Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course Title:
Geometry Honors / Basics of Geometry
Grade Level(s):
9-12</td><td>Unit Summary:
In this unit, students will become familiar with the basic elements of geometry, such as points, lines, angles, and polygons.</td></tr>
<tr><td>Essential Question(s):
How do you name geometric figures?
What are congruent segments?
How do you find the distance and the midpoint between two points in the coordinate plane?
How do you identify whether an angle is acute, right, obtuse, or straight?
How do you identify complementary and supplementary angles?
How do you classify polygons?
How do you find perimeter and area of a figure?</td><td>Enduring Understanding(s):
Students will be able to:
Name and sketch geometric figures.
Use segment postulates to identify congruent segments.
Find lengths of segments in the coordinate plane.
Name, measure, and classify angles.
Use special angle relationships to find angle measures.
Classify polygons.
Find dimensions of a polygon.</td></tr>
</table>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Describing Geometric Figures. [*Standard*] - 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 [*Standard*] - 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	**1.** *NJSLS-G-CO.A.1*, *NJSLS-G-CO.B.7*
2. Measuring Geometric Figures. [*Standard*] - Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	**2.** *NJSLS-G-GPE.B.7*
3. Understanding Equality and Congruence. [*Standard*] - 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.	**3.** *NJSLS-G-CO.B.7*

Inter-Disciplinary Connections:

Real-World problem solving examples: Maps (p. 10), Tennis (p. 10), Maps and the Segment Addition Postulate (p. 15 and 17), Insects (p. 17), Room Layout (p. 18), Baseball (p. 25), Park (p. 26), Running Errands (p. 28), Gardening (p. 35), Hiking (p.36), Lighthouse (p. 38), Maps and Angles (p. 45), Soccer (p.49), Train Crossing (p. 53)

Inter-Disciplinary problem solving examples: Molecules (p. 7), Statistics (p. 18), Architecture (p. 33), Sculpture (p. 45), Bridge Design (p. 53), Architecture Performance Task (p. 55)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 1.1 Points, Lines, and Planes:

Warm-up/Starting Options	**Explorations p.T-3**
Practice and Apply	**p. 8-10 #1-16, 25-34, 39-4750, 56-63**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 1.2 Measuring and Constructing Segments:

Warm-up/Starting Options	**Explorations p.T-11**
Practice and Apply	**p. 16-18 #1, 2, 9-34, 26-29, 31, 33**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 1.3 Using Midpoint and Distance Formula:

Warm-up/Starting Options	**Explorations p. T-19**
Practice and Apply	**p. 24-26 #1-10, 15-30, 36-39, 45**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice 33 odd A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 1.4 Perimeter and Area in the Coordinate Plane:

Warm-up/Starting Options	**Explorations p.T-29**
Practice and Apply	**p. 34-36 #1-26, 30-31**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 1.5 Measuring and Constructing Angles:

Warm-up/Starting Options	**Explorations p. T-37**
Practice and Apply	**p. 43-46 #1-8, 17-30, 33-40, 42-45, 47, 49, 56**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 1.6 Describing Pairs of Angles:

Warm-up/Starting Options	**Explorations p. T-47**
Practice and Apply	**p. 52-54 #1-26, 31-43, 51; McDougal Littell p. 39 #31-33**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Bridge Building**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Reasoning and Proofs **Grade Level(s):** 9-12	**Unit Summary**: In this unit, students will analyze conditional statements and write the converse, inverse, and contrapositive of a conditional statement. They will explore how conditional and biconditional statements are used to state definitions. Students will use deductive reasoning, the Law of Detachment, and the Law of Syllogism, to develop simple logical arguments. 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 congruence, supplementary angles, complementary angles, and vertical angles.
Essential Question(s): • How do you use inductive reasoning in mathematics? • How do you rewrite a biconditional statement? • How do you construct a logical argument? • How can you identify postulates illustrated by a diagram? • How do you solve an equation? • How do you write a geometric proof? • What is the relationship between vertical angles, between two angles that are supplementary to the same angle, and between two angles that are complementary to the same angle?	**Enduring Understanding(s):** Students will be able to: • Write definitions as conditional statements. • Use deductive reasoning to form a logical argument. • Use postulates involving points, lines, and planes. • Use algebraic postulates in logical arguments too. • Write proofs using geometric theorems. • Use properties of special pairs of angles.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Use inductive and deductive reasoning. [*Standard*] - 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. [*Standard*] - Prove theorems about lines and angles. [*Standard*] - Prove theorems about triangles. [*Standard*] - Prove theorems about parallelograms.	**1.** *NJSLS-G-CO.A.1*, *NJSLS-G-CO.C.9*, *NJSLS-G-CO.C.10*, *NJSLS-G-CO.C.11*
2. Measuring Geometric Figures. [*Standard*] - Prove theorems about lines and angles. [*Standard*] - Prove theorems about triangles. [*Standard*] - Prove theorems about parallelograms.	**2.** *NJSLS-G-CO.C.9*, *NJSLS-G-CO.C.10*, *NJSLS-G-CO.C.11*
3. Understanding Equality and Congruence. [*Standard*] - Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. [*Standard*] - Prove theorems about lines and angles. [*Standard*] - Prove theorems about triangles. [*Standard*] - Prove theorems about parallelograms.	**3.** *NJSLS-G-CO.C.9*, *NJSLS-G-CO.C.10*, *NJSLS-G-CO.C.11*, *NJSLS-A-REI.1*

Inter-Disciplinary Connections:

Real-World problem solving examples: Error Analysis (p.72), Natural Arches (p. 73), Advertising (p. 63), Tigers (p. 81), Hiking (p.82), Bowling (p. 90), Temperature (p. 98), Maps (p. 104), Fence (p. 113)

Inter-Disciplinary problem solving examples: Geology (p. 72), Literature (p. 73), Statistics (p. 81), Geology (p. 82), Track and Field (p. 90), Statistics (p. 98), Sculpture (p. 104)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 2.1 Conditional Statements:

Warm-up/Starting Options	**Explorations p. T-65**
Practice and Apply	**p. 71-74 #1-3846, 53, 55, 63**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 2.2 Inductive and Deductive Reasoning:

Warm-up/Starting Options	**Explorations p. T-75**
Practice and Apply	**p. 80-82 #1-2, 9-28, 31-36, 41**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Tigers**

Section 2.3 Postulates and Diagrams:

Warm-up/Starting Options	**Explorations p. T-83**
Practice and Apply	**p. 87-88 #1-8, 13-23**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 2.4 Algebraic Reasoning:

Warm-up/Starting Options	**Explorations p. T-91**
Practice and Apply	**p. 96-98 #3-14, 25-42, 53**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 2.5 Proving Statements about Segments and Angles:

Warm-up/Starting Options	**Explorations p. T-99**
Practice and Apply	**p. 103 #1-10, 13-14; McDougal Littell p. 116-118 #3-4, 16, 21-26 (no fill in the blank)**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 2.6 Proving Geometric Relationships:

Warm-up/Starting Options	**Explorations p. T-105**
Practice and Apply	**p. 111-114 #3-18, 21-24, 29; McDougal Littell p. 130 #38, 39, 42-44 (no fill in the blank)**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Parallel and Perpendicular Lines **Grade Level(s):** 9-12	**Unit Summary**: In this unit, students will classify angle pairs formed by three intersecting lines and study angle pairs formed by a line that intersects two parallel lines. They will investigate slopes of lines and study the relationship between slopes of parallel and perpendicular lines. Students will find equations of lines.
Essential Question(s): • What angle pairs are formed by transversals? • How are corresponding angles and alternate interior angles related for two parallel lines and a transversal? • How do you prove lines parallel? • How do you find the slope of a line given the coordinates of two points on the line? • How do you write an equation of a line? • How do you find the distance between a point and a line?	**Enduring Understanding(s):** Students will be able to: • Identify angle pairs formed by three intersecting lines. • Use angles formed by parallel lines and transversals. • Find and compare slopes of lines. • Find equations of lines. • Find the distance between a point and a line.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Using properties of parallel and perpendicular lines. [*Standard*] - 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. [*Standard*] - Prove theorems about lines and angles.	**1.** *NJSLS-G-CO.A.1*, *NJSLS-G-CO.C.9*
2. Measuring Geometric Figures. [*Standard*] - Prove theorems about lines and angles. [*Standard*] - Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.)	**2.** *NJSLS-G-CO.C.9*, *NJSLS-G-CO.D.12*
3. Understanding Equality and Congruence. [*Standard*] - Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**3.** *NJSLS-A-REI.10*

Inter-Disciplinary Connections:

Real-World problem solving examples: Map (p. 127), Fish Tank (p. 129), Gymnastics (p. 130), Camping (p. 136), Pool (p. 136), Flag (p. 141), Steps (p. 141), Map (p. 143), Wind Surfing (p. 143), Cell Phones (p. 146), Tennis (p. 146), Map (p. 151), Windows (p. 153), Crossing a Stream (p. 154), Crosswalks (p. 154), Map (p. 161), Train Tracks (p. 161), Bike Path (p. 161), Gazebo (p. 161), Football (p. 168), Travel (p.169)

Inter-Disciplinary problem solving examples: Architecture (p. 130), Design (p. 136), Carpentry (p. 143)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 3.1 Pairs of Lines and Angles:

Warm-up/Starting Options	**Explorations p. T-125**
Practice and Apply	**p. 129-130 #1-20, 24-29**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Squaring a Treehouse**

Section 3.2 Parallel Lines and Transversals:

Warm-up/Starting Options	**Explorations p. T-131**
Practice and Apply	**p. 135-136 #3-13, 17-18, 21-22, 24; Supplement Two-Column Proofs from McDougal Littell practice workbook B #23-31 & practice workbook C #19-20 (no fill in the blank)**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 3.3 Proofs with Parallel Lines:

Warm-up/Starting Options	**Explorations p. T-137**
Practice and Apply	**p. 142-144 #3-8, 13-24, 33-36, 40**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 3.4 Proofs with Perpendicular Lines:

Warm-up/Starting Options	**Explorations p. T-147**
Practice and Apply	**p. 153-154 #11-12, 15-23, 25, 27**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 3.5 Equations of Parallel and Perpendicular Lines (This section may be done as a review through warm-ups)

Warm-up/Starting Options	**Explorations p. T-155**
Practice and Apply	**p. 160 #9-20**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Transformations **Grade Level(s):** 9-12	**Unit Summary**: In this unit students will perform translations with vectors and algebra. They will reflect figures in a given line, rotate figures about a point, identify line and rotational symmetry, and perform dilations using drawing tools.
Essential Question(s): • How do you translate a figure using a vector? • How do you reflect a figure in the line y = x? • How do you rotate a figure 90^o, 180^o, or 270^o about the origin? • What is a glide reflection? • When does a figure have line symmetry?	**Enduring Understanding(s):** Students will be able to: • Use a vector to translate a figure. • Reflect a figure in any given line. • Rotate figures about a point. • Perform combinations of two or more transformations. • Identify line and rotational symmetries of a figure. • Use drawing to draw dilations.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Experiment with transformations in the plane. [*Standard*] - Represent transformations in the plane using, e.g., 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 (e.g., translation versus horizontal stretch). [*Standard*] - Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. [*Standard*] - Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	**1.** *NJSLS-G-CO.A.2*, *NJSLS-G-CO.A.4*, *NJSLS-G-CO.A.5*
2. Perform operations with vectors. [*Standard*] - Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v).	**2.** *NJSLS-N-VM.A.1*
3. Understand similarity in terms of similarity transformations. [*Standard*] - Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. [*Standard*] - 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 corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	**3.** *NJSLS-G-SRT.A.1.a*, *NJSLS-G-SRT.A.1.b*, *NJSLS-G-SRT.A.2*

Inter-Disciplinary Connections:

Real-World problem solving examples: Chess (p. 179), Finding a Minimum Distance- Shopping (p. 185), Parking (p. 187), Revolving Doors (p. 195), Kaleidoscope (p. 196), Puzzle (p. 196), Insect (p. 211), Decorations (p. 220), Pizza (p.225), Sign Design (p. 226)

Inter-Disciplinary problem solving examples: Science (p. 179), Graphic Design (p. 180), Art (p. 205), Art (p. 206), Optometry (p. 211), Magnification (p. 213), Photography (p. 213), Architecture (p. 214), Photography (p.225)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 4.1 Translations:

Warm-up/Starting Options	**Explorations p. T-173**
Practice and Apply	**p. 178-180 #1-27, 29-20, 38**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 4.2 Reflections:

Warm-up/Starting Options	**Explorations p. T-181**
Practice and Apply	**p. 186-187 #1-24, 26-27, 29-32**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 4.3 Rotations:

Warm-up/Starting Options	**Explorations p. T-189**
Practice and Apply	**p. 194-196 #7-26, 28, 31-33; p. 204 #5-6; McDougal Littel practice workbook B #17-18; McDougal Littel practice workbook C #17-18**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Rotational Doors**

Section 4.5 Dilations

Warm-up/Starting Options	**Explorations p. T-207**
Practice and Apply	**p. 212-214 #1-6, 15-30, 39; McDougal Littel p. 630 #28, 32**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course Title:
Geometry Honors / Congruent Triangles
Grade Level(s):
9-12</td><td>Unit Summary:
In this unit, students will classify triangles and find measures of angles of triangles. Students will work with a variety of proof formats as they identify congruent figures and investigate and prove triangle congruence. They will also use theorems about isosceles and equilateral triangles.</td></tr>
<tr><td>Essential Question(s):
How are the angle measures in 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 angles of an isosceles triangle?
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?
How can you use congruent triangles to make an indirect measurement?</td><td>Enduring Understanding(s):
Students will be able to:
Classify triangles and find measures of their interior and exterior angles.
Identify and use corresponding parts congruent figures.
Use the Third Angles Theorem
Use the Side-Angle-Side (SAS) Congruence Theorem.
Use the Base Angles Theorem
Use isosceles and equilateral triangles
Use the Side-Side-Side (SSS) Congruence Theorem
Use the Hypotenuse-Leg (HL) Congruence Theorem
Use the Angle-Side-Angle (ASA) and Angle-Angle-Side (AAS) Congruence Theorems
Use congruent triangles
Prove Constructions</td></tr>
</table>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Classifying triangles by sides and angles [*Standard*] - Prove theorems about triangles. [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or a human torso as a cylinder)	**1.** *NJSLS-G-CO.C.10*, *NJSLS-G-MG.A.1*
2. Proving that triangles are congruent [*Standard*] - 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 [*Standard*] - Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or a human torso as a cylinder) [*Standard*] – Apply geometric methods to solve design problems (e.g. designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios) [*Standard*] – Use congruence… criteria for triangles to solve problems and to prove relationships in geometric figures	**2.** *NJSLS-G-CO.B.7*, *NJSLS-G-CO.B.8*, *NJSLS-G-MG.A.1*, *NJSLS-G-MG.A.3*, *NJSLS-G-SRT.B.5*
3. Using properties of isosceles and equilateral triangles. [*Standard*] – Prove theorems about triangles. [*Standard*] – Construct an equilateral triangle [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or a human torso as a cylinder)	**3.** *NJSLS-G-CO.C.10*, *NJSLS-G-CO.D.13*, *NJSLS-G-MG.A.1*

Inter-Disciplinary Connections:

Real-World problem solving examples: Classify triangle shape of support beams by sides and angles (p. 232), Bending strips of metal into isosceles triangles for a sculpture (p 237), dividing a wall into equal parts for painting (p 241), using congruent triangles to find how much canvas is needed to make a sign (p 248), using congruent triangles to determine placement of fire towers (p 251), use angles of a triangle to find the distance between a boat and the shoreline (p 258), isosceles triangles on a lifeguard tower (p 255), how triangle congruence creates structural support in architecture (p. 263), using angles/triangles formed by a light ray and the law of reflection to determine effects on reflection (p 276), measuring the width of a rive (p 277).

Inter-Disciplinary problem solving examples: Architecture (p 232), Art - Sculpture (p 237), Fashion design (p 258), Architecture (p 263), Business/Advertising: equilateral triangle, Architecture: isosceles triangle (p 269), Theater Lighting Design (p 268), Science (p 276).

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 5.1 Angles of Triangles

Warm-up/Starting Options	**Explorations p. T-231**
Practice and Apply	**p. 236-238, #1-6, 11-38, 49-52**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.2 Congruent Polygons:

Warm-up/Starting Options	**Explorations p. T-239**
Practice and Apply	**p. 243-244, #1-15, 17-18, 21, 23-24**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.3 Proving Triangle Congruence by SAS:

Warm-up/Starting Options	**Explorations p. T-245**
Practice and Apply	**p. 249-250, #1-18, 25, 29**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.4 Equilateral and Isosceles Triangles:

Warm-up/Starting Options	**Explorations p. T-251**
Practice and Apply	**p. 256-258 #1-11, 13-16, 19, 23-24, 29-33, 38; McDougal Littell practice workbook B #9-10**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.5 Proving Triangle Congruence by SSS:

Warm-up/Starting Options	**Explorations p. T-261**
Practice and Apply	**p. 266-268 #1-10, 13-16, 19-20, 35-36**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.6 Proving Triangle Congruence by ASA and AAS:

Warm-up/Starting Options	**Explorations p. T-269**
Practice and Apply	**p. 274-276 #1-12, 15-20, 24-26, 29**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 5.7 Using Congruent Triangles:

Warm-up/Starting Options	**Explorations p. T-277**
Practice and Apply	**p. 281-282 #1-8, 15-16; McDougal Littell p. 260 #23-26**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review STEM Video and Performance Task: Hang Glider Challenge**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course Title:
Geometry Honors / Relationships Within Triangles
Grade Level(s):
9-12</td><td>Unit Summary:
The topics in this unit focus on properties of lines and segments associated with triangles. Students prove the Midsegment Theorem and use properties of midsegments to solve problems. Properties of perpendicular bisectors, angle bisectors, medians and altitudes of triangles are used to justify statements and solve problems. Coordinate proofs are introduced.</td></tr>
<tr><td>Essential Question(s):
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 bisector and the angle bisectors of a triangle?
What conjectures can you make about the medians and altitudes of a triangle?
How are the midsegments of a triangle related to the sides of the triangle?
How are the sides related to the angles of a triangle?
How are any two sides of a triangle related to the third side?
If two sides of one triangle are congruent to two sides of another triangle, what can you say about the third sides of the triangles?</td><td>Enduring Understanding(s):
Students will be able to:
Use perpendicular bisectors to find measures
Use angle bisectors to find measures and distance relationships.
Write equations for perpendicular bisector.
Use and find the circumcenters of a triangle
Use and find the incenters of a triangle
Use medians and find the centroids of triangles
Use altitudes and find the orthocenters of triangles
Use midsegments of triangles in the coordinate plane
Use the Triangle Midsegment Theorem to find distances
List sides and angles of a triangle in order by size
Use the Triangle Inequality Theorem to find possible side lengths of triangles
Compare measures in triangles
Solve real-life problems using the Hinge Theorem</td></tr>
</table>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Classifying triangles by sides and angles [*Standard*] - Prove theorems about triangles. [*Standard*] Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or a human torso as a cylinder).	**1.** *NJSLS-G-CO.C.10*, *NJSLS-G-MG.A.1*
2. Proving that triangles are congruent [*Standard*] - Prove theorems about lines and angles. [*Standard*] Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or a human torso as a cylinder). [*Standard*] - Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). [*Standard*] - Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. [*Standard*] – Apply geometric methods to solve design problems (e.g. designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios) [*Standard*] - Prove theorems about triangles.	**2.** *NJSLS-G-CO.C.9*, *NJSLS-G-MG.A.1*, *NJSLS-G-CO.D.12*, *NJSLS-G-C.A.3*, *NJSLS-G-MG.A.3*, *NJSLS-G-CO.C.10*
3. Using properties of isosceles and equilateral triangles. *[Standard] - Prove theorems about triangles.*	**3.** *NJSLS-G-CO.10*

Inter-Disciplinary Connections:

Real-World problem solving examples: Angle Bisectors in soccer (p 305), Support beams (p 307), Change in distances when shooting a hockey puck at a goalie (p 307), Calculating distances of buildings on a map (p 308), finding location for distribution that is equidistant (311& 314), designing a pond with a fountain (p 316), archaeologists using a sketch to estimate center of circle (pg. 317), Midsegments in roof truss design (p 331), Using Hinge Theorem to determine possible paths of a basketball to players on the court (p 348)

Inter-Disciplinary problem solving examples: Physical Education(p 305), Architecture/Engineering (p 307), Art - kaleidoscope image(p 332)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 6.1 Perpendicular and Angle Bisectors:

Warm-up/Starting Options	**Explorations p. T-301**
Practice and Apply	**p. 306-307, #1-24, 29, 30**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 6.2 Bisectors of Triangles:

Warm-up/Starting Options	**Explorations p. T-309**
Practice and Apply	**p. 315-318, #1-16, 25-36, 49-50**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 6.3 Medians and Altitudes of Triangles:

Warm-up/Starting Options	**Explorations p. T-319**
Practice and Apply	**p. 324 – 326 #1-22, 27-28, 31-36, 41-44, 49-50**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 6.4 The Triangle Midsegment Theorem:

Warm-up/Starting Options	**Explorations p. T-329**
Practice and Apply	**p. 333-334 #1-3, 7-21**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Building a Roof Truss**

Section 6.5 Indirect Proof and Inequalities in One Triangle:

Warm-up/Starting Options	**Explorations p. T-335**
Practice and Apply	**p. 340-342 #2, 11-24, 29, 30, 35-37, 40, 41**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 6.6 Inequalities in Two Triangles:

Warm-up/Starting Options	**Explorations p. T-343**
Practice and Apply	**p. 347-348 #3-10, 20, 21**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Quadrilaterals and Other Polygons **Grade Level(s):** 9-12	**Unit Summary**: In this unit, students will find angle measures in polygons. They will investigate properties of parallelograms and learn what information they can use to conclude that a quadrilateral is a parallelogram. Students will also study special quadrilaterals such as rhombuses, rectangles, squares, trapezoids, and kites. They will be able to use the properties of these quadrilaterals to classify.
Essential Question(s): • 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 some properties of trapezoids and kites?	**Enduring Understanding(s):** Students will be able to: • Use the interior angle measures of polygons • Use exterior angle measures of polygons • Use properties to find side lengths and angles of parallelograms • Use parallelograms in the coordinate plane • Identify and verify parallelograms • Show that a quadrilateral is a parallelogram in the coordinate plane • Use properties of special parallelograms • Use properties of diagonals of special parallelograms • Use coordinate geometry to identify special types of parallelograms • Use properties of trapezoids • Use the Trapezoid Midsegment Theorem to find distances • Use properties of kites • Identify quadrilaterals

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Classifying triangles by sides and angles [*Standard*] - Prove theorems about parallelograms.	**1.** *NJSLS-G-CO.C.11*
2. Proving that triangles are congruent [*Standard*] - Prove theorems about parallelograms. [*Standard*] - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or human torso as a cylinder).	**2.** *NJSLS-G-CO.C.11*, *NJSLS-G-SRT.B.5*, *NJSLS-G-MG.A.1*
3. Using properties of isosceles and equilateral triangles. [*Standard*] - Prove theorems about parallelograms. [*Standard*] - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [*Standard*] – Apply geometric methods to solve design problems (e.g. designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or human torso as a cylinder).	**3.** *NJSLS-G-CO.C.11*, *NJSLS-G-SRT.B.5*, *NJSLS-G-MG.A.3*, *NJSLS-G-MG.A.1*

Inter-Disciplinary Connections:

Real-World problem solving examples: Floor angles of a gazebo (p 365), extending arm of a desk lamp & mirror (p 370 & 374), Congruent parallelograms in an arrow (p 373), design of an amusement park ride (p 377), shooting pool ball (P 383), parallelograms in a staircase design (p 386), building a frame for a window (pg. 391), architecture stone design (p 399), parallelogram faces of diamonds (p 406), Scissor lifts (p 407)

Inter-Disciplinary problem solving examples: Fashion/design - base of a jewelry box (p 365), Music - folding a music stand (p 384), Cooking - diameter of the bottom layer of a layered cake (p 404), Engineering - creating a kite (p 401 & 404)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 7.1 Angles of Polygons:

Warm-up/Starting Options	**Explorations p. T-359**
Practice and Apply	**p. 364-366, #3-34, 37-41, 50**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 7.2 Properties of Parallelograms:

Warm-up/Starting Options	**Explorations p. T-367**
Practice and Apply	**p. 372-374, #1-22, 31-34, 39, 40**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 7.3 Proving That a Quadrilateral Is a Parallelogram:

Warm-up/Starting Options	**Explorations p. T-375**
Practice and Apply	**p. 381-383 #1-16, 21-24, 31-32, 35-38**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 7.4 Properties of Special Parallelograms:

Warm-up/Starting Options	**Explorations p. T-387**
Practice and Apply	**p. 393-395 #1-54, 61-62, 65-71**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 7.5 Properties of Trapezoids and Kites:

Warm-up/Starting Options	**Explorations p. T-397**
Practice and Apply	**p. 403-405 #7-12, 15-34, 46**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Diamonds**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr>
<td>Course Title:
Geometry Honors / Similarity

Grade Level(s):
9-12</td>
<td>Unit Summary:
In this unit, students will understand what it means for two figures to be similar by showing corresponding sides proportional and corresponding angles congruent. Students will use ratios and proportions to find a scale factor. They will use this factor to find missing side lengths of similar figures as well as area and perimeters. Students will use sides and angles of triangles to prove triangles similar. Students will also learn to use several proportionality theorems.</td>
</tr>
<tr>
<td>Essential Question(s):
• 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?</td>
<td>Enduring Understanding(s):
Students will be able to:
• Use similarity statements
• Find corresponding lengths in similar polygons
• Find perimeters and areas of similar polygons
• Decide whether polygons are similar
• Use the Angle-Angle Similarity Theorem
• Solve real-life problems
• Use the Side-Side-Side Similarity Theorem
• Use the Side-Angle-Side Similarity Theorem
• Prove slope criteria using similar triangles
• Use the Triangle Proportionality Theorem and its converse
• Use other proportionality theorems</td>
</tr>
</table>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Classifying triangles by sides and angles [*Standard*] - 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 corresponding pairs of angles and the proportionality of all corresponding pairs of sides. [*Standard*] - Apply geometric methods to solve design problems (e.g. designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	**1.** *NJSLS-G-SRT.A.2*, *NJSLS-G-MG.A.3*
2. Proving that triangles are congruent [*Standard*] - Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. [*Standard*] - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [*Standard*] - Prove theorems about triangles. [*Standard*] – 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) [*Standard*] – Use geometric shapes, their measures, and their properties to describe objects (e.g. modeling a tree trunk or human torso as a cylinder).	**2.** *NJSLS-G-SRT.A.3*, *NJSLS-G-SRT.B.5*, *NJSLS-G-SRT.B.4*, *NJSLS-G-GPE.B.5*, *NJSLS-G-MG.A.1*
3. Using properties of isosceles and equilateral triangles. [*Standard*] - Prove theorems about triangles. [*Standard*] - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. [*Standard*] – Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	**3.** *NJSLS-G-SRT.B.4*, *NJSLS-G-SRT.B.5*, *NJSLS-G-GPE.B.6*

Inter-Disciplinary Connections:

Real-World problem solving examples: finding perimeters of an Olympic-sized swimming pool and similar pool (p 420), building a patio with similar dimensions to the backyard (p 419), using tennis court dimensions to determine similarity to table tennis dimensions (p 425), similarity of an object and its projected flashlight image (p 426), find height of a flagpole (p 430), calculate distance between a buoy and the shoreline (p 432), constructing a lean-to shelter (p 438), Ferris wheel length (p 443), shuffleboard (p 443), shoe rack design (p 447), distances traveled on a map (p448)

Inter-Disciplinary problem solving examples: Physical Education – court sizes (p 425), Football plays (p 452), Science – estimate the radius of the moon during a total eclipse (p 419), Engineering - creating a scale model of a swing set (p 443), Business - real estate-finding lake frontage (p 451), Art – perspective drawing (p 457)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 8.1 Similar Polygons:

Warm-up/Starting Options	**Explorations p. T-417**
Practice and Apply	**p. 423-426, #1-24, 27-48, 51**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **STEM Video and Performance Task: Scale Model of a Pool**

Section 8.2 Proving Triangle Similarity by AA:

Warm-up/Starting Options	**Explorations p. T-427**
Practice and Apply	**p. 431-432, #1-21, 23-26**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 8.3 Proving Triangle Similarity by SSS and SAS:

Warm-up/Starting Options	**Explorations p. T-435**
Practice and Apply	**p. 441-442 #1-10, 13-26, 28**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 8.4 Proportionality Theorems:

Warm-up/Starting Options	**Explorations p. T-445**
Practice and Apply	**p. 450-452 #1-8, 13-26, 29-30, 38**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Right Triangles and Trigonometry **Grade Level(s):** 9-12	**Unit Summary**: In this unit, students will be introduced to right triangle trigonometry. The first lesson on the Pythagorean Theorem will not be completely new to students who will have familiarity with this theorem from idle school. The next two lessons use knowledge of similar triangles to investigate relationships in special right triangles (30°-60°-90° and 45°-45°-90°) as well as similar triangles that are formed when the altitude to the hypotenuse is drawn in a right triangle. Being familiar with these relationships and solving for segment lengths in triangles will be helpful in subsequent lessons. The next three lessons present the tangent, sine, and cosine rations. The focus of these lessons is to solve for parts of a right triangle. Many real-life applications are presented. The last lesson of the chapter introduces the Law of Sines and the Law of Cosines so that non-right triangles can be solved.
Essential Question(s): • How can you prove the Pythagorean Theorem? • What is the relationship among the side lengths of 45°-45°-90° and 30°-60°-90° triangles? • How are altitudes and geometric means of right triangles related? • How is a right triangle used to find the sine, cosine, and tangent of an acute triangle? • When you know the lengths of the sides of a right triangle, how can you find the measures of the two acute angles? • What are the Law of Sines and the Law of Cosines?	**Enduring Understanding(s):** Students will be able to: • Find side lengths in right triangles • Use the converse of the Pythagorean Theorem to determine if a triangle is a right triangle • Use properties of the altitude of a right triangle • Use relationships among the sides in special right triangles • To use trigonometric ratios to solve for side lengths in right triangles • Use inverse tangent, sine, and cosine ratios • To use the Law of Sines and the Law of Cosines to solve non-right triangles

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Use geometric means to solve for side lengths in similar right triangles. [*Standard*] - Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**1.** *NJSLS.G-SRT.B.5*
2. Use the relationships among the sides in special right triangles. [*Standard*] - Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. [*Standard*] - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	**2.** *NJSLS.G-SRT.C.8, NJSLS.G-MG.A.1*
3. Use trigonometry to solve triangles. [*Standard*] - 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. [*Standard*] - Explain and use the relationship between the sine and cosine of complementary angles. [*Standard*] - Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. [*Standard*] - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). [*Standard*] - Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). [*Standard*] - Prove the Laws of Sines and Cosines and use them to solve problems. [*Standard*] - Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	**3.** *NJSLS.G-SRT.C.6, NJSLS.G-SRT.C.7, NJSLS.G-SRT.C.8, NJSLS.G-MG.A.1, NJSLS.G-MG.A.3, NJSLS.G-SRT.D.10, NJSLS.G-SRT.D.11*

Inter-Disciplinary Connections:

Real-World problem solving examples: support beams (p. 465), platforms of a fire escape (p. 469), road signs (p. 474), ramp height (p. 474), roof height (p. 479), monument height (p. 483), tree height (p. 490), shade and awnings (p. 492), skiing (p. 497), playground slides (p. 499), escalators (p. 499), submarines (p. 500), raked stage (p. 504), unloading a truck (p. 505), wheelchair ramp (p. 506), bridge over a lake (p. 510), distance between buildings (p. 514)

Inter-Disciplinary problem solving examples: basketball (p. 469), frames for artwork (p. 469), craters on the moon in astrophysics (p. 491), aviation (p. 499), paleontology (p. 512), golfing (p. 515)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 9.1 The Pythagorean Theorem:

Warm-up/Starting Options	**Explorations p.T-463**
Practice and Apply	**p. 468-470 #1-34, 41**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 9.2 Special Right Triangles:

Warm-up/Starting Options	**Explorations p.T-471**
Practice and Apply	**p. 475-476 #1-12, 20**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 9.3 Similar Right Triangles:

Warm-up/Starting Options	**Explorations p. T-477**
Practice and Apply	**p. 482-483 #1-26, 31-34**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **Real Life STEM Video: Height of a Rock Wall**

Section 9.4 The Tangent Ratio:

Warm-up/Starting Options	**Explorations p. T-487**
Practice and Apply	**p. 491-492 #1-12, 15-16, 25**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 9.5 The Sine and Cosine Ratios:

Warm-up/Starting Options	**Explorations p. T-493**
Practice and Apply	**p. 498-500 #1-25, 27-31, 34**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 9.6 Solving Right Triangles:

Warm-up/Starting Options	**Explorations p. T-501**
Practice and Apply	**p. 505-506 #1-21, 23, 27-28**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 9.7 Law of Sines and Law of Cosines:

Warm-up/Starting Options	**Explorations p. T-507**
Practice and Apply	**p. 513-515 #1-8, 13-26, 33-34, 37-42**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course Title: Geometry Honors / Circles **Grade Level(s):** 9-12	**Unit Summary**: In this unit, students will learn about circles. The first three lessons introduce the vocabulary and symbols related to circles. They are followed by a lesson looking at circular arcs that are intercepted by chords. The next lesson introduces all of the angle relationships that occur when two chords, secants, or tangents intersect a circle. An investigation of segment relationships that occur when two chords, secants, or tangents intersect a circle is the focus of the next lesson. In the last lesson, the circle is presented in the coordinate plane where the standard form of the equation is derived.
Essential Question(s): • What are the definitions of the lines and segments that intersect a circle? • How are circular arcs measured? • How do you determine when a chord is a diameter of a circle? • How are inscribed angles related to their intercepted arcs? • How are the angles of an inscribed quadrilateral related? • When a chord intersects a tangent line or another chord, what relationships exist among the angles and arcs formed? • What relationships exist among the segments of circles? • What is the equation of a circle in the coordinate plane?	**Enduring Understanding(s):** Students will be able to: • Define the lines and segments that intersect a circle. • Measure circular arcs. • Determine when a chord is a diameter of a circle. • Use the relationships of inscribed angles and their intercepted arcs. • Use the relationships of the angles of an inscribed quadrilateral. • Use the relationships of the angles and arcs formed when a chord intersects a tangent line. • Use the relationship of the segments formed by two intersecting chords. • Use the relationship of the segments formed among segments of two secants that intersect outside of a circle. • Use the equation of a circle in the coordinate plane.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Use the properties of segments that intersect circles. [*Standard*] - 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. [*Standard*] - Identify and describe relationships among inscribed angles, radii, and chords. [*Standard*] - Construct a tangent line from a point outside a given circle to the circle. [*Standard*] - Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). [*Standard*] - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	**1.** *NJSLS.G-CO.A.1*, *NJSLS.G-C.A.2*, *NJSLS.G-C.A.4*, *NJSLS.G-MG.A.3*, *NJSLS.G-MG.A.1*
2. Apply angle relationships in circles. [*Standard*] - Prove that all circles are similar. [*Standard*] - Identify and describe relationships among inscribed angles, radii, and chords. [*Standard*] - Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. [*Standard*] - Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	**2.** *NJSLS.G-C.A.1*, *NJSLS.G-C.A.2*, *NJSLS.G-C.A.3*, *NJSLS.G-CO.D.13*
3. Use circles in the coordinate plane. [*Standard*] - 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. [*Standard*] - Use coordinates to prove simple geometric theorems algebraically.	**3.** *NJSLS.G-GPE.A.1*, *NJSLS.G-GPE.B.4*

Inter-Disciplinary Connections:

Real-World problem solving examples: bike paths (p. 535), bicycle chain (p. 535), running a survey (p. 539), dartboards (p. 543), placing sprinklers (p. 547), submarine (p. 549), car design (p. 550), movie theatre screening (p. 559), northern lights (p. 565), viewing fireworks (p. 567), television cameras (p. 568), aquariums (p. 572), website design (p. 574), commuter zones (p. 579)

Inter-Disciplinary problem solving examples: time zones (p. 544), archaeologist (p. 549), photography angles (p. 557), carpentry (p. 559), astronomy and moons (p. 559), astronomy (p. 573), seismographs (p. 578)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 10.1 Lines and Segments that Intersect Circles:

Warm-up/Starting Options	**Explorations p.T-529**
Practice and Apply	**p. 534-536 #1-10, 15-26, 29-34, 37, 40, 45**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 10.2 Finding Arc Measures:

Warm-up/Starting Options	**Explorations p.T-537**
Practice and Apply	**p. 542-543 #1-24, 27-28, 31**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 10.3 Using Chords:

Warm-up/Starting Options	**Explorations p. T-545**
Practice and Apply	**p. 549-550 #1-11, 13-17, 21**
Resources	**Online Dynamic Classroom has all resources available. Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook Advanced: Enrichment and Extension, Cumulative Review**

Section 10.4 Inscribed Angles and Polygons:

Warm-up/Starting Options	**Explorations p. T-553**
Practice and Apply	**p. 558-559 #1-17, 19-21**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 10.5 Angle Relationships in Circles:

Warm-up/Starting Options	**Explorations p. T-561**
Practice and Apply	**p. 566-568 #1-25, 34, 39-40**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 10.6 Segment Relationships in Circles:

Warm-up/Starting Options	**Explorations p. T-569**
Practice and Apply	**p. 573-574 #1-18**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 10.7 Circles in the Coordinate Plane:

Warm-up/Starting Options	**Explorations p. T-575**
Practice and Apply	**p. 579-580 #1-24; Use Kuta software to write equations given the endpoints of the diameter**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **Real Life STEM Video: Seismographs and Earthquake Epicenters**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Geometry Honors

Course Number: 032100

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr>
<td>Course Title:
Geometry Honors / Circumference, Area, and Volume

Grade Level(s):
9-12</td>
<td>Unit Summary:
In this unit, the study of circumference, area, and volume finishes the study of measurement of solids. Students will come to this chapter with knowledge of many formulas for surface area and volume. These will be reviewed and a few new formulas added to the list. Different from middle school is that students now have a greater ability to solve equations. They also know the Pythagorean Theorem and trigonometry, so they are able to solve for measures that previously had to be told to them. In this chapter, students will do additional work with circles involving arc length and area of sectors. Students will also find the area of regular polygons.</td>
</tr>
<tr>
<td>Essential Question(s):
• How can you find the length of a circular arc?
• How can you find the area of a sector of a circle?
• How can you find the area of a regular polygon?
• What is the relationship between the numbers of vertices, edges, and faces of a polyhedron?
• How can you find the volume of a prism or cylinder?
• How can you find the volume of a pyramid?
• How can you find the surface area and volume of a cone?
• How can you find the surface area and the volume of a sphere?</td>
<td>Enduring Understanding(s):
Students will be able to:
• Find the length of a circular arc.
• Find the area of a sector of a circle.
• Find the area of a regular polygon.
• Use the relationship between the numbers of vertices, edges, and faces of a polyhedron.
• Find the volume of a prism or cylinder.
• Find the volume of a non-right prism or cylinder.
• Find the volume of a pyramid.
• Find the surface area and volume of a cone.
• Find the surface area and volume of a sphere.</td>
</tr>
</table>

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target	**NJSLS:**
1. Use similarity to find the length of an arc or the area of a sector of a circle. [*Standard*] - Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. [*Standard*] - 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. [*Standard*] - 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. [*Standard*] - Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	**1.** *NJSLS.G-GMD.A.1, NJSLS.G-C.B.5, NJSLS.G-CO.A.1, NJSLS.G-MG.A.2*
2. Finding surface area of geometric shapes. [*Standard*] - Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. [*Standard*] - Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. [*Standard*] - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	**2.** *NJSLS.G-GMD.B.4, NJSLS.G-GMD.A.1, NJSLS.G-MG.A.1*
3. Finding volume of geometric shapes. [*Standard*] - Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. [*Standard*] - Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. [*Standard*] - Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. [*Standard*] - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. [*Standard*] - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	**3.** *NJSLS.G-GMD.B.4, NJSLS.G-GMD.A.1, NJSLS.G-GMD.A.2, NJSLS.G-GMD.A.3, NJSLS.G-MG.A.1*

Inter-Disciplinary Connections:

Real-World problem solving examples: tire distance (p. 596), circular tracks (p. 596), ferris wheel (p. 599), population density (p. 603), lights from a lighthouse (p. 607), decorating a tabletop (p. 613), watch area (p. 615), swimming pools (p. 622), density of gold (p. 628), building a wooden chest (p. 629), density of metals (p. 631), density of coins (p. 631), making candles (p. 633), comparing costs (p. 633), popcorn containers (p. 646), buying cat food (p. 646), farming (p. 653), size of earth (p. 654)

Inter-Disciplinary problem solving examples: horticulture (p. 599), astronomy (p. 599), irrigation systems (p. 601), construction (p. 608), basaltic columns (p. 615), construction (p. 629), archaeology (p. 637), nautical design (p. 640), chemistry (p. 646), baseball (p. 648), soccer (p. 650)

Students will engage with the following text:

Big Ideas Math, Geometry

Students will write:

Students will define and compare/contrast given terms. Students will describe and write about a diagram using mathematical language. Students will relate real world situations geometry terminology. Students will also prove postulates and theorems.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills?

Opportunities for developing students' understanding in this chapter include: investigating geometry activities, problem solving workshops, modeling examples, using real-life application and construction of models or other hands on activities such as projects. Technology such as animated geometry, Smart Board, graphing calculators, and Geometer's Sketchpad will also be explored through the learning experience. Other interests could include, but is not limited to alternative lesson openers, using note-taking strategies, math and history applications, and interdisciplinary applications.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 11.1 Circumference and Arc Length:

Warm-up/Starting Options	**Explorations p.T-593**
Practice and Apply	**p. 598-600 #1-18, 23, 24, 33**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.2 Areas of Circles and Sectors:

Warm-up/Starting Options	**Explorations p.T-601**
Practice and Apply	**p. 606-608 #1-10, 15-28, 31-32, 37**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review** **Real Life STEM Video: Population Density**

Section 11.3 Areas of Polygons:

Warm-up/Starting Options	**Explorations p. T-609**
Practice and Apply	**p. 614-615 #1-25, 27-30; McDougal Littell p. 723-724 #3-8, 16-18, 22-27; McDougal Littell p. 733-734 #3-5, 16-18, 24-29**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.4 Three-Dimensional Figures:

Warm-up/Starting Options	**Explorations p. T-617**
Practice and Apply	**p. 621-622 #1-14, 20**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.5 Volumes of Prisms and Cylinders:

Warm-up/Starting Options	**Explorations p. T-625**
Practice and Apply	**p. 631-633 #1-12, 15, 17-22, 29-33, 35-37, 44, 53, 54; McDougal Littell p. 807-808 #6-11, 13-15, 22, 23**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.6 Volumes of Pyramids:

Warm-up/Starting Options	**Explorations p. T-635**
Practice and Apply	**p. 639-640 #1-9, 11-14, 17-20; McDougal Littell p. 814-815 #6-9, 23**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.7 Surface Area and Volumes of Cones:

Warm-up/Starting Options	**Explorations p. T-641**
Practice and Apply	**p. 645-646 #1-12, 15-16, 18-22; McDougal Littell p. 815 #22, 24**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

Section 11.8 Surface Area and Volumes of Spheres:

Warm-up/Starting Options	**Explorations p. T-647**
Practice and Apply	**p. 652-654 #1-32, 35, 36, 39; McDougal Littell p. 843 #21-23**
Resources	**Online Dynamic Classroom has all resources available.** **Review: Practice A and Practice B, Puzzle Time, Student Journal, and Skills Review Handbook** **Advanced: Enrichment and Extension, Cumulative Review**

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Geometry curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-Of –Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP.

Performance Assessments:

Performance Tasks, Projects, Display of Student Work

Accommodations/Modifications:

As per IEP.