Washington Township School District

The mission of the Washington Township Public Schools is to provide a safe, positive, and progressive educational environment that provides opportunity for all students to attain the knowledge and skills specified in the NJ Learning Standards at all grade levels, so as to ensure their full participation in an ever-changing world as responsible, self-directed and civic-minded citizens.

Course Title:	Geometry B

Grade Level(s):	9-12

Duration:	*Full Year:*	x	*Semester:*		*Marking Period:*	

Course Description:	In this course, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. This course will deepen student understanding of geometric concepts leading to the ability to prove geometric theorems. Topics for this course include: Congruence, Proofs, Constructions, Transformations, Similarity, Right Triangles and Trigonometry, Circles, Expressing Geometric Properties with Equations, Geometric Measurement and Dimension, and Geometric Modeling. The course is designed to promote inquiry learning in which students have the ability to discover geometric concepts. Students will study plane Euclidean geometry, both synthetically (without coordinates) and analytically (with coordinates).
Grading Procedures:	Each semester will be a composite of quiz scores, test scores, homework, classwork, and participation reflecting a student's mastery of the areas outlined above. The student can pass the course with an overall average of 70%. The individual teacher will explain the grading system to the student.
Primary Resources:	**Geometry Big Ideas Learning Textbook** **NJ Student Learning Standards**

Washington Township Principles for Effective Teaching and Learning

- Implementing a standards-based curriculum
- Facilitating a learner-centered environment
- Using academic target language and providing comprehensible instruction
- Adapting and using age-appropriate authentic materials
- Providing performance-based assessment experiences
- Infusing 21st century skills for College and Career Readiness in a global society

Designed by:	Kaitlyn Kuhn

Under the Direction of:	Dr. Carole English

Written: _____ July 2023 _____

Revised: _____

Unit Title: Chapter 1 Basics of Geometry

Unit Description: In this chapter, students will learn precise definitions of line, segment, and angle, which are based on the undefined notions of point and line. Students will also use geometric shapes, their measures, and their properties to describe objects.

Unit Duration: 20 Days

Desired Results

Standard(s):
G-CO.A: Experiment with transformation in the plane.
G-CO.D: Make geometric constructions.
G-GPE.B: Use coordinates to prove simple geometric theorems algebraically.
G-MG.A: Apply geometric concepts in modeling situations.

Indicators:
HSG-CO.A.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.
HSG-CO.D.12: Make formal geometric constructions with a variety of tools and methods.
HSG-MG.A.1: Use geometric shapes, their measures, and their properties to describe objects.

Understandings:	Essential Questions:
Students will understand that… • Geometry is a mathematical system built on accepted facts, basic terms, and definitions. • Number operations can be used to find and compare the lengths of segments and the measures of angles. • Formulas can be used to find the midpoint and length of any segment in the coordinate plane. • Special angle pairs can be used to identify geometric relationships and to find angle measures.	• What are the tools of geometry? • How can you measure and construct a line segment? • How can you find the midpoint and length of a line segment in a coordinate plane? • How can you measure and classify an angle? • How can you describe angle pair relationships and use these descriptions to find angle measures?

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test • Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e., stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

1.1 Points, Lines, and Planes (4 days)
- Naming Points, Lines, and Planes
- Naming Segments, Rays, and Opposite Rays
- Sketching Intersections of Lines and Planes
- Sketching an Intersection of Planes
- Modeling Real Life

1.2 Measuring and Constructing Segments (1 day)
- Using the Ruler Postulate
- Comparing Segments for Congruence
- Using the Segment Addition Postulate
- Modeling Real Life

1.3 Using Midpoint and Distance Formulas (2 days)
- Finding Segment Lengths
- Using Algebra with Segment Lengths
- Using the Midpoint Formula
- Using the Distance Formula

1.4 Perimeter and Area in the Coordinate Plane (Optional/ Complete with Chapter 7)
- Classifying Polygons
- Finding Perimeter in the Coordinate Plane
- Finding Area in Coordinate Plane
- Modeling Real Life

1.5 Measuring and Constructing Angles (3 days)
- Naming Angles
- Measuring and Classifying Angles
- Identifying Congruent Angles
- Finding Angle Measures
- Using a Bisector to Find Angle Measures

1.6 Describing Pairs of Angles (2 days)
- Identifying Pairs of Angles
- Finding Angle Measures
- Modeling Real Life
- Identifying Angle Pairs
- Finding Angle Measures in a Linear Pair

Test Review (1 day)
Test (1 Day)

*Additional 6 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students

Advanced Learners	- Invite students to explore different points of view on a topic of study and compare the two. - Assign a leadership role in classroom learning

	• Determine where student's interests lie and capitalize on their inquisitiveness. • Expose students to a selection and use of specialized resources
Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition • Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience • Establish a framework allowing ELL students to understand and assimilate new ideas and information • Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org

Learners with a 504	Refer to page four in the [Parent and Educator Resource Guide to Section 504](#) to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

New Jersey Student Learning Standards for Technology Education
9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Collaboration
Critical Thinking
Creativity

Unit Title: Chapter 2 Reasoning and Proofs
Unit Description: In this chapter, students will use precise definitions and prove geometric theorems.
Unit Duration: 1 Day

Desired Results

Standard(s):
G-CO.A: Experiment with transformation in the plane.
G-CO.C: Prove geometric theorems.

Indicators:
HSG-CO.A.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.
HSG-CO.C.9: Prove theorems about lines and angles.

Understandings:	**Essential Questions:**
Students will understand that… • Some mathematical relationships can be described using a variety of if-then statements. • Algebraic properties of equality are used in geometry to solve problems and justify reasoning. • Given information, definitions, properties, postulates, and previously proven theorems can be used as reasons in proof.	• When is a conditional statement true or false? • How can you use reasoning to solve problems? • In diagrams what can be assumed and what needs to be labeled? • How can algebraic properties help you solve an equation? • How can you prove a mathematical statement?

Assessment Evidence

Performance Tasks:	**Other Evidence:**
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e., stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

2.1 Conditional Statements (Optional)
   • Rewriting a Statement in If-Then Form
   • Writing a Negation
   • Writing Related Conditional Statements
   • Using Definitions
   • Writing a Biconditional Statement
   • Writing Truth Tables

2.2 Inductive and Deductive Reasoning (Optional)
   • Describing a Visual Pattern
   • Making and Testing Conjecture
   • Finding a Counterexample
   • Using the Law of Detachment

- Using the Law of Syllogism
- Using Inductive and Deductive Reasoning
- Comparing Inductive and Deductive Reasoning

2.3 Postulates and Diagrams (Optional)
- Identifying a Postulate Using a Diagram
- Identifying Postulates from a Diagram
- Sketching a Diagram
- Interpreting a Diagram

2.4 Algebraic Reasoning (1 Day- Complete with Chapter 5)
- Justifying Steps
- Modeling Real Life

2.5 Proving Statements about Segments and Angles (Optional)
- Writing a Two-Column Proof
- Naming Properties of Congruence
- Proving a Symmetric Property of Congruence

2.6 Proving Geometric Relationships (Optional)
- Proving the Right Angles Congruence Theorem
- Proving a Case of the Congruent Supplements Theorems
- Proving the Vertical Angles Congruence Theorem
- Using Angle Relationships
- Using the Vertical Angles Congruence Theorem

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	- Invite students to explore different points of view on a topic of study and compare the two. - Assign a leadership role in classroom learning - Determine where student's interests lie and capitalize on their inquisitiveness. - Expose students to a selection and use of specialized resources
Struggling Learners	- Be flexible with time frames and deadlines - Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers - Group students - Intentional scheduling/grouping with student/teacher of alternative background - Provide support as at-risk students move through all levels of knowledge acquisition - Tap prior knowledge
English Language Learners	- Accommodate with completed study guides to assist with preparation on tests - Allow students to give responses in a form (oral or written) that's easier for him/her - Be flexible with time frames, deadlines, or modify assessments - Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience - Establish a framework allowing ELL students to understand and assimilate new ideas and information

	• Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

New Jersey Student Learning Standards for Computer Science and Design Thinking
8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

New Jersey Student Learning Standards for Technology Education

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Collaboration
Critical Thinking

Unit Title: Chapter 3 Parallel and Perpendicular Lines
Unit Description: In this chapter students will learn the precise definition of parallel line. They will prove theorems about lines and angles and make formal geometric constructions. Students will also partition directed line segments and use the slope criteria for parallel and perpendicular lines.
Unit Duration: 11 Days

Desired Results
Standard(s):   **G-CO.A:** Experiment with transformations in the plane.   **G-CO.C:** Prove geometric theorems.   **G-CO.D:** Make geometric constructions.   **G-GPE.B:** Use coordinates to prove simple geometric theorems algebraically.
Indicators: **HSG-CO.A.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.   **HSG-CO.C.9:** Prove theorems about lines and angles.   **HSG-CO.D.12:** Make formal geometric constructions with a variety of tools and methods.   **HSG-GPE.B.5:** Prove slope criteria for parallel and perpendicular lines and use them to solve geometric problems.   **HSG-GPE.B.6:** Find the point on a directed line segment between two given points that partitions the segment into a given ratio.

Understandings:	**Essential Questions:**
Students will understand that… • Angle relationships between parallel and perpendicular lines are used in the constructions and design of buildings, roads, machines, and many other real-world problems. • Slope is important in solving many mathematical problems and is used in geometry and algebra. • The precise definition of parallel lines and investigate relationship between these lines and the angles that they form. • You can determine whether two lines are parallel or perpendicular by comparing their slopes.	• What does it mean when two lines are parallel, intersecting, or skew? • When two lines are cut by a transversal, which of the resulting pairs of angles are congruent? • For which of the theorems involving parallel lines and transversals is the converse true? • What conjectures can you make about perpendicular lines? • How can you write the equation of a line that is parallel or perpendicular to a given line and passes through a given point?

Assessment Evidence	
Performance Tasks: • Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	**Other Evidence:** • Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**
Benchmarks: Four common assessments will be given throughout the year	

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

3.1 Pairs of Lines and Angles (2 Days)
- Identifying Lines and Planes
- Identifying Parallel and Perpendicular Lines
- Identifying Pairs of Angles

3.2 Parallel Lines and Transversals (3 Days)
- Identifying Angles
- Using Properties of Parallel Lines
- Proving the Alternate Exterior Angles Theorem (Optional)
- Modeling Real Life

3.3 Proofs with Parallel Lines (2 Days)
- Using the Corresponding Angles Converse Theorem
- Proving the Alternate Interior Angles Converse (Optional)
- Determining Whether Lines are Parallel
- Using the Transitive Property of Parallel Lines

3.4 Proofs with Perpendicular Lines (Optional)
- Finding the Distance from a Point to a Line
- Proving the Perpendicular Transversal Theorem
- Modeling Real Life

3.5 Equations of Parallel and Perpendicular Lines (Optional)
- Partitioning a Directed Line Segment
- Identifying Parallel and Perpendicular Lines
- Writing and Equation of a Parallel Line
- Writing an Equation of a Perpendicular Line
- Finding the Distance from a Point to a Line

Test Review (1 day)
Test (1 Day)

*Additional 2 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students

Advanced Learners	• Invite students to explore different points of view on a topic of study and compare the two. • Assign a leadership role in classroom learning • Determine where student's interests lie and capitalize on their inquisitiveness. • Expose students to a selection and use of specialized resources
Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition

	• Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience • Establish a framework allowing ELL students to understand and assimilate new ideas and information • Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
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RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

New Jersey Student Learning Standards for Technology Education
9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.
9.4.12.O.(1).7: Use mathematics, science and technology concepts and process to solve problems in projects involving design and/or production.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Critical Thinking
Creativity

Unit Title: Chapter 4 Transformations

Unit Description: In this chapter, students will understand congruence and similarity in terms of transformations, Students will learn that rigid motions preserve distance and angle measure, whereas non-rigid transformations may change the shape of size of a figure. This chapter also establishes the approach of using rigid motions to identify congruent figures.

Unit Duration: 11 Days

Desired Results

Standard(s):
G-CO.A: Experiment with transformations in the plane.
G-CO.B: Understand congruence in terms of rigid motions.
G-SRT.A: Understand similarity in terms of similarity transformations.

Indicators:
HSG-CO.A.2: Represent transformations in the plane using transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not.
HSG-CO.A.3: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
HSG-CO.A.4: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
HSG-CO.A.5: Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
HSG-CO.B.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 definition of congruence in terms of rigid motions to decide if they are congruent.
HSG-SRT.A.1a: Verify experimentally the properties of dilations given by a center and a scale factor: A dilation takes a line not passing through the center of a dilation to a parallel line and leaves a line passing through the center unchanged.
HSG-SRT.A.1b: Verify experimentally the properties of dilations given by a center and scale factor: The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
HSG-SRT.A.2: Given two figures, use definitions 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 corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Understandings: *Students will understand that…* • Transformations may be described geometrically or by coordinates. • Symmetries of figures may be defined and classified by transformations. • You can use compositions of rigid motions to understand congruence. • When you reflect a figure across a line, each point of the figure maps to another point the same distance from the line but on the other side. The orientation of the figure reverses. • Rotations preserve distance and angle measures, but not orientation of figures. • You can use a scale factor to make a larger or smaller copy of a figure that is also similar to the original figure.	**Essential Questions:** • How can you translate a figure in a coordinate plane? • How can you reflect a figure in a coordinate plane**?** • How can you rotate a figure in a coordinate plane? • What does it mean to dilate a figure? • When a figure is translated, reflected, rotated, or dilated in the plane, is the image always similar to the original figure?

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

4.1 Translations (1 Day)
- Identifying Vector Components (Optional)
- Translating a Figure Using a Vector (Optional)
- Writing a Translation Rule
- Translating a Figure in the Coordinate Plane
- Performing a Composition
- Modeling Real Life

4.2 Reflections (1 Day)
- Reflecting in Horizontal Lines
- Reflecting in the Line $y = x$ (Optional)
- Reflecting in the Line $y = -x$ (Optional)
- Performing a Glide Reflection
- Identifying Line of Symmetry

4.3 Rotations (1 Day)
- Drawing a Rotation (Optional)
- Rotating a Figure in the Coordinate Plane
- Performing a Composition
- Identifying Rotational Symmetry

4.4 Congruence Transformations (Optional)
- Identifying Congruent Figures
- Describing a Congruence Transformation
- Using the Reflection in Parallel Lines Theorem
- Using the Reflection in Perpendicular Lines Theorem

4.5 Dilations (1 Day)
- Identifying Dilations
- Dilating a Figure in the Coordinate Plane
- Constructing a Dilation
- Using a Negative Scale Factor
- Finding a Scale Factor
- Finding the Length of an Image

4.6 Similarity and Transformations (1 Day)
- Performing a Similarity Transformation
- Describing a Similarity Transformation (Optional)
- Proving the Two Squares are Similar (Optional)

Test Review (1 day)
Test (1 Day)

*Additional 4 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	- Invite students to explore different points of view on a topic of study and compare the two. - Assign a leadership role in classroom learning - Determine where student's interests lie and capitalize on their inquisitiveness. - Expose students to a selection and use of specialized resources
Struggling Learners	- Be flexible with time frames and deadlines - Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers - Group students - Intentional scheduling/grouping with student/teacher of alternative background - Provide support as at-risk students move through all levels of knowledge acquisition - Tap prior knowledge
English Language Learners	- Accommodate with completed study guides to assist with preparation on tests - Allow students to give responses in a form (oral or written) that's easier for him/her - Be flexible with time frames, deadlines, or modify assessments - Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience - Establish a framework allowing ELL students to understand and assimilate new ideas and information - Focus on domain specific vocabulary and keywords - Give alternate or paper copies to accommodate electronic assignments. - Have another student share class notes with the ELL student. - Intentional scheduling/grouping with student/teacher of language if possible - Mark texts with a highlighter. - Take more time to complete a task, project, or test. - Use manipulatives, graphic organizer, and real objects when possible - Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include:

	- Variation of time: adapting the time allotted for learning, task completion, or testing - Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction - Variation of size: adapting the number of items the student is expected to complete - Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the [Parent and Educator Resource Guide to Section 504](#) to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

New Jersey Student Learning Standards for Computer Science and Design Thinking
8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.

New Jersey Student Learning Standards for Technology Education
9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Critical Thinking
Creativity

Unit Title: Chapter 5 Congruent Triangles

Unit Description: In this chapter, students will prove theorems about triangles and use the definitions of congruence in terms of rigid motions to show that two triangles are congruent. Students will explain how the criteria for triangle congruence follows from the definition of congruence, and they will use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures.

Unit Duration: 20 Days

Desired Results

Standard(s):
G-CO.C: Prove geometric theorems.
G-SRT.B: Prove theorems involving similarity.
G-GPE.B: Use Coordinates to prove simple geometric theorems algebraically.

Indicators:
HSG-CO.C.10: Prove theorems about triangles.
HSG-CO.B.7: Use the definitions of congruence in terms if rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
HSG-CO.B.8: Explain how the criteria for triangle congruence follow from the definition of congruence in terms of rigid motions.
HSG-SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
HSG-GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.

Understandings:	Essential Questions:
Students will understand that… • Objects can be compared by using characteristics such as size, and shape. • There are shortcuts when determining if triangles are congruent. • Triangles can be proven congruent in terms of rigid motions. • The angles and sides of isosceles and equilateral triangles have special relationships.	• How are the angle measures of a triangle related? • What can you conclude about two triangles when you know that two pairs of corresponding sides and the corresponding included angles are congruent? • What conjectures can you make about the side lengths and angle measures of isosceles and equilateral triangles? • What can you conclude about two triangles when you know the corresponding sides are congruent? • What information is sufficient to determine whether two triangles are congruent? •

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

5.1 Angles of Triangles (3 Days)
- Classifying Triangles by Sides and Angles
- Classifying a Triangle in the Coordinate Plane
- Finding an Angle Measure
- Modeling Real Life

5.2 Congruent Polygons (1 Day)
- Identifying Corresponding Parts
- Using Properties of Congruent Figures
- Showing that Figures are Congruent
- Proving the Triangles are Congruent

5.3 Proving Triangle Congruence by SAS (1 Day)
- Using SAS Congruence Theorems
- Using SAS and Properties of Shapes (Optional)
- Modeling Real Life

5.4 Equilateral and Isosceles Triangles (2 Days)
- Using the Base Angles Theorem
- Finding Measures in Triangles
- Using Isosceles and Equilateral Triangles
- Modeling Real Life

5.5 Proving Triangle Congruence by SSS (1 Days)
- Using the SSS Congruence Theorem
- Modeling Real Life
- Using the Hypotenuse-Leg Congruence Theorem

5.6 Proving Triangle Congruence by ASA and AAS (2 Days)
- Identifying Congruent Triangles
- Using the ASA Congruence Theorem
- Using the AAS Congruence Theorem

5.7 Using Congruent Triangles (2 Days)
- Using Congruent Triangles
- Using Congruent Triangles for Measurement
- Planning a Proof Involving Pairs of Triangles
- Proving a Construction (Optional)

5.8 Coordinate Proofs (Optional)
- Placing a Figure in a Coordinate Plane
- Applying Variable Coordinates
- Writing a Plan for a Coordinate Proof
- Writing a Coordinate Proof
- Modeling Real Life

Test Review (1 Day)
Test (1 Day)

*Additional 6 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Invite students to explore different points of view on a topic of study and compare the two. • Assign a leadership role in classroom learning • Determine where student's interests lie and capitalize on their inquisitiveness. • Expose students to a selection and use of specialized resources
Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition • Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience • Establish a framework allowing ELL students to understand and assimilate new ideas and information • Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement.

	Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the [Parent and Educator Resource Guide to Section 504](#) to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

New Jersey Student Learning Standards for Technology Education
9.3.ST.1: Use technology to acquire, manipulate, analyze and report data.
9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Collaboration
Critical Thinking

Unit Title: Chapter 6 Relationships Within Triangles
Unit Description: In this chapter, students will prove theorems about lines, angles, and triangles.
Unit Duration: 9 Days

Desired Results

Standard(s):
G-CO.C: Prove geometric theorems.
G-C.A: Understand and apply theorems about circles.
G.GPE: Use coordinates to prove simple geometric theorems algebraically

Indicators:
HSG-CO.C.9: Prove theorems about lines and angles.
HSG-CO.C.10: Prove theorems about triangles.
HSG-C.A.3: Construct the inscribed and circumscribed circles of a triangle and prove properties of angles for a quadrilateral inscribed in a circle.
HSG.GPE.B.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Understandings:	**Essential Questions:**
Students will understand that… • When all three segments – perpendicular bisector, angle bisector, median and altitude of a triangle are drawn they all have a concurrent point with its own special properties. • Relationships exist within the sides and angles of non-congruent triangles.	• What conjectures can you make about a point on the perpendicular bisector of a segment and a point on the bisector of an angle? • What conjectures can you make about the perpendicular bisectors and angle bisectors of a triangle? • What conjectures can you make about medians and altitudes of a triangle? • How are the midsegments of a triangle related to the sides of a triangle? • How are the sides related to the angles of a triangle? • How are two sides of any triangle related to the third side? • If two sides of one triangle are congruent to two sides of another triangle what can you saw about the third sides of the triangles?

Assessment Evidence

Performance Tasks:	**Other Evidence:**
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**
Benchmarks: Four common assessments will be given throughout the year	

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

6.1 Perpendicular and Angle Bisectors (1 Day)
- Using Diagrams
- Using the Perpendicular Bisector Theorems
- Using the Angle Bisector Theorem
- Writing an Equation of a Bisector (Optional)

6.2 Bisectors of Triangles (Optional)
- Modeling Real Life
- Finding the Circumcenter of a Triangle
- Using the Incenter of a Triangle
- Modeling Real Life

6.3 Medians and Altitudes of Triangles (1 Day)
- Using the Centroid of a Triangle
- Finding the Centroid of a Triangle
- Finding the Orthocenter of a Triangle
- Proving a Property of Isosceles Triangles (Optional)

6.4 The Triangle Midsegment Theorem (1 Day)
- Using a Midsegment in the Coordinate Plane
- Proving the Triangle Midsegment Theorem
- Using the Triangle Midsegment Theorem
- Modeling Real Life

6.5 Indirect Proof and Inequalities in One Triangle (2 Days)
- Writing an Indirect Proof (Optional)
- Relating Side Length and Angle Measure
- Ordering Angle Measures of a Triangle
- Ordering Side Lengths of a Triangle
- Finding Possible Side Lengths

6.6 Inequalities in Two Triangles (Optional)
- Using the Converse of the Hinge Theorem
- Using the Hinge Theorem
- Proving Triangle Relationships
- Modeling Real Life

Test Review (1 day)
Test (1 Day)

*Additional 2 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students

Advanced Learners	- Invite students to explore different points of view on a topic of study and compare the two. - Assign a leadership role in classroom learning - Determine where student's interests lie and capitalize on their inquisitiveness. - Expose students to a selection and use of specialized resources

Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition • Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience • Establish a framework allowing ELL students to understand and assimilate new ideas and information • Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
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RST.9-10.5: Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

New Jersey Student Learning Standards for Technology Education
9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.
9.4.12.O.(1).7: Use mathematics, science and technology concepts and process to solve problems in projects involving design and/or production.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Critical Thinking

Unit Title: Chapter 7 Quadrilaterals and Other Polygons

Unit Description: In this chapter, students will prove theorems about parallelograms. They will also use coordinates and properties of trapezoids and kites to find measures.
Unit Duration: 23 Days

Desired Results

Standard(s):
G-CO.C: Prove geometric theorems
G-GPE.B: Use coordinates to prove simple geometric theorems algebraically.

Indicators:
HSG-CO.C.11: Prove theorems about parallelograms.
HSG-GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.

Understandings:	Essential Questions:
Students will understand that… • There are different types of quadrilaterals, and each quadrilateral has its own properties. • There are special types of parallelograms that have their own additional set of properties. • You can classify quadrilaterals in the coordinate plane using the formulas for slope, distance, and midpoint	• What is the sum of the measures of the interior angles of a polygon? • What are the properties of parallelograms? • How can you prove that a quadrilateral is a parallelogram? • What are the properties of the diagonals of rectangles, rhombuses, and squares? • What are the properties of trapezoids and kites?

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, Quizlet live, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

7.1 Angles of Polygons (3 Days)
- Finding the Sum of Angle Measures in a Polygon
- Finding the Number of Sides of a Polygon
- Finding an Unknown Interior Angle Measure
- Finding Angle Measures in Polygons
- Finding Unknown Exterior Angle Measures
- Finding Angle Measures in Regular Polygons

7.2 Properties of Parallelograms (2 Days)
- Using Properties of Parallelograms
- Writing a Two Column Proof (Optional)
- Using Parallelograms in the Coordinate Plane

7.3 Proving that a Quadrilateral is a Parallelogram (2 Days)
- Identifying a Parallelogram

- Finding Side Lengths of a Parallelogram
- Finding Diagonal Lengths of a Parallelogram
- Identifying a Parallelogram in the Coordinate Plane

7.4 Properties of Special Parallelograms (3 Days)
- Using Properties of Special Quadrilaterals
- Classifying Special Quadrilaterals
- Finding Angle Measures in a Rhombus
- Identifying a Rectangle
- Finding Diagonal Lengths in a Rectangle
- Identifying a Parallelogram in the Coordinate Plane

7.5 Properties of Trapezoids and Kites (2 Days)
- Identifying a Trapezoid in the Coordinate Plane (Optional)
- Using Properties of Isosceles Trapezoids
- Using the Midsegment of a Trapezoid
- Using a Midsegment in the Coordinate Plane (Optional)
- Finding Angle Measures in a Kite
- Identifying a Quadrilateral

Test Review (2 days)
Test (1 Day)

*Additional 8 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Invite students to explore different points of view on a topic of study and compare the two. • Assign a leadership role in classroom learning • Determine where student's interests lie and capitalize on their inquisitiveness. • Expose students to a selection and use of specialized resources
Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition • Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience • Establish a framework allowing ELL students to understand and assimilate new ideas and information

	• Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
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Interdisciplinary Connections

Indicators:

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RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

WHST.9-10.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

New Jersey Student Learning Standards for Technology Education

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills
Indicators: The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes: Communication Collaboration Critical Thinking

Unit Title: Chapter 8 Similarity

Unit Description: In this chapter, students will understand properties of similar figures and prove theorems involving similarity.
Unit Duration: 11 Days

Desired Results

Standard(s):
G-SRT.A: Understand similarity in terms of similarity transformations.
G-SRT.B: Prove theorems involving similarity.
G.GPE.B: Use coordinates to prove simple geometric theorems algebraically.

Indicators:
HSG-SRT.A.2: Given two figures, use definitions 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 corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
HSG-SRT.A.3: Use properties of similarity transformations to establish the AA criterion for two triangles to be similar.
HSG-SRT.B.4: Prove theorems about triangles.
HSG-SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
HSG-GPE.B.5: Prove slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
HSG-GPE.B.6: Find the point on a directed line segment between two given points that partitions the segment into a given ratio.

Understandings:	**Essential Questions:**
Students will understand that… • Two geometric figures are similar when corresponding lengths are proportional and corresponding angles are congruent. • In mathematics, similarity has a more specific definition: objects or figures can only be similar if they have the same shape. • You can use ratios and proportions to decide whether two polygons are similar and to find unknown side lengths of similar figures. • You can show that two triangles are similar when you know the relationships between only two or three pairs of corresponding parts • When two or more parallel lines intersect other lines, proportional segments are formed	• How are similar polygons related? • What can you conclude about two triangles when you know that two pairs of corresponding angles are congruent? • What are two ways to use corresponding sides of two triangles to determine that the triangles are similar? • What proportionality relationships exist in a triangle intersected by an angle bisector or by a line parallel to one of the sides?

Assessment Evidence

Performance Tasks:	**Other Evidence:**
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, quizlet live, kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**
Benchmarks: Four common assessments will be given throughout the year	

Learning Plan
Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc. **8.1 Similar Polygons (3 Days)** • Using Similarity Statements • Finding a Corresponding Length • Modeling Real Life • Finding Areas of Similar Polygons (Optional) **8.2 Proving Triangle Similarity by AA (Optional)** • Using the AA Similarity Theorem • Modeling Real Life **8.3 Proving Triangle Similarity by SSS and SAS (Optional)** • Using the SSS Similarity Theorem • Modeling Real Life **8.4 Proportionality Theorems (2 Days)** • Finding the Length of a Segment • Modeling Real Life • Using the Three Parallel Lines Theorem • Using the Triangle Angle Bisector Theorem **Test Review (1 Day)** **Test (1 Day)** *Additional 4 days used for extra practice, review, and quiz days * **Resources:** Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Invite students to explore different points of view on a topic of study and compare the two. • Assign a leadership role in classroom learning • Determine where student's interests lie and capitalize on their inquisitiveness. • Expose students to a selection and use of specialized resources
Struggling Learners	• Be flexible with time frames and deadlines • Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers • Group students • Intentional scheduling/grouping with student/teacher of alternative background • Provide support as at-risk students move through all levels of knowledge acquisition • Tap prior knowledge
English Language Learners	• Accommodate with completed study guides to assist with preparation on tests • Allow students to give responses in a form (oral or written) that's easier for him/her • Be flexible with time frames, deadlines, or modify assessments • Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience

	• Establish a framework allowing ELL students to understand and assimilate new ideas and information • Focus on domain specific vocabulary and keywords • Give alternate or paper copies to accommodate electronic assignments. • Have another student share class notes with the ELL student. • Intentional scheduling/grouping with student/teacher of language if possible • Mark texts with a highlighter. • Take more time to complete a task, project, or test. • Use manipulatives, graphic organizer, and real objects when possible • Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
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Interdisciplinary Connections

Indicators:

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9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

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9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills
Indicators: The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes: Communication Collaboration Critical Thinking

Unit Title: Chapter 9 Right Triangles and Trigonometry
Unit Description: In this chapter, students will prove the Pythagorean Theorem and its converse. They will use the Pythagorean Theorem to solve right triangles in application problems.

Unit Duration: 19 Days

Desired Results

Standard(s):
G-SRT.B: Prove theorems involving similarity.
G-SRT.C: Define geometric ratios and solve problems involving right triangles.

Indicators:
HSG-SRT.B.4: Prove theorems about triangles.
HSG-SRT.B.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
HSG-SRT.C.6: Understand by similarity, side ratios in right triangles are properties of the angles in the triangle, leasing to definitions of trigonometric ratios for acute angles.
HSG-SRT.C.7: Explain and use relationships between the sine and cosine of complementary angles.
HSG-SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Understandings:	**Essential Questions:**
Students will understand that… • If you know the lengths of any two sides of a right triangle, you can find the length of the third side by using the Pythagorean Theorem. • Certain right triangles have properties that allow you to use shortcuts to determine side lengths without using Pythagorean Theorem • Trigonometric ratios are used to solve the missing angles and sides in right triangles. • Trigonometric ratios can be applied to real world problems.	• How can you prove the Pythagorean Theorem? • What are the relationships among the side lengths of 45-45-90 and 30-60-90 triangles? • How is a right triangle used to find the tangent of an acute angle? • How is a right triangle used to find the sine and cosine of an acute angle? • When you know the lengths of the sides of a right triangle, how can you find the measures of the two acute angles?

Assessment Evidence

Performance Tasks:	**Other Evidence:**
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Class Discussion • Quizzes • Test Benchmark Assessment: Common Assessment	• Use of digital platforms (Quizizz, Formative, quizlet live, kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc. • Project Based Assessment (optional) ***Additional or alternative performance tasks may be used**

Benchmarks: Four common assessments will be given throughout the year

Learning Plan

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

9.1 The Pythagorean Theorem (3 Days)
- Using the Pythagorean Theorem
- Modeling Real Life
- Verifying Right Triangles
- Classifying Triangles

9.2 Special Right Triangles (Optional)
- Finding Side Lengths of 45-45-90 Triangles
- Finding Side Lengths of 30-60-90 Triangles
- Modeling Real Life

9.3 Similar Right Triangles (Optional)
- Identifying Similar Triangles
- Modeling Real Life
- Finding a Geometric Mean
- Using a Geometric Mean
- Using Indirect Measurement

9.4 The Tangent Ratio (2 Days)
- Finding Tangent Ratios
- Finding a Leg Length
- Using a Special Right Triangle to Find a Tangent
- Modeling Real Life

9.5 The Sine and Cosine Ratios (2 Days)
- Finding Sine and Cosine Ratios
- Rewriting Trigonometric Expressions
- Finding Leg Lengths
- Finding the Sine and Cosine of 45
- Finding the Sine and Cosine of 30
- Modeling Real Life

9.6 Solving Right Triangles (1 Day)
- Identifying Angles from Trigonometric Ratios
- Finding Angle Measures
- Solving a Right Triangle
- Modeling Real Life

9.7 Law of Sines and Law of Cosines (Optional)
- Finding Trigonometric Ratios for Obtuse Triangles
- Finding the Area of a Triangle
- Using the Law of Sines (SSA Case)
- Using the Law of Sines (AAS Case)
- Using the Law of Sines (ASA Case)
- Using the Law of Cosines (SAS Case)
- Using the Law of Cosines (SSS Case)

Test Review (2 Days)
Test (1 Day)

*Additional 8 days used for extra practice, review, and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students

Advanced Learners	- Invite students to explore different points of view on a topic of study and compare the two. - Assign a leadership role in classroom learning - Determine where student's interests lie and capitalize on their inquisitiveness. - Expose students to a selection and use of specialized resources
Struggling Learners	- Be flexible with time frames and deadlines - Create planned opportunities for interaction between individuals in the classroom: cooperative and collaborative learning, pair and share with peers - Group students - Intentional scheduling/grouping with student/teacher of alternative background - Provide support as at-risk students move through all levels of knowledge acquisition - Tap prior knowledge
English Language Learners	- Accommodate with completed study guides to assist with preparation on tests - Allow students to give responses in a form (oral or written) that's easier for him/her - Be flexible with time frames, deadlines, or modify assessments - Create planned opportunities for interaction between individuals in the classroom: skits, cooperative and collaborative learning, student generated stories based on personal experience - Establish a framework allowing ELL students to understand and assimilate new ideas and information - Focus on domain specific vocabulary and keywords - Give alternate or paper copies to accommodate electronic assignments. - Have another student share class notes with the ELL student. - Intentional scheduling/grouping with student/teacher of language if possible - Mark texts with a highlighter. - Take more time to complete a task, project, or test. - Use manipulatives, graphic organizer, and real objects when possible - Use visual presentations/verbal materials (ex: word webs and visual organizers).
Special Needs Learners	Each special education student has in Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: - Variation of time: adapting the time allotted for learning, task completion, or testing - Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction - Variation of size: adapting the number of items the student is expected to complete - Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that

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9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.
9.4.12.O.(1).7: Use mathematics, science and technology concepts and process to solve problems in projects involving design and/or production.

Life and Literacy Skills
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning. The skills used in this unit includes:

Communication
Collaboration
Critical Thinking
Creativity

Unit Title: Chapter 10 Circles

Unit Description: In this chapter, students will understand and apply theorems about circles. They will translate between geometric descriptions and equations for circles.
Unit Duration: 12 Days

Desired Results

Standard(s):
G-CO.A: Experiment with transformations in the plane.
G-CO.D: Make geometric constructions.
G-C.A: Understand and apply theorems about circles.
G-GPE.A: Translate between geometric descriptions and the equation for a conic section.
G-GPE.B: Use coordinate to prove simple geometric theorems algebraically.

Indicators:
HSG-CO.A.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.
HSG-CO.D.13: Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
HSG-C.A.1: Prove that all circles are similar.
HSG-C.A.2: Identify and describe relationships among inscribed angles, radii, and chords.
HSG-C.A.3: Construct the inscribed and circumscribed circles of a triangle and prove properties of angles for a quadrilateral inscribed in a circle.
HSG-C.A.4: Construct a tangent line from a point outside a given circle to the circle.
HSG-GPE.A.1: Derive the equation of a circle given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle by an equation.
HSG-GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.

Understandings:	**Essential Questions:**
Students will understand that…	• What are the definitions of the lines and segments that intersect a circle?
• Circles can be used for their shape, to model a circular object or for their properties, or to model an equal distance around a certain point.	• How are circular arcs measured?
• You can find the length of part of a circle's circumference by relating it to an angle in the circle	• What are two ways to determine when a chord is a diameter of a circle?
• A radius of a circle and the tangent that intersects the endpoint of the radius on the circle have a special relationship.	• How are inscribed angles related to their intercepted arcs?
• Angles formed by intersecting lines have a special relationship to the related arcs formed when the lines intersect inside or outside the circle.	• How are the angles of an inscribed quadrilateral related to each other?
	• When a chord intersects a tangent line or another chord, what relationships exist among the angles and arcs formed?
• The information in the equation of a circle allows you to graph the circle.	• What relationships exist among the segments formed by two intersecting chords or among segments of two secants that intersect outside a circle?
	• What is the equation of a circle with center (h, k) and radius r in the coordinate plane?

Assessment Evidence

Performance Tasks:	**Other Evidence:**
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)	• Use of digital platforms (Quizizz, Formative, quizlet live, kahoot, Schoology, Big Ideas Platform, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)	• Conferences
• Class Participation and Preparation	• Student Performance during group activities
• Class Discussion	• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.
• Quizzes	
• Test	• Project Based Assessment (optional)
Benchmark Assessment: Common Assessment	

	*Additional or alternative performance tasks may be used

Benchmarks: Four common assessments will be given throughout the year

Learning Activities: Guided Notes, worksheets, EdPuzzles, Do Nows, Formative, etc.

10.1 Lines and Segments that Intersect Circles (2 Days)
- Identifying Special Segments and Lines
- Drawing and Identifying Common Tangents
- Verifying a Tangent to a Circle
- Finding the Radius of a Circle
- Using Properties of Tangents

10.2 Finding Arc Measures (1 Day)
- Finding Measure of Arcs
- Using the Arc Addition Postulate
- Finding Measures of Arcs
- Identifying Congruent Arcs

10.3 Using Chords (1 Day)
- Using Congruent Chords to Find an Arc Measure
- Using a Diameter (Optional)
- Using Perpendicular Bisectors (Optional)
- Using Congruent Chords to Find a Circle's Radius (Optional)

10.4 Inscribed Angles and Polygons (1 Day)
- Using Inscribed Angles
- Finding the Measure of an Intercepted Arc
- Finding the Measure of an Angle
- Using Inscribed Polygons
- Using a Circumscribed Circle

10.5 Angle Relationships in Circles (Optional)
- Finding Angle and Arc Measures
- Finding an Angle Measure
- Finding Angle Measures
- Modeling Real Life

10.6 Segment Relationships in Circles (Optional)
- Using Segments of Chords
- Using Segments of Secants
- Using Segments of Secants and Tangents
- Finding the Radius of a Circle

10.7 Circles in the Coordinate Plane (1 Day)
- Writing the Standard Equation of a Circle
- Graphing a Circle
- Writing a Coordinate Proof Involving a Circle (Optional)
- Modeling Real Life

10.8 Focus of a Parabola (Optional)
- Deriving an Equation
- Graphing an Equation of a Parabola
- Writing an Equation of a Parabola
- Writing an Equation of Translated Parabola
- Modeling Real Life

Test Review (1 Day)
Test (1 Day)

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