



**MIDLAND PARK PUBLIC SCHOOLS**  
*Midland Park, New Jersey*  
**CURRICULUM**

# **Math – Grade 8**

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## Math 8 Curriculum Overview

### *2018 New Jersey Student Learning Standards for Mathematics*

In Grade 8, instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Students are encouraged to continue their learning of mathematics through Mathematical Practices, which are:

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

### Suggested Course Sequence:

Unit 1: Real Number System	Unit 5: Geometric Relations
Unit 2: Exponents & Roots	Unit 6: Geometric Transformations
Unit 3: Equations and Inequalities	Unit 7: Geometric Measurement
Unit 4: Linear Functions	Unit 8: Statistics & Bivariate Data

Pre-Requisite Knowledge: Math 7/ Pre-Algebra

Unit Overview Template	
<b>Content Area:</b> The Number System / Number Sense	
<b>Unit Title:</b> Rational Numbers	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b> Students will deepen their understanding of the number line and rational numbers. They will develop and use strategies to both estimate and compute operations involving rational numbers. Students will also learn and understand that numbers that are not rational are irrational and have properties of their own. They will also review their knowledge of powers and exponents and apply that knowledge by using Scientific Notation to represent very large or very small numbers.	
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Learning and Innovation Skills, Life and Career Skills	
Learning Targets	
<b>NJSLS Standards</b> 8.NS.A.1 8.NS.A.2	
<b>Content Statements</b> Know that there are numbers that are not rational, and approximate them by rational numbers.	
CPI#	Cumulative Progress Indicator (CPI)
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 then 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 (like $\pi^2$ ). For example, show that $\sqrt{2}$ is between 1 and 2, and then between 1.4 and 1.5, and explain how to continue on to get better approximations.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>If a number is not “rational”, then what is it and how can we find it on a number line? How important are fractions in the real world?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>Students will strengthen their knowledge of real numbers by focusing on what numbers are rational and irrational and how to estimate or graph them on a number line.</li> <li>Students will strengthen and build upon their computational skills of fractions and see them in real life situations</li> </ul>
<b>Unit Learning Targets</b> <i>Students will...</i> <ul style="list-style-type: none"> <li>Express rational numbers as decimals and decimals as fractions</li> <li>Compare and order rational numbers on a number line</li> <li>Add, subtract, multiply, and divide rational numbers</li> <li>Solve equations using rational numbers</li> <li>Approximate square roots by using the nearest perfect square</li> <li>Calculate square roots, rounding to the nearest hundredth, using a scientific calculator</li> </ul>	



<b>Evidence of Learning</b>	
<b>Summative Assessment</b>	
<b>Equipment Needed:</b>	Internet, InterWrite boards, Number lines and flashcard games
<b>Teacher Resources:</b>	Prentice Hall book & online resources, Kutasoftware program & assessments, Hands-on manipulatives (Katie Kubes, Fraction Tiles)

## Formative Assessments

- Students will be assessed by formal and informal assessments
- Unit test

## Lesson Plans

[illegible]



<b>Content Area:</b> Math 8 CP/CPC	
<b>Unit Title:</b> Unit 2 Exponents & Roots	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b>  Students will use exponents and scientific notation to describe numbers, as well as investigating and applying the Pythagorean Theorem  <b>Primary interdisciplinary connections:</b>  21 <sup>st</sup> century themes: Critical Thinking and Problem Solving, Communication and Collaboration, Life and Career Skills	
<b>Content Statements</b>	
Know that there are numbers that are not rational, and approximate them by rational numbers.	
• CPI#	Cumulative Progress Indicator (CPI)
NJSLS 8.G.B.6-8	-Explain a proof of the Pythagorean Theorem and its converse. -Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real- world and mathematical problems in two and three dimensions. -Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $32 \times 3^{-5} = 3^{-3} = 1/33 = 1/27$ .
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.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. <i>For example, estimate the population of the United States as <math>3 \times 10^8</math> and the population of the world as <math>7 \times 10^9</math>, and determine that the world population is more than 20 times larger.</i>
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.
<p><b>Equipment Needed:</b> Internet, InterWrite boards, Coordinate Grid graphs and paper</p> <p><b>Teacher Resources:</b> Prentice Hall book, internet, Glencoe McGraw-Hill Interactive Lab activities online</p>	
<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>• Unit quizzes and homework checks</li> <li>• Unit test</li> </ul> <p><b>Modifications:</b></p> <ul style="list-style-type: none"> <li>• <b>Special Education Students</b> <ul style="list-style-type: none"> <li>- Allow errors</li> <li>- Rephrase questions, directions, and explanations</li> <li>- Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>- Accept participation at any level, even one word</li> <li>- Consult with Case Managers and follow IEP accommodations/modifications</li> </ul> </li> <li>• <b>English Language Learners</b> <ul style="list-style-type: none"> <li>- Assign a buddy, same language or English speaking</li> <li>- Allow errors in speaking</li> <li>- Rephrase questions, directions, and explanations</li> <li>- Allow extended time to answer questions</li> <li>- Accept participation at any level, even one word</li> </ul> </li> <li>• <b>At-Risk Students</b> <ul style="list-style-type: none"> <li>- Provide extended time to complete tasks</li> <li>- Consult with Guidance Counselors and follow I&amp;RS procedures/action plans</li> <li>- Consult with classroom teacher(s) for specific behavior interventions</li> <li>- Provide rewards as necessary</li> </ul> </li> <li>• <b>Gifted and Talented Students</b> <ul style="list-style-type: none"> <li>- Provide extension activities</li> <li>- Build on students' intrinsic motivations</li> <li>- Consult with parents to accommodate students' interests in completing tasks at their level of engagement</li> </ul> </li> </ul>	

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Lesson #	Lesson Name	Time frame (hours/days)
1	Integer Exponents	2 days
2	Properties of Exponents	3 days
3	Scientific Notation	2 days
4	Operations in Scientific Notation	2 days
5	Squares and Square Roots	2 days
6	Estimating with Square Roots	2 days
7	The Real Numbers	3 days
8	Pythagorean Theorem	4 days

**Curriculum Development Resources**

Click links below to access additional resources used to design this unit:



Unit Overview Template	
<b>Content Area:</b> Patterns and Algebra	
<b>Unit Title:</b> Unit 3 Equations and Inequalities	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b> Students will review and build upon prior knowledge of equations and solving basic one-step equations. This unit, students will solve two-step equations, simplify expressions by combining like terms or using the Distributive Property, systems of equations, and apply those same procedures when solving and graphing inequalities on a number line.	
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Learning and Innovation Skills, Information, Media, and Technology Skills (working in Excel)	
Learning Targets	
<b>NJSLS Standards</b> 8.EE.A 8.EE.B 8.EE.C	
<b>Content Statements</b> 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.	
CPI#	Cumulative Progress Indicator (CPI)
8.EE.A. 1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$ .
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.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. <i>For example, estimate the population of the United States as <math>3 \times 10^8</math> and the population of the world as <math>7 \times 10^9</math>, and determine that the world population is more than 20 times larger.</i>
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.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. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i>
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 $b$ .

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8.EE.C.7	<p>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 <math>x = a</math>, <math>a = a</math>, or <math>a = b</math> results (where <math>a</math> and <math>b</math> are different numbers).</p> <p>Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>
8.EE.C.8	<p>a. 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.</p> <p>b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i></p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>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.</i></p>
<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>How can we solve real life problems by setting up and solving an equation, given an unknown value?</li> <li>What are the steps and procedures in solving an equation or inequality?</li> <li>When do we have one solution? No solution? Infinite solutions? How do we visually represent infinite solutions?</li> </ul>	<p><b>Unit Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>Students should understand that setting up and solving linear equations and inequalities to solve real life problems can help build their word problem skills.</li> <li>Students will see and understand that they can also graphically represent one solution, no solutions, or infinite solutions on a number line</li> </ul>
<p><b>Unit Learning Targets</b></p> <p><i>Students will...</i></p> <ul style="list-style-type: none"> <li>Use the distributive property to simplify algebraic expressions and equations</li> <li>Solve one, two, and multi step equations</li> <li>Solve equations with variables on both sides of an equation</li> <li>Solve and analyze solutions for systems of equations</li> <li>Write and solve one and two step equations that represent real life situations</li> <li>Write and graph inequalities that represent real life situations</li> <li>Solve inequalities</li> </ul>	
<b>Evidence of Learning</b>	
<p><b>Summative Assessment</b></p> <p>Unit test</p> <p><b>Equipment Needed:</b> Internet, InterWrite boards, Equation balance, Algebra tiles</p> <p><b>Teacher Resources:</b> Prentice Hall book &amp; online resources, Kutasoftware program &amp; assessments, Hands-on manipulatives (Katie Kubes, Fraction Tiles)</p>	
<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"> <li>Students will be assessed by formal and informal assessments</li> <li>Unit test</li> </ul>	



**Modifications:**

- **Special Education Students**
  - Allow errors
  - Rephrase questions, directions, and explanations
  - Allow extended time to answer questions, and permit drawing, as an explanation
  - Accept participation at any level, even one word
  - Consult with Case Managers and follow IEP accommodations/modifications
- **English Language Learners**
  - Assign a buddy, same language or English speaking
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- **Gifted and Talented Students**
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**Lesson Plans**

Lesson #	Lesson Name
1	Simplifying Algebraic Expressions (pre-algebra review)
2	Review solving one step equations
3	Solving two step equations
4	Solving multi-step equations
5	Solving equations with variables on both sides of an equation
6	Systems of Equations by Graphing (easy)
7	Systems of Equations by Substitution(easy)
8	Systems of Equations by Elimination (easy)



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9	Solving and graphing one step inequalities	
10	Solving and graphing two and multi-step inequalities	

**Teacher Notes:**

**Manipulatives:** Equation Balances, wipe off boards with equation balance, Guess my Value with wipe off boards

Unit Overview Template	
<b>Content Area:</b> Patterns & Functions	
<b>Unit Title:</b> Unit 4 Functions	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b> In this unit, students will further their knowledge of representing equations by graphing them in the coordinate plane. Students will begin to hear and understand the idea of a function and linear relationships (as one element changes, it affects the other directly). Students will understand slope as a rate of change in a linear relationship and understand ways to find the slope. Students will finally see a glimpse of quadratic and other nonlinear functions and their graphs.	
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Creativity and Innovation, Critical Thinking & Problem Solving, Technology Skills	
Learning Targets	
NJSLS Standards 8.F.A 8.F.B	
<b>Content Statements</b>	
<b>CPI#</b>	<b>Cumulative Progress Indicator (CPI)</b>
8.F.A.1-3	Define, evaluate, and compare functions
8.F.B. 4-5	Use functions to model relationships between quantities
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>What do the two variables in an equation really mean and how does one variable's change affect another?</li> <li>What is a rate of change and how does that look graphically and in an equation?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>Students will start to gain an understanding that as one variable changes, it affects the other variable directly in a linear function. They will use real life situations to represent linear functions and use their graphs to understand the rate of change.</li> </ul>
<b>Unit Learning Targets</b> <i>Students will...</i> <ul style="list-style-type: none"> <li>Analyze functional relationships to explain how a change in one quantity can result in a change in another using graphs and tables</li> <li>Find the slope of a line and analyze how the slope also represents the rate of change</li> <li>Relate linear and nonlinear graphs to Events</li> <li>Graph linear equations using tables, slope and y-intercepts</li> <li>Write rules for linear functions</li> <li>Use tables to graph and interpret quadratic and other nonlinear functions</li> </ul>	
Evidence of Learning	
<b>Summative Assessment</b> Unit test	

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**Equipment Needed:** Internet, InterWrite boards

**Teacher Resources:** Prentice Hall book & online resources, Kutasoftware program & assessments, Hands-on manipulatives

**Formative Assessments**

- Students will be assessed by formal and informal assessments
- Unit test

**Modifications:**

- **Special Education Students**
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- **English Language Learners**
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- **At-Risk Students**
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  - Consult with classroom teacher(s) for specific behavior interventions
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- **Gifted and Talented Students**
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**Lesson Plans**

Lesson #	Lesson Name	Time frame (hours/days)
1	Sequences	1-3 days
2	Relating Graphs to Events	2-3 days
3	Functions	2-3 days
4	Understanding Slope	2-3 days



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5	Graphing Linear Equations	2-3 days
6	Writing Rules for Linear Functions	3 days
7	Quadratic and other Nonlinear Functions	2-3 days

**Teacher Notes:**

**Curriculum Development Resources**

Click links below to access additional resources used to design this unit:

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Unit Overview Template	
<b>Content Area:</b> Geometry	
<b>Unit Title:</b> Unit 5 Geometric Relations	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b> In this unit, students will review basic 2D geometry properties. We will look at geometry in the coordinate plane, like transformations, but also review and build on student's knowledge of 2D geometry involving angles, lines, polygons, and measurements with 2D objects.	
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Creativity and Innovation, Critical Thinking & Problem Solving, Technology Skills	
Learning Targets	
<b>NJSLS Standards</b> 7.G.B. 4-6 8.G.A. 5 8.G.B	
<b>Content Statements</b>	
<b>CPI#</b>	Cumulative Progress Indicator (CPI)
<b>7.G.B.4-6</b>	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
<b>8.G.A.5</b>	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. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>
<b>8.G.B</b>	4. Explain a proof of the Pythagorean Theorem and its converse. 5. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. 6. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>How can I use what I know about shapes and figures to apply it to two-dimensional objects?</li> <li>What are some real life applications for geometry concepts and measurements?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>Students will find that there are many real life applications to geometry properties and problems. Learning about them and being able to measure will help them solve real world problems</li> </ul>
<b>Unit Learning Targets</b> <i>Students will...</i> <ul style="list-style-type: none"> <li>Identify special pairs of angles and relationships of angles formed by two parallel lines cut by a transversal</li> <li>Use parallel lines to investigate the sum of measures of the angles in triangles and other polygons</li> <li>Identify congruent polygons</li> <li>Find the circumference and area of circles</li> <li>Understand and apply properties of triangles (interior and exterior angle theorems)</li> <li>Apply triangle properties to find unknown angles and algebraic expression angles</li> </ul>	

- Learn and apply the Pythagorean Theorem to right triangle problems and real world problems
- Learn the Distance Formula to coordinate geometry and apply to real world problems

#### Evidence of Learning

##### Summative Assessment

Ongoing math journals and homework assignments, final unit test

**Equipment Needed:** Computers, InterWrite board activities and figures, 3D Geometry figures, Peg boards and colored rubber bands

**Teacher Resources:** Prentice Hall texts, Kutasoftware program & assessments, [www.mathopenreference.com](http://www.mathopenreference.com)

##### Formative Assessments

- Group activities

- Math journals
- Unit test

##### Modifications:

- **Special Education Students**
  - Allow errors
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#### Lesson Plans

Lesson #	Lesson Name	Time frame (hours/days)
1	Pairs of Angles	1 class period



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2	Angles and Parallel Lines	2 class periods
3	Classifying Triangles	1 class period
4	Triangle properties (interior and exterior angles)	1 class period review
5	Applying triangle properties to algebraic unknown angles	1-2 class period review
6	The Pythagorean Theorem	2 class period
7	The Distance Formula	1-2 class period

**Teacher Notes:**

Use mathopenreference.com as a visual resource for angles, triangles, Pythagorean theorem, and other great properties!

**Curriculum Development Resources**

Unit Overview Template	
<b>Content Area:</b> Geometry	
<b>Unit Title:</b> Unit 6 Geometric Transformations	
<b>Target Course/Grade Level:</b> Math 8	
<b>Unit Summary</b> A. In this unit, students will understand congruence and similarity using physical models, transparencies, or geometry software. Students will discover properties of transformations, including translations, reflections, rotations, and dilations, and understand which produce congruent figures and which produce similar figures. They will apply these basic transformations to also find compound transformations (two or more transformations in one). Learning and understanding important geometric symbols is also an important concept for students in this unit (A' means the image point, for example).	
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Creativity and Innovation, Critical Thinking & Problem Solving, Technology Skills	
Learning Targets	
<b>NJSLS Standards</b> 8.G.A.1-4	
<b>Content Statements</b>	
CPI#	Cumulative Progress Indicator (CPI)
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations: <ul style="list-style-type: none"> <li>a. Lines are transformed to lines, and line segments to line segments of the same length.</li> <li>b. Angles are transformed to angles of the same measure.</li> <li>c. Parallel lines are transformed to parallel lines.</li> </ul>
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 figures, describe a sequence that exhibits the similarity between them.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• How can a transformation of a shape in the coordinate plane result in congruent or similar figure?</li> <li>• What are some real life applications or examples of transformations and how do these properties apply?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• Students will find that there are many real life applications to geometry properties and problems. Learning about them and being able to measure will help them solve real world problems</li> </ul>
<b>Unit Learning Targets</b>	

*Students will...*

- Identify and learn properties of translations in the coordinate plane
- Identify and learn properties of reflections in the coordinate plane
- Identify and learn properties of rotations in the coordinate plane, given a center of rotation at the origin
- Identify and learn properties of dilations in the coordinate plane, given a center of dilation at the origin
- Locate and name combined transformations in the Coordinate Plane

#### Evidence of Learning

##### Summative Assessment

Ongoing math applications and homework assignments, final unit test

**Equipment Needed:** Computers, InterWrite board activities and figures, Document Camera 2D shapes and coordinate grid paper

**Teacher Resources:** Prentice Hall texts, Kutasoftware program and assessments, wipe off boards with coordinate grids, document camera 2D shapes, [www.mathopenreference.com](http://www.mathopenreference.com)

##### Formative Assessments

- Math journals
- Unit test
- Group activities

##### Modifications:

- **Special Education Students**
  - Allow errors
  - Rephrase questions, directions, and explanations
  - Allow extended time to answer questions, and permit drawing, as an explanation
  - Accept participation at any level, even one word
  - Consult with Case Managers and follow IEP accommodations/modifications
- **English Language Learners**
  - Assign a buddy, same language or English speaking
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- **At-Risk Students**
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  - Provide extension activities
  - Build on students' intrinsic motivations



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- Consult with parents to accommodate students' interests in completing tasks at their level of engagement

Lesson Plans		
Lesson #	Lesson Name	Time frame (hours/days)
1	Translations	2 class period
2	Reflections & Symmetry	2 class periods
3	Rotations	2-3 class periods
4	Dilations & Similarity	1-2 class periods
5	Combined Transformations	2 class periods

**Teacher Notes:**

Use as many hands-on manipulatives and visual tools to help

**Curriculum Development Resources**

Unit Overview Template		
Content Area: Geometry		
Unit Title: Unit 7 Geometric Measurement		
Target Course/Grade Level: Math 8		
Unit Summary		
In this unit, students will take what they learned in 2D geometry and apply it to 3D geometry properties and measurements. Students will learn about perspective drawings. Students will review knowledge of surface area from 7 <sup>th</sup> grade, and then learn concepts of volume of prisms, pyramids, cones, cylinders, and spheres.		
Primary interdisciplinary connections:		
21 <sup>st</sup> century themes: Creativity and Innovation, Critical Thinking & Problem Solving, Technology Skills		
Learning Targets		
NJSLStandards		
8.G.C		
Content Statements		
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
CPI#	Cumulative Progress Indicator (CPI)	
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.	
Unit Essential Questions		Unit Enduring Understandings
<ul style="list-style-type: none"><li>What does it look like and mean to go from 2D to 3D geometry?</li><li>How can I draw or represent 3D objects on a flat, 2D surface?</li><li>How are 3D objects measured? How is this used in real life situations?</li></ul>		<ul style="list-style-type: none"><li>Students will find that there are many real life applications to 3D geometry. They will identify and draw 3D objects as well as find their measurements, like surface area and volume.</li></ul>
Unit Learning Targets		
Students will...		
<ul style="list-style-type: none"><li>Identify and draw 3D figures</li><li>Discuss and identify Nets of 3D objects by using an interactive online virtual site</li><li>Find the surface areas of prisms, cylinders, pyramids, and cones</li><li>Find the volume of prisms, pyramids, cylinders, cones, and spheres</li><li>Apply volume to real life world problems</li></ul>		
Evidence of Learning		
Equipment Needed: Computers, InterWrite board activities and figures, Document Camera 2D shapes and coordinate grid paper		
Teacher Resources: Prentice Hall texts, Kutasoftware program and assessments, wipe off boards with coordinate grids, document camera 2D shapes, <a href="http://www.mathopenreference.com">www.mathopenreference.com</a>		
Formative Assessments		<ul style="list-style-type: none"><li>Group activities</li></ul>
<ul style="list-style-type: none"><li>Math journals</li><li>Unit test</li></ul>		

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Lesson Plans		
Lesson #	Lesson Name	Time frame (hours/days)
1	Categorizing 3D Solids	1 class period
2	Drawing 3D figures	½ class period
3	Nets and 3D figures	½ class period
4	Surface area of prisms and pyramids	2 class periods
5	Surface area of cylinders and cones	2 class periods
6	Volumes of prisms and pyramids	2 class periods
7	Volume of cylinders and cones	2 class periods



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8	Properties of Spheres & Volume	1-2 class periods

Teacher Notes:

Curriculum Development Resources

Unit Overview Template			
<b>Content Area:</b> Discrete Mathematics			
<b>Unit Title:</b> Unit 8 Statistics & Bivariate Data			
<b>Target Course/Grade Level:</b> Math 8			
<b>Unit Summary</b> In this unit, students will look into data and how data is found, represented, and graphed. Students will gather their own data to display in a variety of graphs, calculate important measures of central tendency, and discuss basic concepts of bivariate data. As a connection to linear relationships, students will also discuss the connection between proportional relationships as seen in graphs like Distance-Time graphs and Scatter Plots. Scatter Plots will also lead to discussion of important vocabulary like correlation, correlation coefficient, and line of best fit.			
<b>Primary interdisciplinary connections:</b> <b>21<sup>st</sup> century themes:</b> Creativity and Innovation, Critical Thinking & Problem Solving, Technology Skills			
Learning Targets			
<b>NJSLS Standards</b> <b>8.SP.A</b>			
<b>Content Statements</b> Investigate patterns of association in bivariate data.			
<b>CPI#</b>	Cumulative Progress Indicator (CPI)		
<b>8.SP.A.1</b>	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.		
<b>8.SP.A.2</b>	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.		
<b>8.SP.A.3</b>	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>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.</i>		
<b>8.SP.A.4</b>	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. <i>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?</i>		
<table border="1"> <tr> <td> <b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>Why are data and statistical information so incredibly important in our day, and how can I learn how to collect and display data in a meaningful way?</li> <li>How can graphs help me to understand and see data more clearly and effectively?</li> </ul> </td><td> <b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>Our world is a data-driven world, and students will learn the importance of collecting, analyzing, and representing data in a variety of ways. They will understand how to create and analyze bivariate data and interpret results using correlations, correlation coefficients, line of best fits. Students will discuss</li> </ul> </td></tr> </table>		<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>Why are data and statistical information so incredibly important in our day, and how can I learn how to collect and display data in a meaningful way?</li> <li>How can graphs help me to understand and see data more clearly and effectively?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>Our world is a data-driven world, and students will learn the importance of collecting, analyzing, and representing data in a variety of ways. They will understand how to create and analyze bivariate data and interpret results using correlations, correlation coefficients, line of best fits. Students will discuss</li> </ul>
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<ul style="list-style-type: none"> <li>• How are proportional relationships related to data graphs, specifically a scatter plot?</li> <li>• How can I relate two categorical data to find relationships between these two items?</li> <li>•</li> </ul>	biased data and outliers and how they affect results of surveys
<b>Unit Learning Targets</b> <i>Students will...</i> <ul style="list-style-type: none"> <li>• Find the measures of variation of a set of data</li> <li>• Discuss data collection and varieties of graphs that display certain data</li> <li>• Predict the actions of a larger group by using a sample</li> <li>• Learn how to interpret and make predictions using scatter plot graphs</li> <li>• Discuss relationships between two categorical data sets (i.e. does the amount of time studying affect a student's grade on a test?).</li> <li>• Connect correlations to relationships (positive, negative, or no correlations) and their strength (strong and weak relationships)</li> </ul>	
<b>Evidence of Learning</b>	
<b>Summative Assessment</b> Ongoing math journals and homework assignments, final unit test	
<b>Equipment Needed:</b> Computers, InterWrite board activities and figures, scatter plot graphs and examples <b>Teacher Resources:</b> Prentice Hall texts, internet, etc. Microsoft Excel or Google Sheets	
<b>Formative Assessments</b> <ul style="list-style-type: none"> <li>• Math journals</li> <li>• Unit test</li> <li>• Survey projects and graphs</li> </ul> <b>Modifications:</b> <ul style="list-style-type: none"> <li>• <b>Special Education Students</b> <ul style="list-style-type: none"> <li>- Allow errors</li> <li>- Rephrase questions, directions, and explanations</li> <li>- Allow extended time to answer questions, and permit drawing, as an explanation</li> <li>- Accept participation at any level, even one word</li> <li>- Consult with Case Managers and follow IEP accommodations/modifications</li> </ul> </li> <li>• <b>English Language Learners</b> <ul style="list-style-type: none"> <li>- Assign a buddy, same language or English speaking</li> <li>- Allow errors in speaking</li> <li>- Rephrase questions, directions, and explanations</li> <li>- Allow extended time to answer questions</li> <li>- Accept participation at any level, even one word</li> </ul> </li> <li>• <b>At-Risk Students</b></li> </ul>	



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**Lesson Plans**

Lesson #	Lesson Name	Time frame (hours/days)
1	Reading Graphs Critically	1 class period
2	Patterns and associations in bivariate data (interpreting slope)	1-2 class period
3	Scatter plot graphs and interpreting them using correlations	1-2 class period
4	Making Predictions from Scatterplots, understanding correlation coefficients	1-2 class periods
5	Conducting a Survey & interpreting results Project	4-5 class periods
6	Two-Way Tables	1-2 class periods
12	Permutations and Combinations	2-3 class periods

Teacher Notes:

Curriculum Development Resources