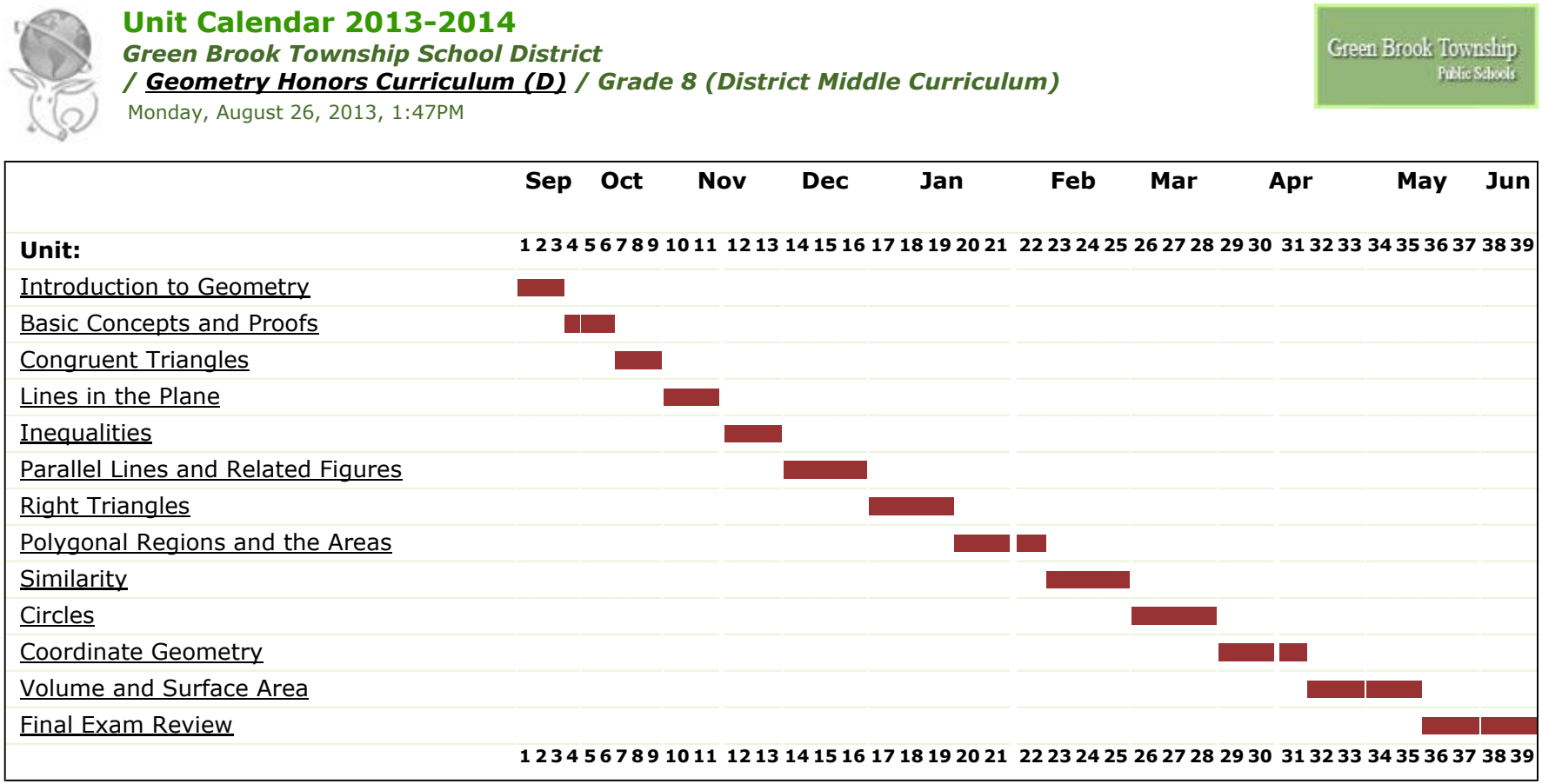
Unit Calendar 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:47PM



Last Updated: Wednesday, December 19, 2012, 8:53AM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:47PM

Green Brook Township Public Schools

Unit: Introduction to Geometry (Week 1, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Experiment with transformations in the plane

- G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Description of Unit	Essential Questions
In this unit, students will learn essential vocabulary and concepts that they will use in definitions and theorems for the remainder of this course. Students will be introduced to geometry as a mathematical system of logical thinking that is composed of undefined terms, definitions, postulates, and theorems. They will understand that algebra and geometry are different branches of mathematics, but they can be used in conjunction to solve problems. Students will review and extend their prior knowledge on basic geometric concepts	1) Why must care be given when labeling and inspecting in the study of geometry? 2) How can algebraic principles be used to solve problems that involve angle measurement and segment length? 3) How can knowledge of problem-solving strategies assist in decision-making and real-world situations?

such as points, lines, and angles. This unit contains the building blocks of geometry that students will need to use for the remainder of the course.

Knowledge	Skills
Students will know that: 1) the union of two sets is the set of all elements from both sets. 2) the intersection of two sets is the set of the elements that are common between both sets. 3) each degree in an angle is divided into 60 minutes. 4) objects are collinear when they lie on a straight line. 5) the sum of the lengths of any two sides of a triangle is always greater than the length of the third side. 6) two-column proofs are a method that can be used to prove theorems and other mathematical statements. 7) bisectors divide an angle or segment into two congruent parts while trisectors divide an angle or segment into three congruent parts.	Students will be able to: a) identify and name points, lines, rays, angles, and triangles. b) find the union and intersection of sets and geometric figures. c) convert degree measurements into degrees, minutes, and seconds. d) identify collinearity and betweenness of points. e) write basic two-column proofs. f) apply the definitions of bisectors and trisectors to find missing measurements and complete two-column proofs.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of algebraic concepts that they will need to utilize during this course.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
The unit quiz will include unions, intersections, angle measures, betweenness, assumptions from diagrams, and collinearity.

Unit Test
Summative: Written Test
Students will be assessed on understanding of definitions for discussed geometric terms, finding missing angle and segment measurements, converting degree measurements to degrees, minutes, and seconds, recognizing congruency, writing basic two-column proofs, recognizing collinearity, and applying definitions and properties to find unknown information.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or collected for grading and comments. Angle Bisector Construction Students will construct an angle bisector by drawing an angle and using paper folds. Triangle Inequality Investigation Students will complete an investigation using an online geometry applet in order to discover the triangle inequality. This can be done on Netbooks or as a whole-class demonstration. Triangle Inequality Investigation	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to solve when participating in communicator practice will be provided. Students will be assigned missing measurement problems that will require solving systems of equations or quadratic equations.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Thursday, November 29, 2012, 9:59AM

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:48PM

Green Brook Township Public Schools

Unit: Basic Concepts and Proofs (Week 4, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Experiment with transformations in the plane

- G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO Prove geometric theorems

- G.CO.9. Prove theorems about lines and angles.

Description of Unit	Essential Questions
In this unit, students will begin to study how geometric and logical proofs are constructed. Throughout this unit, they will build their knowledge of definitions, theorems, and postulates. Students will learn what can and cannot be assumed from a diagram. Finally, they will use properties of equality and the laws of logic to prove basic theorems about congruency,	1) Why is proof necessary? 2) How does writing proofs allow us to support claims that we believe to be true? 3) How is proof connected to the process of solving an equation?

supplementary angles, complementary angles, and vertical angles.	4) How does the understanding of writing mathematical proofs aid us in other areas of life?

Knowledge	**Skills**
Students will know that: 1) perpendicularity cannot be assumed. 2) complementary angles are two angles whose sum is 90° and supplementary angles are two angles whose sum is 180°. 3) building connections between key words in given information and known theorems and definitions is necessary when drawing conclusions. 4) if angles are complements/supplements to congruent angles, then they are congruent. 5) the addition, subtraction, multiplication, and division properties can be applied to segments and angles. 6) the transitive and substitution properties can be used when proving congruency. 7) vertical angles are congruent.	Students will be able to: a) write proofs and solve problems involving perpendicularity. b) apply the properties of complementary and supplementary angles to solve problems. c) provide conclusions and reasons using given information and prior knowledge. d) prove angle congruency using given information regarding congruent complements and supplements. e) apply the addition, subtraction, multiplication, and division properties to segments and angles. f) use the transitive and substitution properties to find missing measurements and as reasons within proofs. g) use the congruency of vertical angles when writing proofs.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of perpendicularity, complementary angles, supplementary angles, and vertical angles.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on their understanding of finding missing measurements and writing proofs involving perpendicularity, complementary angles, supplementary angles, and interpretting diagrams.

Unit Test
Summative: Written Test
Students will be assessed on their understanding of finding missing measurements and writing proofs involving perpendicularity, complementary angles, supplementary angles, interpretting diagrams, addition property, subtraction property, multiplication property, division property, transitive property, substitution property, and vertical angles.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Congruent Complements and Supplements Investigation Students will measure provided complementary and supplementary angles in order to discover that complements of congruent angles are congruent and supplements of congruent angles are congruent.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Thursday, November 29, 2012, 10:00AM

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:48PM

Green Brook Township Public Schools

Unit: Congruent Triangles (Week 7, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Understand congruence in terms of rigid motions

- G.CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
- G.CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- G.CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO Prove geometric theorems

- G.CO.10. Prove theorems about triangles.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Prove theorems involving similarity

- G-SRT.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

Description of Unit	Essential Questions
During this unit, students will work with the properties and features of triangles. They will begin their study by identifying congruent figures. They will use previously learned theorems as well as triangle congruence postulates to prove that two triangles are congruent. The students will extend this knowledge, along with the concept that corresponding parts of congruent triangles are congruent (CPCTC), to prove various conclusions. Students will also use theorems about isosceles and equilateral triangles to find missing measurements and to write proofs.	1) Why is proof necessary? 2) How does writing proofs allow us to support claims that we believe to be true? 3) Why do we need multiple postulates to prove that two triangles are congruent?

Knowledge	Skills
Students will know that: 1) two geometric figures are congruent if and only if all corresponding parts are congruent. 2) the reflexive property is applicable when a side or an angle is shared by two figures. 3) triangles can be proven congruent by using the SSS, SAS, ASA, and HL postulates. 4) corresponding parts of congruent triangles are congruent (CPCTC). 5) overlapping figures share common angle(s) or side(s). 6) isosceles triangles have two congruent sides and congruent base angles. 7) equilateral triangles are equiangular. 8) right triangles can be proven congruent by using the HL postulate.	Students will be able to: a) identify the corresponding parts of congruent figures. b) use the reflexive property when proving figures congruent. c) prove triangles to be congruent using the triangle congruence postulates. d) use CPCTC to prove congruency and draw conclusions. e) use overlapping triangles in proofs. f) find missing measurements and write proofs involving isosceles and equilateral triangles. g) prove right triangles to be congruent using the HL postulate.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of the classification of triangles, the sum of triangles' angles, and congruent figures.

Daily Formative Assessments
Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on identifying congruent figures and their corresponding parts, proving triangles congruent, and using CPCTC in proofs.

Unit Test
Summative: Written Test
Students will be assessed on identifying congruent figures and their corresponding parts, proving triangles congruent, using CPCTC in proofs, using overlapping triangles in proofs, and using properties of isosceles triangles, equilateral triangles, and perpendicular bisectors in proofs.

Activities	**Activities to Differentiate Instruction**
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments. Triangle Congruence Postulates Investigations Students will complete investigations from the *Activity Generator* in which they will either discover or confirm triangle congruence postulates. This includes the SSS, SAS, and ASA postulates. Students will also complete an investigation, which will provide multiple counterexamples that disprove the SSA postulate for proving triangle congruency.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard

	Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Straws and string (for Triangle Congruence SSS Postulate Investigation) Smart Exchange

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Last Updated: Thursday, November 29, 2012, 10:06AM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:48PM

Green Brook Township Public Schools

Unit: Lines in the Plane (Week 10, 2 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Experiment with transformations in the plane

- G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO Understand congruence in terms of rigid motions

- G.CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO Prove geometric theorems

- G.CO.10. Prove theorems about triangles.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Prove theorems involving similarity

- G-SRT.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

CommonCore: Mathematics, CommonCore: HS: Geometry, Expressing Geometric Properties with Equations
G-GPE Use coordinates to prove simple geometric theorems algebraically

- G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- G-GPE.6. Find the point on a directed line segment between two given points that divide the segment in a given ratio.

Description of Unit	**Essential Questions**
During this unit, students will work with the properties of perpendicular lines. They will begin their study by writing detour proofs, using previously learned theorems and triangle congruence postulates to complete these proofs. The students will write the "set up" and draw the diagrams for proofs that are solely given in words. Student will also use theorems about congruent and supplementary angles, equidistance, and perpendicular bisectors to write proofs. Finally, they will use their previous knowledge of slope to prove lines are either parallel or perpendicular.	1) Why is proof necessary? 2) How does writing proofs allow us to support claims that we believe to be true? 3) How can algebraic principles be used to solve problems or prove geometric statements?
Knowledge	**Skills**
Students will know that: 1) detour proofs are proofs in which a pair of triangles can only be proven congruent if another set of triangles are proven congruent. 2) problems in which diagrams are not provided will require "set up" before a proof can be written. 3) if two angles are both supplementary and congruent, then they are right angles. 4) a perpendicular bisector of a segment is a line that bisects and is perpendicular to the segment. 5) if two points are each equidistant from the endpoints of a segment, then the two points determine the perpendicular bisector of that segment. 6) if a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of that segment. 7) corresponding, alternate interior, and alternate exterior angles are formed when two coplanar lines are intersected by a transversal.	Students will be able to: a) write detour proofs. b) organize information, draw diagrams, set up the given, and prove statements for problems presented in words. c) prove that two angles are right angles by using the given information that they are congruent and supplementary. d) apply the properties of equidistance and perpendicular bisectors to prove statements about geometric figures. e) identify corresponding, alternate interior, and alternate exterior angles that are formed when a transversal intersects two coplanar lines. f) recognize and prove parallel and perpendicular lines using slopes.

8) parallel lines are coplanar lines that do not intersect. 9) lines whose slopes are the same are parallel, and lines whose slopes are opposite reciprocals are perpendicular.	

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of perpendicular lines, parallel lines, using the midpoint formula, and slope.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on writing detour proofs, providing the "set up" for problems involving proofs, and proving two angles are right angles.

Unit Test
Summative: Written Test
Students will be assessed on writing detour proofs, providing the "set up" for problems involving proofs, proving two angles are right angles, applying theorems involving equidistance in proofs, and using slope to prove lines are either parallel or perpendicular.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly.

	Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.

Integrated/Cross-Disciplinary Instruction	Resources
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Thursday, November 29, 2012, 10:12AM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:49PM

Green Brook Township Public Schools

Unit: Inequalities (Week 12, 2 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Prove geometric theorems

- G.CO.10. Prove theorems about triangles.

CommonCore: Mathematics, CommonCore: HS: Geometry, Modeling with Geometry
G-MG Apply geometric concepts in modeling situations

- G-MG.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).Ö

Description of Unit	Essential Questions
In this unit, students will explore the concept that three segments do not always form a triangle and the relationship that exists between the lengths of the sides of a triangle and the measures of the angles that are opposite those sides.	1) What relationships exist between the side lengths and the angles of a triangle? 2) What relationships exist between the sides and the angles of two triangles?

Students will also explore the relationships that can exist between sides and angles of triangles that are not congruent.	3) How can algebraic principles be used to solve problems or prove geometric statements?

Knowledge	**Skills**
Students will know that: 1) the transitive, addition, and multiplication properties can be applied to inequalities as well as the negative multiplication property of inequalities. 2) the sum of the lengths of any two sides of a triangle is greater than the length of the third side. 3) the angle opposite the longest side of a triangle is the greatest angle in the triangle. 4) the side opposite the greatest angle is the longest side of the triangle. 5) if two sides of one triangle are congruent to two sides of another triangle and the included angle in the first triangle is greater than that in the second triangle, then the remaining side of the first triangle is greater than the remaining side in the second triangle. 6) if two sides of one triangle are congruent to two sides of another triangle and the third side of the first triangle is greater than the third side of the second triangle, then the angle opposite the third side in the first triangle is greater than the angle opposite the third side in the second triangle.	Students will be able to: a) use algebraic properties of inequality to solve inequalities. b) apply the Triangle Inequality Postulate to solve problems. c) apply the Exterior-Angle-Inequality Theorem to solve problems. c) use the Hinge Theorems to determine the relative measures of sides and angles.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of the Triangle Inequality Postulate and the relative measures of side lengths and measures of angles in triangles.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Test

Summative: Written Test
Students will be assessed on their knowledge of the relationships that exist between the lengths of the sides of a triangle and the measures of the angles that are opposite those sides.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Drawing and Comparing Triangles Students will draw a variety of triangles and measure the unknown side lengths and angle measures. This will lead to the discovery that the side opposite the largest angle is the longest side in a triangle.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Thursday, November 29, 2012, 10:15AM

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:49PM

Green Brook Township Public Schools

Unit: Parallel Lines and Related Figures (Week 14, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Experiment with transformations in the plane

- G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO Prove geometric theorems

- G.CO.9. Prove theorems about lines and angles.
- G.CO.11. Prove theorems about parallelograms.

G-CO Make geometric constructions

- G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

CommonCore: Mathematics, CommonCore: HS: Geometry, Expressing Geometric Properties with Equations

G-GPE Use coordinates to prove simple geometric theorems algebraically

- G-GPE.4. Use coordinates to prove simple geometric theorems algebraically.
- G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Description of Unit	**Essential Questions**
In this unit, students will study parallel lines and special quadrilaterals. First, they will identify and define parallel lines and the angle pairs that are formed by a transversal that intersects two parallel lines. They will be able to find missing measurements and use the properties of the angle pairs when writing proofs. Students will also use these angle relationships to prove that lines are parallel. They will identify and use the properties of special quadrilaterals including squares, rectangles, parallelograms, rhombi, trapezoids, and kites. Students will be able to find missing measurements, prove properties regarding special quadrilaterals, and prove that a figure is one of the special quadrilaterals.	1) Why is proof necessary? 2) How can lines be proven to be parallel? 3) How can the parallel lines that are contained within squares, rectangles, parallelograms, and trapezoids be used to prove properties of these polygons?
Knowledge	**Skills**
Students will know that: 1) parallel lines are coplanar lines that do not intersect and cannot be assumed from a diagram. 2) lines can be proven parallel by either proving that corresponding, alternate interior, or alternate exterior angles are congruent or that same side interior or same side exterior angles are supplementary. 3) if two parallel lines are cut by a transversal, then any pair of the angles formed are either congruent or supplementary. 4) the special quadrilaterals, squares, rectangles, parallelograms, rhombi, trapezoids, and kites, contain parallel lines and/or perpendicular bisectors. 5) to prove that a figure is one of the special quadrilaterals, one must be sure to prove sufficient properties to establish the quadrilateral's identity.	Students will be able to: a) identify and solve problems pertaining to parallel lines and the angle pairs that are formed by parallel lines and transversals. b) prove that lines are parallel. c) use the Parallel Postulate and theorems regarding angle pairs that are formed by parallel lines and transversals when writing proofs. d) use properties of special quadrilaterals to find missing measurements and write proofs. e) prove that figures are special quadrilaterals.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of parallel lines, angle pairs of parallel lines, classification of quadrilaterals, and the properties of quadrilaterals.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on defining parallel lines, finding missing measurements in figures containing parallel lines, and proving lines are parallel.

Unit Test
Summative: Written Test
Students will be assessed on defining parallel lines, finding missing measurements in figures containing parallel lines, proving lines are parallel, using properties to find missing measurements and write proofs, and proving figures are special quadrilaterals.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments. Definition of Parallel Lines Investigation Students will draw a figure of a rectangular prism and use it to visualize the definitions of parallel, intersecting, and skew lines. Proving Lines are Parallel Investigation Students will diagonally cut an index card and use it to draw two lines that intersect a third line. They will use	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.

their knowledge of corresponding angles to discover that if corresponding angles are congruent, then two lines are parallel.

Proving that Quadrilaterals are Parallelograms Investigation
Students will use measured straws in their investigation to discover two methods that can be used to prove that a quadrilateral is a parallelogram. (If both pairs of opposite sides of a quadrilateral are congruent, then it is a parallelogram, and if one pair of opposite sides of a quadrilateral is parallel and congruent, then it is a parallelogram.)

Integrated/Cross-Disciplinary Instruction	Resources
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion. • Students will build connections between geometry and engineering by discovering techniques in which one can prove that two segments are parallel. These methods can be used in order to prove that two objects are parallel to each other.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM (Geometry 3.1, 3.3, and 8.3 investigations) Rulers Straws and string (for investigations) Smart Exchange

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Last Updated: Saturday, December 15, 2012, 12:55PM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:51PM

Green Brook Township Public Schools

Unit: Right Triangles (Week 17, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Prove theorems involving similarity

- G-SRT.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

G-SRT Define trigonometric ratios and solve problems involving right triangles

- G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G-SRT.7. Explain and use the relationship between the sine and cosine of complementary angles.
- G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Description of Unit	Essential Questions
During this unit, students will work with right triangles and apply right triangle properties to solve problems. Although introduced in previous courses, students will revisit the Pythagorean Theorem in a rigorous manner to	1) Why is proof necessary? 2) How can right triangle theorems be used to solve real world situations?

introduce the 45–45–90 and 30–60–90 relationships in right triangles. Similarity in terms of right triangles and the famous corollaries will be investigated. Trigonometry will be introduced and used to solve problems that contain figures that are not special right triangles. These right triangle problem-solving techniques will be used to solve problems involving squares, equilateral triangles, rectangles, rhombi, parallelograms, and trapezoids.

3) How can algebraic principles be used to solve problems or prove geometric statements?

Knowledge	**Skills**
Students will know that: 1) if the altitude is drawn from the right angle of a right triangle, then it is the geometric mean between the two segments of the hypotenuse. 2) the leg of a right triangle is the geometric mean between the hypotenuse and the segment of the hypotenuse formed when the altitude to the hypotenuse is drawn. 3) Pythagorean triples are sets of three integers which can be sides of a right triangle. 4) the converse of the Pythagorean Theorem is used to identify acute, obtuse, and right triangles when three side lengths are given. 5) the distance formula for two coordinate points is $d = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$. 6) the relationship between the sides of a 45–45–90 right triangle is x, x, and $x\sqrt{2}$. 7) the relationship between the sides of a 30–60–90 right triangle is x, $x\sqrt{3}$, and 2x. 8) the sine, cosine, and tangent relationships in a right triangle can be used to find missing side lengths. 9) the inverse of the sine, cosine, and tangent ratios can be used to find the missing acute angles in a right triangle.	Students will be able to: a) find missing sides of right triangles using altitude-on-hypotenuse theorems. b) find missing sides of right triangles using the Pythagorean Theorem. c) determine if a triangle is right, obtuse, or acute given the three side lengths. d) find the distance between two coordinate points. e) find missing sides of special right triangles. f) find missing sides and angles of right triangles using trigonometric ratios. g) find missing sides and angles of geometric figures using special right triangles or trigonometry. h) solve problems involving angles of elevation and angles of depression using trigonometry.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of the Pythagorean Theorem and simplifying radical expressions.

Daily Formative Assessments

Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on solving problems that utilize altitude-on-hypotenuse theorems, the Pythagorean Theorem, the Distance Formula, and special right triangles.

Unit Test
Summative: Written Test
Students will be assessed on solving problems that utilize altitude-on-hypotenuse theorems, the Pythagorean Theorem, the Distance Formula, special right triangles, and trigonometry.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Special Right Triangles Investigation Students will investigate the relationship between 45-45-90 triangles and 30-60-90 triangles.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will build connections between geometry and architecture by discovering that knowledge of trigonometry can assist in calculating the height of tall structures.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange

	McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Wednesday, December 19, 2012, 8:53AM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:51PM

Green Brook Township Public Schools

Unit: Polygonal Regions and the Areas (Week 20, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Make geometric constructions

- G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Define trigonometric ratios and solve problems involving right triangles

- G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

CommonCore: Mathematics, CommonCore: HS: Geometry, Expressing Geometric Properties with Equations
G-GPE Use coordinates to prove simple geometric theorems algebraically

- G-GPE.7. Use coordinates to compute perimeters of polygons and areas for triangles and rectangles, e.g. using the distance formula. Ò

CommonCore: Mathematics, CommonCore: HS: Geometry, Modeling with Geometry
G-MG Apply geometric concepts in modeling situations

- G-MG.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).Ö

Description of Unit	**Essential Questions**
In this unit, students will develop and use formulas for the area of various polygons including triangles, squares, rectangles, parallelograms, trapezoids, rhombi, and kites. They will use the Pythagorean Theorem to find missing sides of right triangles in order to solve complex problems. Students will explore special right angles and develop the formulas for 30°-60°-90° triangles and 45°-45°-90° triangles. Finally, they will apply all of these skills to find the area of both regular polygons and complex figures.	1) Why is proof necessary? 2) How can right triangle theorems be applied to solve real-world problems? 3) How are we able to build upon previously learned concepts and apply them to geometry?
Knowledge	**Skills**
Students will know that: 1) the area of a closed region is the number of square units of space within the boundary. 2) formulas can be used to find the area of squares, rectangles, triangles, trapezoids, parallelograms, rhombi, kites, and regular polygons. 3) an irregular polygon can be divided into pieces so that the area can be found by finding the area of each individual piece and adding the areas together.	Students will be able to: a) find the area of polygons including squares, rectangles, triangles, right triangles, trapezoids, parallelograms, rhombi, and kites. b) find the area of irregular figures.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of area and the Pythagorean Theorem.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on finding the areas of regular and irregular figures.

Unit Test
Summative: Written Test
Students will be assessed on finding the areas of polygons, applying the Pythagorean Theorem, and using special right triangles when finding missing measurements.

Activities	**Activities to Differentiate Instruction**
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Area of Regular Figures Investigation Students will analyze regular polygons and discover the formula for the area of regular figures using a guided investigation.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will build connections between geometry and art by knowing and applying properties of polygons into artwork.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* (Geometry 11.6 investigation)  Smart Exchange

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Last Updated: Friday, November 30, 2012, 2:23PM

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:52PM

Green Brook Township Public Schools

Unit: Similarity (Week 23, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence
G-CO Prove geometric theorems

- G.CO.10. Prove theorems about triangles.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Understand similarity in terms of similarity transformations

- G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar;explain using similarity transformations the meaning of similarity for triangles as the equality of all pairs of angles and the proportionality of all pairs of sides.
- G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for similarity of triangles.

G-SRT Prove theorems involving similarity

- G-SRT.4. Prove theorems about triangles using similarity transformations.
- G-SRT.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

Description of Unit	**Essential Questions**
In this unit, students will study ratios and proportions through a geometric approach using similar triangles and similar polygons. They will use scale factors to solve for missing pieces in similar plane figures. Students will investigate how to prove triangles similar, as well as the difference between congruence and similarity.	1) Why is proof necessary? 2) How can the knowledge of algebraic proportions be useful in the study of triangles? 3) Why would it be important to be able to prove similarity in real-world situations?

Knowledge	**Skills**
Students will know that: 1) similar figures have side lengths that are proportional. 2) the geometric mean, *b*, of *a* and *c* can be found by solving a/b = b/c or by calculating $b = \sqrt{(ac)}$. 3) ratios and proportions are different in that one simplifies a ratio but solves a proportion. They are similar because a proportion is composed of two ratios. 4) AA, AAS similarity, and SSS similarity are ways to determine if two triangles are similar; they cannot be used with other polygons. 5) when an extended proportion is created to solve for missing sides in similar triangles, the numerators are sides of one triangle, and the denominators are the corresponding sides of the other triangle.	Students will be able to: a) solve problems containing proportional relationships. b) find the geometric mean of two numbers. c) solve for missing parts of similar polygons. d) determine if two triangles are similar using the definition of similar triangles, AA, SAS similarity, or SSS similarity. e) prove triangles similar.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of similar figures, including classifying and finding missing measurements.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on calculating geometric mean, calculating ratios of similar figures, finding missing measurements of similar figures, and proving that triangles are similar.

Unit Test
Summative: Written Test
Students will be assessed on their ability to calculate geometric mean, calculate ratios of similar figures, find missing measurements of similar figures, prove that triangles are similar, prove statements using congruence of angles and the proportionality of segments, and prove the proportionality.

Activities	**Activities to Differentiate Instruction**
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments. Similar Figures Investigation Complete an investigation in which students measure angles and segment lengths of two similar pictures to find that angles are congruent and side lengths are proportional in similar figures. They will use these concepts to determine whether different sets of figures are similar.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange

	McDougal Littell *Activity Generator* CD-ROM Smart Exchange

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Last Updated: Friday, November 30, 2012, 2:24PM

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:52PM

Green Brook Township Public Schools

Unit: Circles (Week 26, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Circles
G-C Understand and apply theorems about circles

- G-C.1. Prove that all circles are similar.
- G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle.

G-C Find arc lengths and areas of sectors of circles

- G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Description of Unit	Essential Questions

During this unit, students will investigate parts of circles and their various relationships. The relationships include those between a radius and a chord that is perpendicular to that radius, congruent chords, central angles and arc length, congruency of central angles, chords, and arcs, and congruent lengths for two tangents drawn from an external point. The students will apply these principles to solve complex problems. Students will be able to find the measure of various angles related to circles as well as missing arc lengths. They will continue to use the relationships of two inscribed or tangent-chord angles and the Power Theorem to solve problems. Students also will work with inscribed and circumscribed polygons. Finally, students will find the circumferences and the arc lengths given information regarding either the radius length, tangent length, or central angle measure.

1) How can understanding the properties of triangles be useful during the study
of circles?
2) How can properties of circles be used to solve real world situations?
3) How can algebraic principles be used to solve problems or prove geometric statements?

Knowledge	**Skills**
Students will know that: 1) a diameter is the longest chord of a circle. 2) if a radius is perpendicular to a chord, then the chord is bisected and its arc is bisected. 3) chords that are equidistant from the center of the circle are congruent. 4) a minor arc is less than 180°, a semi-circle is 180°, and a major arc is more than 180°. 5) a central angle has the same measure as its minor arc. 6) if a line is tangent to a circle, then the radius drawn to the point of tangency is perpendicular to the tangent. 7) an inscribed angle has half the measure of its arc. 8) an angle formed by a chord and a tangent has half the measure of its arc. 9) an angle formed by two secants or a secant and a tangent is half the difference of its two arcs. 10) an angle formed by two chords is half the sum of its arc and its vertical angle's arc.	Students will be able to: a) use right triangle-solving techniques, such as the Pythagorean Theorem, to solve problems with a radius perpendicular to a chord. b) apply relationships between radii, chords, tangents, and secants to find missing measurements. c) solve for angles and arcs associated with a circle. d) find missing measurements of inscribed and circumscribed polygons. e) calculate circumferences, arc lengths, perimeter, and area of sectors of figures that are composed of circles.

11) an angle formed by two tangents is half the difference of its arcs.
12) an angle inscribed in a semi-circle is a right angle.
13) a polygon is inscribed in a circle if all of its vertices lie on the circle.
14) a polygon is circumscribed about a circle if each of its sides is tangent to the circle.
15) the Power Theorems can be used to find the length of segments of chords, tangents, and secants.
16) the length of an arc is equal to the circumference of its circle times the fractional part of the circle determined by the arc.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of circles and circumference.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on finding missing measurements of segments, angles, and arc measures that are a part of circles.

Unit Test
Summative: Written Test
Students will be assessed on finding missing measurements of segments, angles, and arc measures that are a part of circles, finding missing measurements of inscribed and circumscribed polygons, and finding perimeters of figures containing circles.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments.

Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Tangent Segment Investigation Students will complete an investigation to find that the length of two tangents from an external point are congruent. Inscribed Angles Investigation Students will complete an investigation to discover that inscribed angles are half the measure of the intercepted arc measure.	Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Protractors Rulers Smart Exchange

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Last Updated: Friday, November 30, 2012, 2:24PM

Atlas Version 7.2.6

Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:53PM

Green Brook Township Public Schools

Unit: Coordinate Geometry (Week 29, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Expressing Geometric Properties with Equations
G-GPE Translate between the geometric description and the equation for a conic section

- G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G-GPE Use coordinates to prove simple geometric theorems algebraically

- G-GPE.4. Use coordinates to prove simple geometric theorems algebraically.
- G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- G-GPE.6. Find the point on a directed line segment between two given points that divide the segment in a given ratio.
- G-GPE.7. Use coordinates to compute perimeters of polygons and areas for triangles and rectangles, e.g. using the distance formula. Ò

Description of Unit	Essential Questions

This unit provides another perspective of geometry by focusing on the use of the coordinate plane while utilizing concepts that students have learned throughout the course. Students will revisit concepts from Algebra 1 and apply them to solve complex geometry problems. These concepts include graphing lines and linear inequalities, finding the slope of a line, calculating x and y-intercepts, and writing equations of lines. Additionally, they will explore the new concepts of writing equations of circles and determining types of triangles and types of quadrilaterals when given the coordinates of the vertices.

1) How can concepts involving the coordinate plane be utilized to solve real-world problems?
2) How can prior concepts from this course be applied to solve problems involving the coordinate plane?
3) How can algebraic principles be used to solve problems or prove geometric statements?

Knowledge	**Skills**
Students will know that: 1) a graph of an equation is composed of all of the coordinate points that are solutions to that equation. 2) parallel lines have the same slopes and perpendicular lines have opposite reciprocal slopes. 3) systems of equations can have either one solution, no solution, or an infinite amount of solutions that consist of all points on the line. 4) two-dimensional inequalities contain an infinite amount of solutions. 5) three-dimensional coordinates are of the form (x, y, z). 6) the distance formula for two three-dimensional points is $d = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2)}$. 7) the equation of a circle whose center is (h, k) and whose radius is r is $(x - h)^2 + (y - k)^2 = r^2$.	Students will be able to: a) apply graphing equations, calculating slope, and calculating x and y-intercepts to solve problems. b) use definitions learned previously and formulas from the course to write equations for lines. c) use systems of equations to solve problems. d) solve problems involving the graphing of linear inequalities and systems of linear inequalities. e) graph three-dimensional coordinates and find the distance and midpoint between two three-dimensional coordinates. f) graph and write equations of circles.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of graphing and writing equations, calculating slope and x and y-intercepts, and graphing linear inequalities.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on solving problems by applying the concepts of graphing equations, writing equations, calculating slope and intercepts, solving systems of equations, and graphing linear inequalities.

Unit Test
Summative: Written Test
Students will be assessed on solving problems by applying the concepts of graphing equations, writing equations, calculating slope and intercepts, solving systems of equations, graphing linear inequalities, graphing and finding the distance between three-dimensional points, and writing equations of circles.

Activities	**Activities to Differentiate Instruction**
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately-leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will build connections between geometry and geography by discovering how two-dimensional coordinate geometry can be related to lines of latitude and longitude.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM

	Protractors Rulers Smart Exchange

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Last Updated: Friday, November 30, 2012, 2:24PM

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:59PM

Green Brook Township Public Schools

Unit: Volume and Surface Area (Week 32, 4 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Geometric Measurement & Dimension
G-GMD Explain volume formulas and use them to solve problems

- G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
- G-GMD.2. (+) Given an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
- G-GMD.3. Use volume formulas for cylinders, pyramids, cones and spheres to solve problems.Ò

G-GMD Visualize the relation between two-dimensional and three-dimensional objects

- G-GMD.4. Identify cross-sectional shapes of slices of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

CommonCore: Mathematics, CommonCore: HS: Geometry, Modeling with Geometry
G-MG Apply geometric concepts in modeling situations

- G-MG.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).Ò
- G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).Ò
- G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy constraints or minimize cost; working with typographic grid systems based on ratios).Ò

Description of Unit	**Essential Questions**
In this unit, students will compare and contrast prisms, pyramids, cylinders, cones, and spheres. They will find the lateral area, total area (or surface area), and volume of these three-dimensional figures. They will apply their knowledge to solve real-world problems involving these figures. Finally, they will investigate the ratio of volumes for similar three-dimensional figures.	1) How can surface area and volume of three-dimensional figures be applied when solving real-world problems? 2) How can knowledge of two-dimensional figures assist in solving problems involving three-dimensional figures? 3) How can algebraic principles be used to solve problems or prove geometric statements?
Knowledge	**Skills**
Students will know that: 1) prisms and cylinders differ from pyramids and cones in that the former has two bases while the latter has one base. 2) lateral area is the total area of the lateral faces. 3) total area (or surface area) is the total area of all of the faces of a three-dimensional figure. 4) volume is the amount of space that a three-dimensional figure occupies. 5) the ratio of the volumes of similar figures is the cube of the ratio of scale factors.	Students will be able to: a) calculate the lateral area, total area, and volume of prisms and cylinders. b) calculate the lateral area, total area, and volume of pyramids and cones. c) calculate the surface area and volume of spheres. d) calculate missing dimensions of a figure when given either the lateral area, total area, or volume. e) calculate the ratio of lateral areas, total area, and volumes of similar three-dimensional figures. f) solve real-world problems involving three-dimensional figures.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will be assessed on their prior knowledge of calculating surface area and volume of three-dimensional figures.

Daily Formative Assessment

Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Unit Quiz
Formative: Written Test
Students will be assessed on their knowledge of calculating surface area and volume of prisms, pyramids, cylinders, and cones.

Unit Test
Summative: Written Test
Students will be assessed on their knowledge of calculating surface area and volume of prisms, pyramids, cylinders, cones, spheres, and complex figures, and finding ratios of lateral areas, total area, and volumes of similar three-dimensional figures.

Activities	**Activities to Differentiate Instruction**
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or turned in for grading and comments. Similar Solids Investigation Students will investigate the ratios for surface area and volume of similar solids.	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups. Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately leveled problems for students to complete. Proofs can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will build connections between geometry and architecture by discovering how knowing the surface area and volume of complex three-dimensional figures is essential when constructing new objects.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange

	McDougal Littell *Activity Generator* CD-ROM Smart Exchange

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Unit Map 2013-2014

Green Brook Township School District

/ Geometry Honors Curriculum (D) / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 1:59PM

Green Brook Township Public Schools

Unit: Final Exam Review (Week 36, 4 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 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.

CommonCore: Mathematics, CommonCore: HS: Geometry, Congruence

G-CO Experiment with transformations in the plane

- G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G-CO Understand congruence in terms of rigid motions

- G.CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- G.CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G-CO Prove geometric theorems

- G.CO.9. Prove theorems about lines and angles.
- G.CO.10. Prove theorems about triangles.
- G.CO.11. Prove theorems about parallelograms.

CommonCore: Mathematics, CommonCore: HS: Geometry, Similarity, Right Triangles, & Trigonometry
G-SRT Understand similarity in terms of similarity transformations

- G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar;explain using similarity transformations the meaning of similarity for triangles as the equality of all pairs of angles and the proportionality of all pairs of sides.
- G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for similarity of triangles.

G-SRT Prove theorems involving similarity

- G-SRT.4. Prove theorems about triangles using similarity transformations.
- G-SRT.5. Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures.

G-SRT Define trigonometric ratios and solve problems involving right triangles

- G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

CommonCore: Mathematics, CommonCore: HS: Geometry, Circles
G-C Understand and apply theorems about circles

- G-C.1. Prove that all circles are similar.
- G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle.

G-C Find arc lengths and areas of sectors of circles

- G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

CommonCore: Mathematics, CommonCore: HS: Geometry, Expressing Geometric Properties with Equations
G-GPE Translate between the geometric description and the equation for a conic section

- G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G-GPE Use coordinates to prove simple geometric theorems algebraically

- G-GPE.4. Use coordinates to prove simple geometric theorems algebraically.

- G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- G-GPE.6. Find the point on a directed line segment between two given points that divide the segment in a given ratio.
- G-GPE.7. Use coordinates to compute perimeters of polygons and areas for triangles and rectangles, e.g. using the distance formula. Ò

CommonCore: Mathematics, CommonCore: HS: Geometry, Geometric Measurement & Dimension
G-GMD Explain volume formulas and use them to solve problems

- G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
- G-GMD.2. (+) Given an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
- G-GMD.3. Use volume formulas for cylinders, pyramids, cones and spheres to solve problems.Ò

G-GMD Visualize the relation between two-dimensional and three-dimensional objects

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CommonCore: Mathematics, CommonCore: HS: Geometry, Modeling with Geometry
G-MG Apply geometric concepts in modeling situations

- G-MG.1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).Ò
- G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).Ò
- G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy constraints or minimize cost; working with typographic grid systems based on ratios).Ò

Description of Unit	**Essential Questions**
In this unit, students will prepare for their final exam as well as apply the concepts that they have learned to problem-solving situations. Students will be given various review materials and will learn test-taking strategies for comprehensive, cumulative tests.	1) How does knowledge of geometrical concepts assist in making decisions? 2) How is geometry used in the real-world? 3) What strategies can be utilized when preparing for and taking a comprehensive, cumulative exam?
Knowledge	**Skills**

Students will know that: 1) congruency of geometric figures can be proven using theorems such as the triangle congruency theorems and CPCTC. 2) parallel lines and a transversal create congruent angles. 3) area is the amount of space within a two-dimensional figure. 4) similar figures have congruent angles and proportional side lengths. 5) side lengths of right triangles can be calculated by using the Pythagorean Theorem or trigonometry. 6) angles within circles can be calculated using arc measures of the circle. 7) algebraic concepts of slope, distance formula, and midpoint formula can be applied to solving geometric problems. 8) the total area of three-dimensional figures is the sum of the faces and the volume is the amount of space within the figure.	Students will be able to: a) prove congruency, similarity, and properties of polygons using theorems, definitions, and properties studied throughout the course. b) find missing angles and prove polygons contain sets of parallel lines. c) calculate the area of geometric figures. d) prove similarity between figures and calculate their ratios. e) find missing side lengths of right triangles. f) calculate angles within circles, arc measures, and sector areas of circles. g) use coordinate geometry to prove geometric statements. h) calculate lateral area, total area, and volume of three-dimensional areas.

Assessments

Pre-Assessment
Diagnostic: Other written assessments
Students will take a pre-assessment to assist in planning for the topics that will be reviewed during this unit. Results of this pre-assessment, as well as student input, will guide the teacher in judging the time needed for each topic.

Daily Formative Assessments
Formative: Other written assessments
Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Geometry H Final Exam
Summative: Written Test
Students will take the Geometry H Final Exam for this level course provided by the Mathematics Department of Watchung Hills Regional High School. This test will cover all units in the curriculum. Students must receive a qualifying score in order to move on to the next course, Algebra 2 Honors.

Activities	Activities to Differentiate Instruction
Communicator Practice Students will complete differentiated practice problems on SmartPal response boards. Cooperative Problem-Solving	Interactive Smartboard Activities will be utilized. Students will work in mixed-level groups.

Students will work cooperatively on challenge problems. This work may be presented by students, discussed as a class, or submitted for grading and comments.	Students will be assigned optional and mandatory challenge problems on homework assignments. Enrichment worksheets will be available for classwork and/or homework. Guided notes and study guides will be provided accordingly. Appropriately leveled problems for students to complete. Proofs and problems can range from having few steps to requiring multiple steps using multiple geometric figures.
Integrated/Cross-Disciplinary Instruction	**Resources**
• Students will understand that the writing geometry proofs is similar to writing persuasive essays. They must take given information, build supporting details, and draw a conclusion.	McDougal Littell *Geometry for Enjoyment and Challenge* textbook and resources Smartboard Smart Exchange McDougal Littell *Activity Generator* CD-ROM Smart Exchange

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