

## Rumson-Fair Haven Regional High School Curriculum

**Course:** *Geometry Honors*

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### **Section I: Course Description**

*Geometry Honors* is a full-year course that carries five credits toward high school graduation. Included in the course is an in-depth exploration of fundamental geometric vocabulary, logic, and proof, three-dimensional and coordinate geometry as well as trigonometry and measurement formulas. An investigative approach is used to create a deeper understanding and form a greater connection with the Geometry material. The use of Geogebra and Geometer's Sketchpad software is also emphasized as a learning tool throughout the school year in *Geometry Honors*. Applications provide evidence that mathematics is important in our world and Geometry learned in our classroom has practical uses. These applications provide connections to business, consumer economics, science, life skills, leisure activities, and technology.

### **Section II: NJSLs: New Jersey Student Learning Standards/Learning Objectives**

1. **2023 New Jersey Student Learning Standards – Mathematics:**
  - “A New Jersey education in Mathematics builds quantitatively and analytically literate citizens prepared to meet the demands of college and career, and to engage productively in an information-driven society; ...A high-quality mathematics education fosters a population that...leverages data in decision-making and as a lens for discussing, analyzing, and responding to practical questions, persists to make sense of and model problems arising in everyday life, society, and the workplace, thinks critically and strategically to assess quantitative relationships and to solutions to complex problems, employs precise reasoning and constructs viable arguments to deduce conclusions, recognize false statements and assess peers’ reasoning, interprets, evaluates and critiques the mathematics embedded in social, scientific and commercial systems, as well as the claims made in the private and public sectors, communicates precisely when conveying, representing, and justifying both qualitative and quantitative perspectives.”
2. **2023 New Jersey Student Learning Standards English Language Arts:**
  - A New Jersey education in English Language Arts builds readers, writers, and communicators prepared to meet the demands of college and career and to engage as productive American citizens with global responsibilities. ...Students will develop the necessary skills in reading, writing, speaking, and listening that are the foundations for creative and purposeful expression in language read rich, challenging texts that build their knowledge of the world, grow their confidence and identities as readers, and develop critical thinking skills and vocabulary necessary for long-term success[; e]ngage in regular, meaningful, writing authentic tasks, exploring valued topics, writing for impact and expression, and sharing their work with others (including authentic audiences) leverage complex texts and digital media to develop comprehension, active listening, and discussion skills ground daily writing and discussion in evidence, fostering an ability to read critically, build arguments, cite evidence, and communicate ideas to contribute meaningfully as productive citizens evaluate the reliability, credibility, and perspective of authors and speakers across all forms of media express ideas and knowledge through a variety of modalities and media, and serve as effective communicators who purposefully read, write, and speak across multiple disciplines [and ]learn to persist in reading complex texts, establishing lifelong habits to read voluntarily for pleasure, for further education, for information on public policy, and for advancement in the workplace.
3. **Standard 8.1 (Computer Science) and 8.2 (Design Thinking) of the 2020 NJSLs:**
  - “The ‘Intent and Spirit of the Computer Science and Design Thinking Standards’ is to focus on deep understanding of concepts that enable students to think critically and systematically about leveraging technology to solve local and global issues. Authentic learning experiences that enable students to apply content knowledge, integrate concepts across disciplines, develop computational thinking skills, acquire and incorporate varied perspectives, and communicate with diverse audiences about the use and effects of computing prepares New Jersey students for college and careers.”
4. **Standard 9.4 (Life Literacies and Key Skills) of the 2020 NJSLs:**
  - “This standard outlines key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy\* that are critical for students to develop to live and work in an interconnected global economy.”
  - **\*Climate Change:** The state of New Jersey has mandated instruction in, “Climate Change across all content areas, leveraging the passion students have shown for this critical issue and providing them opportunities to develop a deep understanding of the science behind the changes and to explore the solutions our world desperately needs.”

5. **\*Amistad Law: N.J.S.A. 18A 52:16A-88:**
  - The inclusion of lessons and resources/texts dealing with the African slave trade, slavery in America, the vestiges of slavery in this country, and the contributions of African Americans to our society will be implemented in English and Social Studies courses in accordance with state law: “Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.”
6. **\*Holocaust Law: N.J.S.A. 18A 35-28:**
  - The inclusion of lessons and resources/texts that enable pupils to identify and analyze applicable theories concerning human nature and behavior; to understand that genocide is a consequence of prejudice and discrimination; and to understand that issues of moral dilemma and conscience have a profound impact on life will be implemented in English and Social Studies courses in accordance with state law: “Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.”
7. **\*LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35:**
  - A transformative approach to the inclusion of lessons and resources/texts on the contributions and issues concerning the LGBTQ+ population and people with disabilities will be implemented across all core subjects in accordance with state law: “A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district’s implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36). A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.”
8. **\*Asian American and Pacific Islanders Legislation: N.J.S.A 4021/A6100:**
  - The inclusion of lessons and resources/texts on the history and contributions of Asian Americans and Pacific Islanders will enable New Jersey’s schools to provide a curriculum that reflects the diversity of our state. In accordance with state law: “A board of education shall include instruction on the history and contributions of Asian Americans and Pacific Islanders in an appropriate place in the curriculum of students in grades kindergarten through as part of the school district’s implementation of the New Jersey Student Learning Standards in Social Studies.”
9. Acquisition/development/refinement of the higher-order critical thinking skills aligned with the *Revised Bloom’s Taxonomy of Cognitive Objectives*

### **Section III: Curriculum Modifications**

The *Geometry Honors* curriculum is subject to case-by-case modifications to support/advance the needs of all students, including special education students, English language learners, gifted students, and those at risk of school failure. These modifications are based on Individualized Learning Programs (IEPs), recommendations made by the district’s English Language Learners (ELL) coordinator, feedback from members of the Intervention & Referral Services Team (*I&RS*) for at-risk students, and 504 Plans.

### **Section IV: Preparation for Standardized Testing**

Instruction in *Geometry Honors* is aligned with the requirements of state and national standardized assessments, including the *NJGPA*, *NJSLA*, the *ACT*, the *PSAT*, and the *SAT*.

### **Section V: Curriculum Pacing Guide**

Curriculum Pacing Guide	
Course Title: <i>Geometry Honors</i>	Grade Level: 9
Unit I: Building Blocks of Geometry	Weeks 1-5

<b>Unit II:</b> Reasoning and Parallel Lines	Weeks 6-9
<b>Unit III:</b> Construction	Weeks 10-14
<b>Unit IV:</b> Triangle Properties	Weeks 15-17
<b>Unit V:</b> Polygon Properties	Weeks 18-23
<b>Unit VI:</b> Right Triangles	Weeks 24-25
<b>Unit VII:</b> Circles	Weeks 26-29
<b>Unit VIII:</b> Similarity	Weeks 30-31
<b>Unit IX:</b> Trigonometry	Weeks 32-33
<b>Unit X:</b> Area and Surface Area	Weeks 34-37
<b>Unit XI:</b> Volume of Solids	Weeks 38-40

### **Section VI: Technology Skills**

Students in *Geometry Honors* are required to complete the technology skills components of the curriculum:

- Kuta Software
- Geogebra
- Desmos
- Edulastic
- Math XL
- Google Suite
- TI-30 Scientific Calculator
- Kuta Software

### **Section VII: Primary Texts and Year-Long Instructional Resources**

The following texts and instructional resources are employed in *Geometry Honors*:

- Common Sense Education ([www.common sense.org](http://www.common sense.org))
- Serra, *Discovering Geometry*, Key Curriculum Press, Emeryville, California, 2015 (textbook and workbooks)

### **Section VIII: Grading Formula and Assessment Modes**

Marking period grades in *Geometry Honors* are determined via a percentage weighting model. The specific grading categories and weightings of each will be determined before each academic year's start and published in the posted/distributed course syllabi.

Assessments in *Geometry Honors* vary greatly in format, scope/content/skills assessed, and alternative assessments, differentiation in assessments and choice will be incorporated as appropriate. Preliminary assessments of each format will be used as benchmarks and summative assessments will be created/revised collaboratively each year and planned by members of the *Geometry Honors* instructional team to inform future learning and to measure student growth.

### **Section IX: Unit Templates**

The following unit templates have been established for the *Geometry Honors* curriculum by the *Geometry Honors* instructional team:

Unit I: Building Blocks of Geometry		
<b>Unit Summary</b>		
In this unit, students will apply basic facts about points, lines, planes, segments, and angles. Students will measure segments and angles using geometry tools and use theorems to create and solve algebraic equations to find missing measurements. Students will apply these concepts to real-world problems. Finally, students will use formulas to find the distance and coordinates of a midpoint.		
<b>Standards/Core Ideas/Performance Expectations</b>		
The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i> :		
<ul style="list-style-type: none"> <li>● 2023 New Jersey Student Learning Standards: Mathematics               <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.CO.A.1, 3-5 &amp; B.6-7, G.MG.A.1</li> </ul> </li> <li>● 2023 New Jersey Student Learning Standards English Language Arts               <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● 2020 New Jersey Student Learning Standards: Computer Science and Design Thinking               <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● 2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills               <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>		
<b>Unit Essential Questions</b>	<b>Unit Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>● How is an awareness of the structure of a mathematical system connecting definitions, postulates, and theorems developed?</li> <li>● How can a three-dimensional figure with a two-dimensional drawing be represented?</li> <li>● What are the building blocks of geometry?</li> <li>● How can the attributes of a segment or angle be described?</li> </ul>	<ul style="list-style-type: none"> <li>● Students will understand definitions of geometric figures, congruence of segments, and basic construction techniques to explore properties.</li> <li>● A 3-D figure with a 2-D drawing can be represented by visualizing the surfaces of the figure and how they relate to each other.</li> <li>● Geometry is a mathematical system built on basic terms, definitions, and assumptions called postulates, extending from an understanding of the basic building blocks of points, lines, and planes.</li> <li>● The attributes of a segment or angle can be described by using unit amounts.</li> </ul>	
<b>Evidence of Learning</b>		
<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>● Classwork</li> <li>● Homework</li> <li>● Performance activities</li> <li>● Math About Me activity</li> <li>● Poolroom Math activity</li> <li>● Desmos Transformation Golf activity</li> <li>● Points, Lines, Planes Quiz</li> <li>● Definitions 2-D Figures Quiz</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>● Benchmark Unit Test</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>● <i>Discovering Geometry</i> textbook</li> <li>● Geometry tools</li> <li>● Graph and Dot Paper</li> <li>● Poolroom Math Worksheets</li> <li>● Various teacher-made PowerPoints, Google Slides, and worksheets</li> <li>● Desmos Activity</li> <li>● <a href="#">Common Sense Media “The Big Data Dilemma”</a></li> </ul>

<ul style="list-style-type: none"> <li>Individual student check-ins with teacher</li> </ul>		
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## Unit II: Reasoning and Parallel Lines

### Unit Summary

Students will use inductive and deductive reasoning to make conjectures and conclusions. Students will write conditional and biconditional statements. Students will also use reasoning to justify solutions to algebraic equations. Students will identify parallel and perpendicular lines. Students will discover the relationships of angles formed by parallel lines and a transversal. Finally, students will review slope and slope-intercept forms to graph lines in the coordinate plane and identify parallel and perpendicular lines.

### Standards/Core Ideas/Performance Expectations

The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in *Geometry Honors*:

- 2023 New Jersey Student Learning Standards: Mathematics
  - MP.1-8
  - G.CO.A.1, C.9-11 & D.12, G.SRT.B.4, G.GPE.B.5-6
- 2023 New Jersey Student Learning Standards English Language Arts
  - RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B & E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4
- 2020 New Jersey Student Learning Standards: Computer Science and Design Thinking
  - 8.1.12.DA.1 & 6
- 2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills
  - 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7

### Unit Essential Questions

- What are the relationships of the angles formed by parallel lines cut by a transversal?
- How can it be proven that two lines are parallel?
- How are logical conclusions drawn in mathematics?

### Unit Enduring Understandings

- When a parallel line is cut by a transversal, special congruent pairs and supplementary pairs of angles are formed.
- Students can prove that two lines are parallel by using special angle relationships and the relationships of two lines to a third line.
- Students should draw logical conclusions from given information and mathematical knowledge.

### Evidence of Learning

#### Formative & Alternative

##### Assessments:

- Classwork
- Homework
- Performance activities
- Word Problem Poster Presentation
- Halloween Ghost activity on parallel and perpendicular
- Angle Relationships Quiz
- Individual student check in with teacher

#### Benchmark & Summative

##### Assessments:

- Parallel and Perpendicular Cooperative Assessment
- Unit II Test

#### Resources Needed:

- Discovering Geometry* textbook
- Geometry tools
- Graph Paper
- Poster paper, markers
- Various teacher-made PowerPoints, Google Slides, and worksheets
- Halloween Slides activity

## Unit III: Construction

### Unit Summary

Students will develop skills using a compass, straightedge, patty paper, and geometry software. Students will create complex figures using only a compass and straightedge. Students will use construction to discover and prove various theorems. Students will look at the points of concurrency in a triangle as well as construct them.

### Standards/Core Ideas/Performance Expectations

The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in *Geometry Honors*:

- 2023 New Jersey Student Learning Standards: Mathematics
  - MP.1-8
  - G.CO.D.12-13, G.C.A.1-4
- 2023 New Jersey Student Learning Standards English Language Arts
  - RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B & E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4

<ul style="list-style-type: none"> <li>2020 New Jersey Student Learning Standards: Computer Science and Design Thinking             <ul style="list-style-type: none"> <li>8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills             <ul style="list-style-type: none"> <li>9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>	
Unit Essential Questions	Unit Enduring Understandings
<ul style="list-style-type: none"> <li>How are geometry tools used to discover properties of geometric figures?</li> </ul>	<ul style="list-style-type: none"> <li>Students will construct geometric figures using compasses and rulers and write conjectures based on their findings.</li> </ul>
Evidence of Learning	
<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>Classwork</li> <li>Homework</li> <li>Performance activities</li> <li>Points of Concurrency Kahoot Review Game</li> <li>Points of Concurrency Coordinate Plane JigSaw Activity</li> <li>Construction Problem Set</li> <li>Construction Quiz</li> <li>Points of Concurrency Quiz</li> <li>Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>Concurrency in the Coordinate Plane Cooperative Assessment</li> <li>Construction Project</li> </ul>
<b>Resources Needed:</b> <ul style="list-style-type: none"> <li><i>Discovering Geometry</i> textbook</li> <li>Geometry tools</li> <li>Graph and Patty Paper</li> <li>Colored pencils, markers</li> <li>Various teacher-made PowerPoints, Google Slides, and worksheets</li> <li>Project design examples</li> <li>Color-coded worksheets for jigsaw activity</li> </ul>	

Unit IV: Triangle Properties	
Unit Summary	
<p>Students will learn why triangles are useful in structures. Students will discover the relationships between the sides and angles of triangles and discover theorems about triangles. Students will use these findings and apply them to algebra problems. Students will learn about the conditions that guarantee that two triangles are congruent and write formal proofs.</p>	
Standards/Core Ideas/Performance Expectations	
<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>2023 New Jersey Student Learning Standards: Mathematics             <ul style="list-style-type: none"> <li>MP.1-8</li> <li>G.CO.B.7-8 &amp; C.9-10, G.SRT.B.5, G.GPE.B.4, G.C.A.3</li> </ul> </li> <li>2023 New Jersey Student Learning Standards English Language Arts             <ul style="list-style-type: none"> <li>RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>2020 New Jersey Student Learning Standards: Computer Science and Design Thinking             <ul style="list-style-type: none"> <li>8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills             <ul style="list-style-type: none"> <li>9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>	
Unit Essential Questions	Unit Enduring Understandings
<ul style="list-style-type: none"> <li>What are the properties of triangles?</li> <li>What is the least amount of information needed to determine if triangles are congruent?</li> </ul>	<ul style="list-style-type: none"> <li>Triangles have their own set of properties. Isosceles and equilateral triangles have additional special properties.</li> <li>Triangles have 180 degrees.</li> <li>Triangles are congruent by proving that certain relationships exist between three pairs of corresponding parts.</li> </ul>
Evidence of Learning	
<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>Classwork</li> <li>Homework</li> <li>Performance activities</li> <li>Nearpod Maze Puzzle</li> <li>Monster Triangle Puzzle</li> <li>Triangle Congruence Drag &amp; Drop Activity</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>Triangle Summative</li> </ul>
<b>Resources Needed:</b> <ul style="list-style-type: none"> <li><i>Discovering Geometry</i> textbook</li> <li>Geometry tools</li> <li>Colored pencils, markers</li> <li>Various teacher-made PowerPoints, Google Slides and worksheets</li> <li>Monster Triangle Puzzle Worksheet</li> <li>Google Slides Drag &amp; Drop Activity</li> <li>Coloring Page</li> </ul>	

<ul style="list-style-type: none"> <li>Relationships in Triangles Holiday Coloring Activity</li> <li>Side and Angle Relationships in Triangles Quiz</li> <li>Proving Triangles Congruent Quiz</li> <li>Individual student check-ins with teacher</li> </ul>		<ul style="list-style-type: none"> <li>GeoGebra activities</li> <li>NearPod activity</li> </ul>
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### Unit V: Polygon Properties

#### Unit Summary

Students will explore the properties of polygons and special quadrilaterals. Students will identify the properties of trapezoids, rhombi, squares, rectangles, parallelograms, and kites. Students will show that a polygon is a special quadrilateral and write proofs involving special quadrilaterals. The unit will be extended to include special quadrilaterals in the coordinate plane.

#### Standards/Core Ideas/Performance Expectations

The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in *Geometry Honors*:

- 2023 New Jersey Student Learning Standards: Mathematics
  - MP.1-8
  - G.CO.C.11, G.GPE.B.4
- 2023 New Jersey Student Learning Standards English Language Arts
  - RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B & E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4
- 2020 New Jersey Student Learning Standards: Computer Science and Design Thinking
  - 8.1.12.DA.1 & 6
- 2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills
  - 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7

#### Unit Essential Questions

- How can the sum of the measures of polygon angles be found?
- How can quadrilaterals be classified?
- How can coordinate geometry be used to prove general relationships?

#### Unit Enduring Understandings

- The sum of the interior angle measures of any polygon can be found using a formula based on its number of sides.
- A quadrilateral can be classified given certain information about the sides, angles, or diagonals of a quadrilateral. Special quadrilaterals all have unique properties. Squares, rectangles, and rhombuses are all special types of parallelograms.
- Coordinated proofs use variable coordinates to prove relationships in the coordinate plane.

#### Evidence of Learning

##### Formative & Alternative Assessments:

- Classwork
- Homework
- Performance activities
- Cut and paste proof activity
- Coordinate proof poster presentation
- Polygons, Kites and Trapezoid Quiz
- Quadrilateral Proofs Quiz
- Individual student check-ins with teacher

##### Benchmark & Summative Assessments:

- Special Parallelograms Cooperative Assessment

##### Resources Needed:

- Discovering Geometry* textbook
- Geometry tools
- Graph paper
- Poster paper, markers
- Scissors, glue sticks
- Color-coded worksheets for cut & paste activity
- GeoGebra activities
- Various teacher-made PowerPoints, Google Slides, and worksheets

### Unit VI: Right Triangles

#### Unit Summary

Students will explore proofs of the Pythagorean Theorem and use conjectures related to the Pythagorean Theorem to solve problems. They will use the Pythagorean Theorem to calculate the distance between any two points. Students will discover and apply angle and side relationships in two special right triangles.

Standards/Core Ideas/Performance Expectations		
<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>● 2023 <i>New Jersey Student Learning Standards: Mathematics</i> <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.SRT.B.4-5 &amp; C.7-8</li> </ul> </li> <li>● 2023 <i>New Jersey Student Learning Standards English Language Arts</i> <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● 2020 <i>New Jersey Student Learning Standards: Computer Science and Design Thinking</i> <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● 2020 <i>New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills</i> <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>		
Unit Essential Questions	Unit Enduring Understandings	
<ul style="list-style-type: none"> <li>● How does one find a side length or angle measure in a right triangle?</li> <li>● How are the Pythagorean Theorem and related conjectures used?</li> </ul>	<ul style="list-style-type: none"> <li>● Pythagorean Theorem and properties of special right triangles can be used to find the side lengths and angles of a right triangle.</li> <li>● The Pythagorean Theorem can be applied to right triangles. Pythagorean inequalities can be used to classify triangles.</li> </ul>	
Evidence of Learning		
<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>● Classwork</li> <li>● Homework</li> <li>● Performance activities</li> <li>● Mad Minute Radical Challenge</li> <li>● Special Right Triangle Around the Room Activity</li> <li>● Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>● Pythagorean Theorem and Special Right Triangles Test</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>● <i>Discovering Geometry</i> textbook</li> <li>● Graph paper</li> <li>● Around the Room Cards and answer key</li> <li>● GeoGebra activities</li> <li>● Various teacher-made PowerPoints, Google Slides, and worksheets</li> </ul>

Unit VII: Circles	
Unit Summary	
<p>Students will solve problems involving circles. Students will familiarize themselves with the vocabulary associated with parts of circles. Students will find lengths, angle measures, and areas associated with circles. Students will apply circle conjectures to solve a wide range of problems.</p>	
Standards/Core Ideas/Performance Expectations	
<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>● 2023 <i>New Jersey Student Learning Standards: Mathematics</i> <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.CO.A.1, G.C.A.1-4 &amp; B.5, G.GMD.A.1, G.GPE.A.1 &amp; B.4</li> </ul> </li> <li>● 2023 <i>New Jersey Student Learning Standards English Language Arts</i> <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● 2020 <i>New Jersey Student Learning Standards: Computer Science and Design Thinking</i> <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● 2020 <i>New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills</i> <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>	
Unit Essential Questions	Unit Enduring Understandings
<ul style="list-style-type: none"> <li>● How can one prove relationships between angles and arcs in a circle?</li> <li>● When lines intersect a circle or within a circle, how are the measures of resulting angles, arcs, and segments found?</li> <li>● How can one find the equation of a circle in the coordinate plane?</li> </ul>	<ul style="list-style-type: none"> <li>● The measure of an arc equals the measure of its central angle. This angle and arc prove relationships of other angles and arcs.</li> <li>● Segments intersecting circles form angles and intercepted arcs. Measures can be found using appropriate formulas.</li> <li>● The center and radius are used to write an equation of a circle.</li> </ul>
Evidence of Learning	

<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>• Classwork</li> <li>• Homework</li> <li>• Performance activities</li> <li>• Circles Review Digital Escape Room</li> <li>• Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>• Circle Conjectures Cooperative Assessment</li> <li>• Circle Test</li> <li>• Circles in Coordinate Plane Cooperative Assessment</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>• <i>Discovering Geometry</i> textbook</li> <li>• Graph paper</li> <li>• Colored pencils, highlighters</li> <li>• GeoGebra activities</li> <li>• Various teacher-made PowerPoints, Google Slides, and worksheets</li> <li>• Google Slides Escape Room</li> </ul>
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### Unit VIII: Similarity

#### Unit Summary

Students will verify that polygons are similar using corresponding angles and sides. Students will define similarity through the lens of dilations and will spend part of the unit dilating figures in the coordinate plane. Students will also review and practice using proportions to solve for missing side lengths. Similarity will also be used to define indirect measures. Students will use properties of similar polygons and write proofs about similar polygons using the Similarity Shortcuts.

#### Standards/Core Ideas/Performance Expectations

The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in *Geometry Honors*:

- 2023 New Jersey Student Learning Standards: Mathematics
  - MP.1-8
  - G.CO.A.2, G.SRT.A.1, G.SRT.A.2-3 & B.4-5, G.GPE.B.5-6
- 2023 New Jersey Student Learning Standards English Language Arts
  - RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B & E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4
- 2020 New Jersey Student Learning Standards: Computer Science and Design Thinking
  - 8.1.12.DA.1 & 6
- 2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills
  - 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7

#### Unit Essential Questions

- What is a dilation?
- How can proportions be used to find side lengths in similar polygons?
- How do students show two triangles are similar?
- How does one identify corresponding parts of similar triangles?

#### Unit Enduring Understandings

- A dilation is a non-rigid transformation that changes an object's size while keeping angles congruent and side lengths proportional.
- Students can set up and solve proportions using corresponding sides of similar polygons.
- Two triangles are similar if certain relationships exist between two or three pairs of corresponding parts.
- Sketch and label triangles separately in the same orientation to see how the vertices correspond.

#### Evidence of Learning

<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>• Classwork</li> <li>• Homework</li> <li>• Performance activities</li> <li>• Around the Room Similarity Activity</li> <li>• Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>• Similarity Test</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>• <i>Discovering Geometry</i> textbook</li> <li>• Around the Room Cards and answer sheet</li> <li>• Dilation Investigation</li> <li>• Graph Paper</li> <li>• Various teacher-made PowerPoints, Google Slides, and worksheets</li> </ul>
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### Unit IX: Trigonometry

#### Unit Summary

Students will apply similarity to right triangles to form definitions of the sine, cosine, and tangent functions. Students will continue to use ratios and proportions to find missing side lengths in right triangles. Students will learn how to use trigonometric ratios to solve real-world problems. Students will work with the sine, cosine, and tangent ratios in right triangles to solve for missing sides and missing angles.

#### Standards/Core Ideas/Performance Expectations

<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>● <i>2023 New Jersey Student Learning Standards: Mathematics</i> <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.SRT.B.4-5 &amp; C.6-8</li> </ul> </li> <li>● <i>2023 New Jersey Student Learning Standards English Language Arts</i> <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Computer Science and Design Thinking</i> <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills</i> <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>		
<b>Unit Essential Questions</b>		<b>Unit Enduring Understandings</b>
<ul style="list-style-type: none"> <li>● How can a side length or angle measure in a right triangle be found?</li> <li>● How do trigonometric ratios relate to similar right triangles?</li> </ul>		<ul style="list-style-type: none"> <li>● Trigonometric ratios can find a side length or angle measure of a right triangle.</li> <li>● A trigonometric ratio compares the lengths of two sides of a right triangle. The ratios remain constant within a group of similar right triangles.</li> </ul>
<b>Evidence of Learning</b>		
<b>Formative &amp; Alternative Assessments:</b>	<b>Benchmark &amp; Summative Assessments:</b>	<b>Resources Needed:</b>
<ul style="list-style-type: none"> <li>● Classwork</li> <li>● Homework</li> <li>● Performance activities</li> <li>● Angles of Elevation and Depression Presentations</li> <li>● Individual student check-ins with teacher</li> </ul>	<ul style="list-style-type: none"> <li>● Introduction to Trig Test</li> </ul>	<ul style="list-style-type: none"> <li>● <i>Discovering Geometry</i> textbook</li> <li>● Scientific calculator</li> <li>● Posters/markers or Expo markers for Angles and Elevation and Depression presentations</li> <li>● Various teacher-made PowerPoints, Google Slides, and worksheets</li> </ul>

<b>Unit X: Area and Surface Area</b>	
<b>Unit Summary</b>	
<p>Students will be shown the derivation of area formulas and surface area formulas. They will find the area and perimeters of figures whose vertices are given by ordered pairs, areas, and perimeters of figures whose dimensions are found by using the Pythagorean Theorem, and the area and perimeters of figures in customary and metric units. Students will apply formulas to real-life application problems. Students will learn the properties of three-dimensional figures and applicable vocabulary. Students will apply area formulas to find the surface area of 3-D objects.</p>	
<b>Standards/Core Ideas/Performance Expectations</b>	
<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>● <i>2023 New Jersey Student Learning Standards: Mathematics</i> <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.C.B.5, G.GMD.A.1 &amp; 3, G.MG.A.1 &amp; 3</li> </ul> </li> <li>● <i>2023 New Jersey Student Learning Standards English Language Arts</i> <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Computer Science and Design Thinking</i> <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills</i> <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>	
<b>Unit Essential Questions</b>	<b>Unit Enduring Understandings</b>
<ul style="list-style-type: none"> <li>● How do students find the area of a polygon or find the circumference and area of a circle?</li> <li>● How do students find the surface area of a solid?</li> <li>● How do the surface areas of similar solids compare?</li> </ul>	<ul style="list-style-type: none"> <li>● The area of a polygon, or the circumference or area of a circle, can be found by first determining which formula to use. Then students can substitute the needed measures into the formula.</li> <li>● The surface area of a solid can be found by first choosing a formula to use and then substituting the needed dimensions into the formula.</li> <li>● The surface areas of similar solids are proportional to the squares of their corresponding dimensions.</li> </ul>
<b>Evidence of Learning</b>	

<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>● Classwork</li> <li>● Homework</li> <li>● Performance activities</li> <li>● 3-D Name Project</li> <li>● Area of Triangles, Rectangles, Parallelograms, &amp; Trapezoids Quiz</li> <li>● Surface Area Quiz</li> <li>● Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>● Area of Regular Polygons and Circles Cooperative</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>● <i>Discovering Geometry</i> textbook</li> <li>● Scientific calculator</li> <li>● 3-D models</li> <li>● Dot Paper</li> <li>● Markers, colored pencils, rulers, glue, scissors</li> <li>● Name Project examples</li> <li>● Geogebra Activities</li> <li>● Various teacher-made PowerPoints, Google Slides, and worksheets</li> </ul>
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Unit XI: Volume of Solids		
Unit Summary		
<p>Students will understand the concept of volume and derive formulas for finding the volume of both right and oblique 3-D figures. Students will be able to convert between linear, squared, and cubed dimensional measurements. Students will also solve application problems associated with volume. Students will extend their knowledge of volume to displacement and density. Students will also understand and derive formulas for both the surface area and volume of a sphere and solve application problems involving both measurements.</p>		
Standards/Core Ideas/Performance Expectations		
<p>The state standards outlined below, and established by the New Jersey Department of Education, will guide instruction throughout this unit in <i>Geometry Honors</i>:</p> <ul style="list-style-type: none"> <li>● <i>2023 New Jersey Student Learning Standards: Mathematics</i> <ul style="list-style-type: none"> <li>○ MP.1-8</li> <li>○ G.GMD.A.1 &amp; 3 &amp; B.4, G.MG.A.1-3</li> </ul> </li> <li>● <i>2023 New Jersey Student Learning Standards English Language Arts</i> <ul style="list-style-type: none"> <li>○ RL.CR.9–10.1, RI.MF.9–10.6, W.AW.9–10.1.A,B &amp; E, SL.PE.9–10.1, SL.II.9–10.2, SL.PI.9–10.4</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Computer Science and Design Thinking</i> <ul style="list-style-type: none"> <li>○ 8.1.12.DA.1 &amp; 6</li> </ul> </li> <li>● <i>2020 New Jersey Student Learning Standards: Career Readiness, Life Literacies and Key Skills</i> <ul style="list-style-type: none"> <li>○ 9.2.12.CAP.2-3, 9.4.12.CI.1, 9.4.12.CT.2, 9.4.12.DC.7</li> </ul> </li> </ul>		
Unit Essential Questions	Unit Enduring Understandings	
<ul style="list-style-type: none"> <li>● How do students find the volume of a solid?</li> <li>● How do the volumes of similar solids compare?</li> </ul>	<ul style="list-style-type: none"> <li>● The volume of a solid can be found by first choosing a formula to use and then substituting the needed dimensions into the formula.</li> <li>● The volumes are proportional to the cubes of their corresponding dimensions.</li> </ul>	
Evidence of Learning		
<b>Formative &amp; Alternative Assessments:</b> <ul style="list-style-type: none"> <li>● Classwork</li> <li>● Homework</li> <li>● Performance activities</li> <li>● Volume Application Race</li> <li>● Spheres Applications Game</li> <li>● Individual student check-ins with teacher</li> </ul>	<b>Benchmark &amp; Summative Assessments:</b> <ul style="list-style-type: none"> <li>● Volume Cooperative</li> <li>● Unit Assessment</li> </ul>	<b>Resources Needed:</b> <ul style="list-style-type: none"> <li>● <i>Discovering Geometry</i> textbook</li> <li>● Geogebra Activities</li> <li>● scientific calculator</li> <li>● 3-D models</li> <li>● Rice/Water for volume discovery lesson</li> <li>● Word Problems for Application Race</li> <li>● Slideshow and Post-Its for Sphere Game</li> <li>● Various teacher-made PowerPoints, Google Slides, and worksheets</li> </ul>

### **Section X: Unit Reflection**

The *Geometry Honors* instructional team must confer upon the completion of each instructional unit in the *Geometry Honors* curriculum and rate the degrees to which the instructional units meet performance criteria established by the New Jersey Department of Education using the Unit Reflection Form. Completed unit reflection forms must be submitted to the Department Supervisor for approval upon completion of curriculum implementation with a complementing list of suggested modifications to the *Geometry Honors* curriculum.

<b>Unit Reflection Form: <i>Geometry Honors</i></b>			
<b>Lesson Activities:</b>	<b>Strongly</b>	<b>Moderately</b>	<b>Weakly</b>
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills;			
Are challenging and require higher-order thinking and problem-solving skills;			
Allow for student choice;			
Provide scaffolding for acquiring targeted knowledge/skills;			
Integrate modern, global perspectives, especially those regarding diversity, genocide, global issues, and historical ones regarding racial relations;			
Integrate 21 <sup>st</sup> century skills;			
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills;			
Are varied to address different student learning styles and preferences;			
Are differentiated based on student needs;			
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process;			
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives;			
Provide opportunities for student reflection and self-assessment;			
Provide data to inform and adjust instruction to better meet the varying needs of learners.			

### **Appendix**

#### ***Writing Instruction and the RFH Community***

Writing instruction should happen across the RFH Community. Writing across the curriculum is a philosophy that advances the belief that writing is a method of learning. Since all departments are committed to helping students learn, writing must be used as a methodology to advance student learning.

Each academic discipline has its own unique conventions, formats and structures. It is the responsibility of each department to agree upon domain-specific writing praxes, model them for students, and require them to utilize them on a consistent basis. Students must understand that acceptable writing in one domain may not be acceptable writing in another area. The development of domain-specific writing skills supports the overall development of the student writer because all writing is grounded in the writing situation: audience, context, purpose, subject, and writer. Representatives from the academic disciplines must share their domain-specific writing praxes with each other, identify intersections, and determine how to address perceived gaps that limit student learning.

Students must experience writing situations that help them learn how to think creatively and critically and communicate effectively in the academic disciplines. Writing instruction, regardless of the academic discipline, must always reinforce student understanding of the writing situation. When students experience writing situations, they must study examples of domain-specific writing in order to understand how writers communicate in discipline-related contexts. This does not mean information embedded in textbooks. Domain-specific writing is writing that is used to inform and influence readers as it draws them into an established circle of discourse. Students must use these non-fiction texts to develop the close reading skills that will shape their own writing. Focused engagement with domain-specific writing should not be limited to basic reading comprehension and topical understanding. It must also include the analysis of the writing situation that is represented in the text: audience, context, purpose, subject, and writer. The close reading of well-written texts—regardless of the domain—will

show students the importance of writing mechanics, diction, and syntax. The development of close reading skills will also help the students grow in terms of their ability to construct and advance independent and original claims that are well-supported by evidence. Domain-specific writing is grounded in positioning of claims and the effective use of evidence.

The final written product is important; nevertheless, the learning that results in this production must not be devalued. The writing process is not limited to the basic steps of planning, drafting, revising, and editing/proofreading. It is a complex sequence of critical and creative thinking and writing that leads to the production of a text that provides evidence of learning and understanding. Students must ultimately develop the ability to self-assess the effectiveness of their writing as a representation of the writing situation. Without the use of models that evidence learning and understanding, students will not develop the ability to self-assess their own work—the true outcome of the writing process.

### **What types of writing situations should RFH students engage in?**

RFH students should engage in writing situations across the curriculum that require them to:

- write to improve mechanical proficiency, diction usage, and syntactical sophistication
- write to narrate, describe, and reflect
- write to summarize and report
- write to classify and define
- write to explain how process leads to an outcome
- write to compare, contrast and evaluate
- write to speculate on cause and effect
- write to propose solutions and solve problems
- write to analyze

These writing situations should be positioned in a coordinated, developmental sequence that extends across the academic disciplines.

Upon Completion of Grade 12, RFH students must be ready to transition to the following writing situations:

- write to analyze
- write to persuade (argument)

The core focus of first-year college writing courses are analysis and argument. These courses orient the students to the demands and expectations of writing for the academic culture of college. At colleges/universities with carefully coordinated writing programs, students must demonstrate proficiency in analysis and argument before they transition to upper level courses that require them to engage in the following writing situation:

- write to investigate (research)