/Tutorial
- MobyMax
- LinkIt!
- Math Fact Fluency/Rocket Math

Tier III:
- Customized Learning Intervention Activities resources
- Intensive Intervention resource
- Systematic Assessments to focus on specific deficits

ELL:
- Big Ideas Math Student Editions are available online in Spanish

- Letters to Parents are available in the Resources by Chapter book to assist in guiding parents through each chapter and offer helpful suggestions they can use to demonstrate mathematical concepts for their child in daily activities. These letters are editable so teachers can customize them.
- Student Dynamic eBook Audio has the option to be read in English or Spanish
- Multi-Language Glossary for new Math vocabulary is available in 14 different languages.
- Audio version is available in English or Spanish.
- Game Closet can be accessed in English or Spanish, while also allowing for all students to play and understand these educational games.
- ELL Notes included in Teacher Edition to help teachers overcome obstacles.
- Record & Practice Journal available in Spanish.
- Student Journal available in Spanish.
- Chapter Reviews available in English and Spanish.
- Vocabulary Flash Cards
- Chunking Information
- Math Word Wall/Word Bank
- Multi-Sensory Instruction
- Use of Translation software
- Gradual Release Model
- TODOS: Mathematics for ALL - Excellence and Equity in Mathematics
- FABRIC - A Learning Paradigm for ELLs (NJDOE resource)

SPED:
- Menu Math (mostly for very low functioning students)
- Math Labs/Tutorial
- MobyMax
- LinkIt!
- IXL
- Learning Ally (audio version for textbooks and other published materials) – Also available for 504 students
- Apex Online Learning – Bridge students only
- Use of specialized equipment such as beeping balls, text to speech and speech to text software, special seats or desks
- Use of hands-on materials for problem solving
- Visual supports and Use of Manipulatives
- Extended time to complete tests and assignments
- Graphic Organizers/Study Guides
- Mnemonic tricks to improve memory
- Reducing workload
- Centers/Small Group Instruction
- Adjusting accountability for standards by focusing only on essential standards

- Use of IPads or laptops for students with motor issues that make writing difficult
- Use of tangible rewards (certificates, small toys, etc. per behavior plan)
- Use prompts and model directions
- Use task analysis to break down activities and lessons into each individual step needed to complete the task
- Use concrete examples to teach concepts
- Have student repeat/rephrase written directions
- Provide multi-sensory, hands-on materials for instruction
- Chunking Information
- Modify all fine motor tasks for example: (fat crayons, pencil grip, adaptive scissors)
- Functional or practical emphasis

504:

- Learning Ally (audio version for textbooks and other published materials)
- Extra help opportunities
- Reduce workload
- Partial credit
- Allow use of calculator, when appropriate
- Modified length and time frame of assignments
- Alternate assessments with extended time
- Provide guided notes and study guides as needed (use interactive notebook)
- Preferential Seating
- Extra Practice
- Directions repeated, clarified and reworded
- Breakdown task into manageable units
- Differentiated instruction
- Use of manipulatives

Unit 2 MATH 8TH GRADE		
Content & Practice Standards	Interdisciplinary Standards	Critical Knowledge & Skills
● 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). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. ● 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. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. ● 8.F.B.4. Construct a function to model a linear relationship between two quantities. Determine the rate of	● W.6.10 Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. ● TECHNOLOGY STANDARDS and APPLY explicit standards as appropriate. 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. E: Research and Information Fluency:	● Slope of a Line ● Slope-Intercept Form ● Writing Equations in Slope-intercept Form ● x and y- intercepts ● Graphing- Systems ● Substitution- Systems ● Elimination- Systems ● Solving Special Systems ● Function Tables (Linear & Quadratic) ● Representing Linear Functions ● Comparing Linear and Nonlinear Functions

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.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.
- 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. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
- 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.C.7. Solve linear equations in one variable.

Students apply digital tools to gather, evaluate, and use information. F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

- 21st Century Themes/Careers: Through instruction in life and career skills, all students acquire the knowledge and skills needed to prepare for life as citizens and workers in the 21st century. For further clarification see NJ World Class Standards at www.NJ.gov/education/aps/cccs/care er/ CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

- 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 the 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.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 algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.

● 8.EE.C.8c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.		

Unit 2 MATH 8TH GRADE
Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES
Students will be able to define, evaluate, and compare functions. They will also be able to use functions to model relationships between quantities.	● 8.F.A.1 Function Rules ● 8.F.A.2 Battery Charging ● 8.F.A.3 Introduction to Linear Functions ● 8.F.B.4 Chicken and Steak, Variation 1 ● 8.F.B.4 Baseball Cards ● 8.EE.C.7 The Sign of Solutions ● 8.EE.C.7 Coupon versus discount ● 8.EE.C.8a Intersection of Two Lines ● ● 8.EE.C.8 How Many Solutions

UNDERSTANDINGS
Students will understand and generalize patterns as they represent and analyze quantitative relationships and change in a variety of contexts and problems using graphs, tables, and equations.

Students will know…	Students will be able to…
● Student should gain knowledge of tables, graphs, and equations in order to represent verbal descriptions of quantitative relationships and vice-versa.	● Write algebraic expressions to determine any term in an arithmetic sequence.

● Define, evaluate, and compare functions. ● Use functions to model relationships between quantities.	● Analyze functional relationships to explain how a change in one quantity can result in a change in another using graphs and tables. ● Find the slope of a line. ● Graph and analyze slope triangles. ● Graph linear equations using the slope and y-intercept.

Stage 2 – Assessment Evidence	
Performance Tasks: What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)? Performance Tasks/Use of Technology ● Computer Lab Activity- graphing and identifying linear functions ● Cell phone comparison plan ● Use EXCEL to graph functions ● Use coordinate plane boards to practice graphing	Formative ● Teacher observation ● Exit slip/check for understanding ● games ● oral assessments/conferencing ● portfolio/math journal ● Daily classwork ● pre-assessment ● fluency check ● quick quiz ● student activity pages Summative ● quick quiz ● performance task ● unit test ● benchmark assessment ● alternative assessment/choice boards ● MobyMax/fact fluency ● Linkit

Stage 3 – Learning Plan
• Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)

- Functions: Students explore mapping diagrams. Previous Learning: Students should have an understanding of fractions, decimals, and percent operations. Vocabulary: input, output, relation, mapping diagram, function
- Compare Properties of Functions: Students explore different ways to represent a function. Previous Learning: Students should know how to find area and perimeter, write equations, and plot points in a coordinate plane. Vocabulary: function rule
- Construct Functions
- Linear & Nonlinear Functions: Students explore the graphs of functions that are linear and nonlinear. Previous Learning: Students should know common geometric formulas, such as area and perimeter. Vocabulary: nonlinear function
- Analyzing and Sketching Graphs: Students explore graphs showing the relationship between quantities without using specific numbers. Previous Learning: Students need to be familiar with graphing linear and nonlinear functions.

• Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.

• Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.

•Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, SPED, and Gift & Talented Students

• Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.

• Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.

•Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.

Gifted & Talented:
- "Differentiating the Lesson" in Big Ideas online resources for all sections
- "Additional Topics" in Big Ideas online resources to extend and enhance instruction
- Big Ideas Game Closet
- Big Ideas Differentiated Instruction options
- Big Ideas Mini-Assessments
- Design Challenges
- Student Choice/Driven Activities
- Group Projects
- MobyMax
- LinkIt!
- Rocket Math

- Intervention Central
- Do to Learn
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Math Fact Fluency

Tier I:
- "Differentiating the Lesson" in Big Ideas online resources for all sections
- Big Ideas MATH Pyramid of Tiered Interventions for additional resources
- Record and Practice Journal
- Differentiated Instruction options
- Fair Game Review
- Vocabulary Support Glossary resources
- Mini-Assessments
- Game Closet
- Lesson Tutorials
- Flash Cards
  Extended Time
- Flexible Grouping
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- Peer Buddies
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- Intervention Central
- Do to Learn
- Learning Ally
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Flash Card Math
- Math Fact Fluency

Tier II:
- Lesson Tutorials
- Basic Skills Handbook
- Skills Review Handbook
- Differentiated Instruction Big Ideas resources
- Game Closet
- Centers/Small Group Instruction
- Math Tutoring Center (HS only)
- Math Lab/Tutorial
- MobyMax
- LinkIt!
- Math Fact Fluency/Rocket Math

Tier III:
- Customized Learning Intervention Activities resources
- Intensive Intervention resource
- Systematic Assessments to focus on specific deficits

ELL:
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- Letters to Parents are available in the Resources by Chapter book to assist in guiding parents through each chapter and offer helpful suggestions they can use to demonstrate mathematical concepts for their child in daily activities. These letters are editable so teachers can customize them.
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- Vocabulary Flash Cards
- Chunking Information
- Math Word Wall/Word Bank
- Multi-Sensory Instruction
- Use of Translation software
- Gradual Release Model
- TODOS: Mathematics for ALL - Excellence and Equity in Mathematics

- <u>FABRIC - A Learning Paradigm for ELLs</u> (NJDOE resource)

SPED:
- Menu Math (mostly for very low functioning students)
- Math Labs/Tutorial
- MobyMax
- LinkIt!
- IXL
- Learning Ally (audio version for textbooks and other published materials) – Also available for 504 students
- Apex Online Learning – Bridge students only
- Use of specialized equipment such as beeping balls, text to speech and speech to text software, special seats or desks
- Use of hands-on materials for problem solving
- Visual supports and Use of Manipulatives
- Extended time to complete tests and assignments
- Graphic Organizers/Study Guides
- Mnemonic tricks to improve memory
- Reducing workload
- Centers/Small Group Instruction
- Adjusting accountability for standards by focusing only on essential standards
- Use of IPads or laptops for students with motor issues that make writing difficult
- Use of tangible rewards (certificates, small toys, etc. per behavior plan)
- Use prompts and model directions
- Use task analysis to break down activities and lessons into each individual step needed to complete the task
- Use concrete examples to teach concepts
- Have student repeat/rephrase written directions
- Provide multi-sensory, hands-on materials for instruction
- Chunking Information
- Modify all fine motor tasks for example: (fat crayons, pencil grip, adaptive scissors)
- Functional or practical emphasis

504:
- Learning Ally (audio version for textbooks and other published materials)
- Extra help opportunities
- Reduce workload
- Partial credit
- Allow use of calculator, when appropriate
- Modified length and time frame of assignments

- Alternate assessments with extended time
- Provide guided notes and study guides as needed (use interactive notebook)
- Preferential Seating
- Extra Practice
- Directions repeated, clarified and reworded
- Breakdown task into manageable units
- Differentiated instruction
- Use of manipulatives

Unit 3 MATH 8TH GRADE		
Content & Practice Standards	Interdisciplinary Standards	Critical Knowledge & Skills
8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. 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. 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	- W.6.10 Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. - TECHNOLOGY STANDARDS and APPLY explicit standards as appropriate. 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations C. Communication and Collaboration: Students use digital media and	- Congruent Figures - Translations - Reflections - Rotations - Similar Figures Dilations - Parallel Lines and Transversals - Angles of Triangles - Using Similar Triangles - Volume of Cylinders - Volume of Cones - Volume of Spheres

- 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.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.1c. Parallel lines are transformed to parallel lines.
- 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.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 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

environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information. F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

- 21st Century Themes/Careers: Through instruction in life and career skills, all students acquire the knowledge and skills needed to prepare for life as citizens and workers in the 21st century. For further clarification see NJ World Class Standards at www.NJ.gov/education/aps/cccs/career/ CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively and with reason. CRP6. Demonstrate creativity and innovation. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

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.		

Unit 3 MATH 8TH GRADE
Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES
In this unit, students will investigate geometry and measurement. Students will be able to understand congruence and similarity using physical models, transparencies, and/or geometry software. They will also be able to understand and apply the Pythagorean Theorem, and solve real-world and mathematical problems that involve volume of cylinders, cones, and spheres.	● 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.1 Reflections, Rotations, and Translations ● 8.G.A.2 Congruent Triangles ● 8.G.A.3 Effects of Dilations on Length, Area, and Angles ● 8.G.A.4 Are They Similar ● 8.G.A.5 Street Intersections ● ● 8.G.A.5 Similar Triangles II ● 8.G.A.5 Triangle's Interior Angles

UNDERSTANDINGS
● Apply congruence and similarity correspondences and properties of the figures to find missing parts of geometric figures and solve practical problems involving the Pythagorean Theorem. ● Work with radical and integer exponents. ● Congruent and Similar Figures ● Understand and apply the Pythagorean Theorem.

● Solve real- world and mathematical problems involving volume of cylinders, cones, and spheres.

Students will know…	Students will be able to…
Students will understand that… ● Relationships exist among lines and angles to find unknown measurements, and what congruence means about the relationships between them. ● Various transformations affect geometric objects. ● There are properties of two and three dimensional objects that will allow formulas to be implemented when finding various measurements. ● Proportional relationships express how quantities change in relationship to each other.	● Identify similar polygons and find missing measurements. ● Generate similar geometric figures by applying all transformations. ● Identify special pairs of angles and relationships of angles. ● Use parallel lines to investigate the sum of the measures of the angles in a triangle and similar triangles. ● Find the volumes of cylinders, cones, and spheres. ● Find the relationship among the sides of a right triangle by using the Pythagorean Theorem.

Stage 2 – Assessment Evidence

Performance Tasks: What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)? Performance Tasks/Use of Technology ● GeoSolids (Use rice/sand and GeoSolids to analyze the difference in volume formulas) ● Use K'Nex to create angles	Formative ● Teacher observation ● Exit slip/check for understanding ● games ● oral assessments/conferencing ● portfolio/math journal ● Daily classwork ● pre-assessment ● fluency check ● quick quiz ● student activity pages Summative ● quick quiz ● performance task ● unit test ● benchmark assessment ● alternative assessment/choice boards ● MobyMax/fact fluency

	● Linkit
Stage 3 – Learning Plan	

• Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)

- Line & Angle relationships
- Angles of Triangles (Interior & Exterior): Students will explore the sum of the angle measures of a triangle and the vocabulary associated with triangles. Vocabulary: interior angles of a polygon, exterior angles of a polygon Previous Learning: Students should know basic vocabulary associated with angles and triangles
- The Pythagorean Theorem: Students investigate a visual proof of the Pythagorean Theorem. Previous Learning: Students should know how to evaluate algebraic expressions for given values of the variables. Vocabulary: theorem, legs, hypotenuse, Pythagorean Theorem
- Translations: Students will explore translations by manipulating pattern blocks and sketching translations. Previous Learning: Students should know how to plot points in the coordinate plane. Vocabulary: transformation, image, translation
- Reflections: Students will explore reflections in frieze patterns. Previous Learning: Students should know how to plot points in the coordinate plane. Vocabulary: reflection, line of reflection
- Rotations: Students will explore and sketch rotations. Previous Learning: Students should know how to plot points in the coordinate plane. Vocabulary: rotation, center of rotation, angle of rotation
- Dilations: Students will explore enlarging and reducing triangles in the coordinate plane. Previous Learning: Students should know how to multiply integers and plot points in the coordinate plane. Vocabulary: dilation, center of dilation, scale factor
- Volume of cylinders: Students discover how to find the volume of a cylinder by considering the layers that make up a cylinder. Previous Learning: Students should know that cylinders are composed of 2 circular bases and a rectangle.
- Volume of cones: Students develop a strategy to summarize volume and surface area formulas. Previous Learning: Students should know how to find the surface area of a cone.
- Volume of spheres: Students derive the formula for the volume of a sphere. Vocabulary: sphere, hemisphere Previous Learning: Students should know how to find volumes of cylinders and cones.

• Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.

• Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.

•Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, SPED, and Gift & Talented Students

• Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.
• Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.
•Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.

Gifted & Talented:
- "Differentiating the Lesson" in Big Ideas online resources for all sections
- "Additional Topics" in Big Ideas online resources to extend and enhance instruction
- Big Ideas Game Closet
- Big Ideas Differentiated Instruction options
- Big Ideas Mini-Assessments
- Design Challenges
- Student Choice/Driven Activities
- Group Projects
- MobyMax
- LinkIt!
- Rocket Math
- Intervention Central
- Do to Learn
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Math Fact Fluency

Tier I:
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- Big Ideas MATH Pyramid of Tiered Interventions for additional resources
- Record and Practice Journal
- Differentiated Instruction options
- Fair Game Review
- Vocabulary Support Glossary resources
- Mini-Assessments
- Game Closet
- Lesson Tutorials

- Flash Cards
  Extended Time
- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Math Tutoring Center (HS only)
- Math Lab/Tutorial
- MobyMax
- LinkIt!
- Rocket Math
- Intervention Central
- Do to Learn
- Learning Ally
- Differentiation Strategies for Math
- Discovery Education Math
- Everyday Mathematics
- Homework Spot
- Flash Card Math
- Math Fact Fluency

Tier II:
- Lesson Tutorials
- Basic Skills Handbook
- Skills Review Handbook
- Differentiated Instruction Big Ideas resources
- Game Closet
- Centers/Small Group Instruction
- Math Tutoring Center (HS only)
- Math Lab/Tutorial
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Tier III:
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- Chunking Information
- Modify all fine motor tasks for example: (fat crayons, pencil grip, adaptive scissors)
- Functional or practical emphasis

504:
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- Extra help opportunities
- Reduce workload
- Partial credit
- Allow use of calculator, when appropriate
- Modified length and time frame of assignments
- Alternate assessments with extended time
- Provide guided notes and study guides as needed (use interactive notebook)
- Preferential Seating
- Extra Practice
- Directions repeated, clarified and reworded
- Breakdown task into manageable units
- Differentiated instruction
- Use of manipulatives

Unit 4 MATH 8TH GRADE		
Content & Practice Standards	Interdisciplinary Standards	Critical Knowledge & Skills
• 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 (e.g. line of best fit) by judging the closeness of the data points to the line.	• W.6.10 Write routinely over extended time frames (time for research, reflection, metacognition/self correction, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. • TECHNOLOGY STANDARDS and APPLY explicit standards as appropriate. 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. A.	- Scatter Plots - Lines of Fit - Two-Way Tables

- 8.SP.A.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
- 8.SP.A.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?
- 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

Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information. F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

- 21st Century Themes/Careers: Through instruction in life and career skills, all students acquire the knowledge and skills needed to prepare for life as citizens and workers in the 21st century. For further clarification see NJ World Class Standards at www.NJ.gov/education/aps/cccs/career/ CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP4. Communicate clearly and effectively

situation it models, and in terms of its graph or a table of values.	and with reason. CRP6. Demonstrate creativity and innovation. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.	

Unit 4 MATH 8TH GRADE

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES
Students will investigate patterns of association in bivariate data.	● 8.SP.A.1 Texting and Grades 1 ● 8.SP.A.2 Animal Brains ● 8.SP.A.3 US Airports ● 8.SP.A.4 What's Your Favorite Subject ● 8.SP.A.4 Music and Sports ● ● 8.F.B.4 Delivering the Mail

UNDERSTANDINGS
● Students will learn several tools to display and analysis statistical data and learn to choose an appropriate display. They will also learn fundamental concepts of probability. ● Investigate patterns of association in bivariate data.

Students will know…	Students will be able to…
Students will understand that… ● They can interpret data and select appropriate displays. ● The way that data is collected, organized and displayed influences interpretation.	- Construct and interpret scatter plots. - Select an appropriate display for a set of data.

Stage 2 – Assessment Evidence

Performance Tasks:	Formative ● Teacher observation

What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)? <u>Performance Tasks/Use of Technology</u> ● STEM Project: Self-Driving Cars	● Exit slip/check for understanding ● games ● oral assessments/conferencing ● portfolio/math journal ● Daily classwork ● pre-assessment ● fluency check ● quick quiz ● student activity pages Summative ● quick quiz ● performance task ● unit test ● benchmark assessment ● alternative assessment/choice boards ● MobyMax/fact fluency ● Linkit

Stage 3 – Learning Plan

• Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)

● Scatter Plots: Students gain an intuitive understanding of how to construct and interpret scatter plots. Vocabulary: scatter plot Previous Learning: Students should be familiar with the concept of the slope of a line and know how to plot points in a coordinate plane.
● Lines of Best Fit: Students will gain an intuitive understanding of how to write an equation of a line of fit for a scatter plot. Vocabulary: line of fit, line of best fit Previous Learning: Students should know how to make scatter plots and write equations in slope-intercept form.
● Two-Way Tables: Students will read two-way tables. Vocabulary: two-way table, joint frequency, marginal frequency Previous Learning: Students should know how to display data using different types of displays, such as histograms, box-and-whisker plots, and scatter plots.
● Polynomials (if time allows)

• Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.

• Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.

•Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, SPED, and Gift & Talented Students

• Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.

• Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.

•Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.

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