Geometry
Level 1 and Level 2

Length of Course: Term
Elective/Required: Required
School: High Schools
Student Eligibility: Grade 9-10
Credit Value: 5 Credits
Date Approved: August 25, 2014
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Statement of Purpose

The curriculum covers the traditional “geometry of Euclid” and provides a thorough preparation for geometry questions that may be included on the Partnership for Assessment of Readiness for College and Careers (PARCC) and the Scholastic Aptitude Test (SAT).

In order to promote the effective implementation of this program, the following suggestions are provided:

1. Formative assessment should be used throughout this course, as with any math course, in order to monitor students’ learning and instruction such be adjusted as needed.

2. Instruction should be differentiated in order to accommodate the different ways students learn.

3. Students should be encouraged to maintain an organized and thorough set of notes in a notebook. Teachers should indicate the expected format and content and should explain how notebooks can be effectively utilized.

4. Meaningful and relevant homework assignments should be given to students on a regular basis to encourage practice of new skills and concepts.

5. Either the horizontal flowchart method or the ledger form of proofs may be used in this course.

6. Examples of application of mathematics and specifically geometry in careers and everyday life situations should be provided as motivation wherever possible.

7. Students should be required to use correct mathematical terminology at all times.

8. Students should be made aware that the study of geometry is an extension of previously learned mathematical concepts and skills as well as a prerequisite for the study of higher mathematics courses. The connection and practice of algebra skills should be prevalent throughout the course.

9. To better prepare students for the PARCC as well as PSAT and SAT, the topics included in this course may be enhanced by the review of frequently asked topics, inclusion of warm-up exercises, and practice of types of questions such as multiple choice and open-ended.

10. The use of technology is encouraged wherever possible in order to foster the impact on students’ learning and understanding.

11. Modifications and accommodations should be included where necessary to meet student’s Individual Education Plans (IEP).
Course Objectives

The student will demonstrate proficiency in:

1. Recognizing and using vocabulary and symbols of geometry.

2. Applying various types of reasoning to both mathematical and non-mathematical situations.

3. Developing and applying fundamental geometric and algebraic assumptions.

4. Recognizing geometric figures and identifying their properties.

5. Understanding a geometric proof.

6. Visualizing two and three-dimensional figures.

7. Applying geometric concepts to the solution of practical problems.

8. Performing fundamental operations and evaluating algebraic expressions.


10. Using technology wherever and whenever appropriate.
### Suggested Time Table – Geometry Level 1

<table>
<thead>
<tr>
<th>Chapter-Section</th>
<th>Number of Class Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Foundations for Geometry</td>
<td>15 Days</td>
</tr>
<tr>
<td>1-1 Understanding Points, Lines, and Planes</td>
<td></td>
</tr>
<tr>
<td>1-2 Measuring and Constructing Segments</td>
<td></td>
</tr>
<tr>
<td>1-3 Measuring and Constructing Angles</td>
<td></td>
</tr>
<tr>
<td>1-4 Pairs of Angles</td>
<td></td>
</tr>
<tr>
<td>1-5 Using Formulas in Geometry</td>
<td></td>
</tr>
<tr>
<td>1-6 Midpoint and Distance in the Coordinate Plane</td>
<td></td>
</tr>
<tr>
<td>1-7 Transformations in the Coordinate Plane</td>
<td></td>
</tr>
<tr>
<td>Unit 2: Geometric Reasoning</td>
<td>15 Days</td>
</tr>
<tr>
<td>2-1 Using Inductive Reasoning to Make Conjectures</td>
<td></td>
</tr>
<tr>
<td>2-2 Conditional Statements</td>
<td></td>
</tr>
<tr>
<td>2-3 Using Deductive Reasoning to Verify Conjectures</td>
<td></td>
</tr>
<tr>
<td>2-4 Biconditional Statements and Definitions</td>
<td></td>
</tr>
<tr>
<td>2-5 Algebraic Proof</td>
<td></td>
</tr>
<tr>
<td>2-6 Geometric Proof</td>
<td></td>
</tr>
<tr>
<td>2-7 Flowchart and Paragraph Proof</td>
<td></td>
</tr>
<tr>
<td>Unit 3: Parallel and Perpendicular Lines</td>
<td>10 Days</td>
</tr>
<tr>
<td>3-1 Lines and Angles</td>
<td></td>
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<tr>
<td>3-2 Angles Formed by Parallel Lines and Transversals</td>
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<tr>
<td>3-3 Proving Lines Parallel</td>
<td></td>
</tr>
<tr>
<td>3-4 Perpendicular Lines</td>
<td>BEGIN MP 2</td>
</tr>
<tr>
<td>3-5 Slopes of Lines</td>
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<tr>
<td>3-6 Lines in the Coordinate Plane</td>
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</tr>
<tr>
<td>Unit 4: Triangle Congruence</td>
<td>20 Days</td>
</tr>
<tr>
<td>4-1 Congruence and Transformations</td>
<td></td>
</tr>
<tr>
<td>4-2 Classifying Triangles</td>
<td></td>
</tr>
<tr>
<td>4-3 Angles Relationships in Triangles</td>
<td></td>
</tr>
</tbody>
</table>
4-5 Triangle Congruence: SSS and SAS
4-6 Triangle Congruence: ASA, AAS, and HL
4-7 Triangle Congruence CPCTC
4-8 Introduction to Coordinate Prof
4-9 Isosceles and Equilateral Triangles

Unit 6: Polygons and Quadrilaterals

LAB 1 Construct Regular Polygons
6-1 Properties of Parallelograms
6-2 Properties of Parallelograms
6-3 Conditions for Parallelograms
6-4 Properties of Special Parallelograms
6-5 Conditions for Special Parallelograms
6-6 Properties of Kites and Trapezoids

Unit 7: Similarity

7-1 Ratios in Similar Polygons
7-3 Triangle Similarity: AA, SSS, and SAS
7-4 Applying Properties of Similar Triangles
7-5 Using Proportional Relationships
7-6 Dilations and Similarity in the Coordinate Plane
EXT Segment Partition

BEGIN MP3

Unit 5: Properties and Attributes of Triangles

5-7 The Pythagorean Theorem
LAB 3 Hands on Proof of the Pythagorean Theorem
5-8 Applying Special Right Triangles

Unit 8: Right Triangles and Trigonometry

8-1 Similarity in Right Triangles
8-2 Trigonometric Ratios
EXT Trigonometric Ratios of Complementary Angles
8-3 Solving Right Triangles
8-4 Angles of Depression and Elevation

Unit 5: Properties and Attributes of Triangles

15 Days
10 Days
10 Days
10 Days
10 Days
10 Days
15 Days
5-1 Perpendicular and Angle Bisectors
5-3 Medians and Altitudes of Triangles
5-4 The Triangle Midsegment Theorem

Unit 12: Circles-----------------------------------------------15 Days
12-1 Lines That Intersect Circles
12-2 Arcs and Chords
12-3 Sector Area and Arc Length
12-4 Inscribed Angles
12-5 Angle Relationships in Circles
12-6 Segment Relationships in Circles
12-7 Circles in the Coordinate Plane

Unit 9: Extending Transformational Geometry-----------------------10 Days
9-1 Reflections
9-2 Translations
9-3 Rotations
9-4 Composition of Transformations

Unit 10: Extending Perimeter, Circumference and Area----------------15 Days
10-1 Developing Formulas for Triangles and Quadrilaterals
10-2 Develop Formulas for Circles and Regular Polygons
10-3 Composite Figures
10-4 Perimeter and Area in the Coordinate Plane
10-5 Effects of Changing Dimensions Proportionally
10-6 Geometric Probability

Unit 11: Spatial Reasoning----------------------------------------10 Days
11-1 Solid Geometry
11-2 Volumes of Prisms and Cylinders
11-3 Volumes of Pyramids and Cones
11-4 Spheres

TOTAL: 170 Days
PARCC ASSESSMENTS:

End-of-Year Assessment (EOY) will test the following standards:

G-CO.1, G-CO.3, G-CO.5, G-CO.6, G-CO.C, G-CO.D, G-SRT.1a, G-SRT.1b, G-SRT.2, G-SRT.5, G.SRT.7-2, G-SRT.8, G-C.A.Int.1, G-C.B.Int.1, G-GPE.6, G-GMD.1, G-GMD.3, G-GMD.1, G-Int.1

SUGGESTED ORDER OF TOPICS:

Units 1, 2, 3, 4, 6, 7 Sections 5-7, 5-8, 8, 5, 12, 9, 10, 11
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<thead>
<tr>
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<tbody>
<tr>
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<tr>
<td>3-6 Lines in the Coordinate Plane</td>
<td>BEGIN MP2</td>
</tr>
<tr>
<td><strong>Unit 5: Properties and Attributes of Triangles</strong></td>
<td>5 Days</td>
</tr>
<tr>
<td>5-7 The Pythagorean Theorem</td>
<td></td>
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<td>LAB 3 Hands on Proof of the Pythagorean Theorem</td>
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EXT Segment Partition

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5-7 The Pythagorean Theorem
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Unit 11: Spatial Reasoning
11-1 Solid Geometry
11-2 Volumes of Prisms and Cylinders
11-3 Volumes of Pyramids and Cones
11-4 Spheres

TOTAL: 170 Days
## Unit of Study: Chapter 1 Foundations for Geometry

**Targeted State Standards:**
- **Geometry- Congruence:** G-CO  Experiment with transformations in the plane; G-CO  Make geometric constructions; G-CO  Make geometric constructions; G-CO  Make geometric constructions.
- **Geometry- Expressing Geometric Properties with Equations:** G-GPE  Use coordinates to prove simple geometric theorems algebraically;
- **Algebra- Seeing Structure in Expressions:** A-SSE  Interpret the structure of expressions; A-SSE  Interpret the structure of expressions; A-SSE  Interpret the structure of expressions; A-SSE  Interpret the structure of expressions.
- **Algebra- Creating Equations:** A-CED  Create equations that describe numbers or relationships

**Unit Objectives/Enduring Understandings:** Students will be able to identify and label the different types of lines and angles, apply basic formulas and transformations.

**Essential Questions:** How can measurement of different lines and angles and transformations relate to the real world?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives

### Core Content

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts What students will know.</th>
<th>Skills What students will be able to do.</th>
<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points</th>
</tr>
</thead>
</table>
| G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. | Students will know:  
  - Unit vocabulary as listed in *Skills*  
  - How midpoint can be applied in real-life situations.  
  - The different classifications of an angle based on measure.  
  - Complementary and supplementary angles do not need to share a vertex.  
  - Circumference if the perimeter of a circle.  
  - Midpoint formula and how it is derived  
  - Distance formula Pythagorean Theorem | Students will be able to:  
  - Recognize and use the following terms in context:  
    a. Point  
    b. Line/segment/ray  
    c. Plane  
    d. Collinear/coplanar  
    e. Endpoint  
    f. Postulate  
    g. Coordinate  
    h. Distance  
    i. Congruent segments  
    j. Between  
    k. Midpoint  
    l. Bisect  
    m. Angle  
    n. Vertex  
    o. Measure  
    p. Acute/right/obtuse angles  
    q. Straight angle  
    r. Angle bisector | Have students complete a graphic organizer of all the vocabulary including definitions, diagrams and proper labels.  
Have students complete a graphic organizer for the different types of angles and classifications, including diagrams and proper labels.  
Use GSP to demonstrate bisectors (page 27).  
Have students complete a graphic organizer for perimeter, circumference and area.  
Show the students where the value for pi comes from by explaining what it represents. | Complete “Ready To Go On” on page 35 to demonstrate understanding of 1-1 – 1-4.  
Complete “Ready To Go On” on page 59 to demonstrate understanding of 1-5 – 1-7.  
If you draw two intersecting lines, how many different types of angles can you identify?  
What are two ways you can find the length of a segment given its coordinates? |
## Unit of Study: Chapter 1 Foundations for Geometry (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts What students will know.</th>
<th>Skills What students will be able to do.</th>
<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.</td>
<td>• The relationship between the Pythagorean Theorem and the distance formula.</td>
<td>• Identify, name and draw points, lines, segments, rays and planes</td>
<td>Show where the formula for midpoint comes from.</td>
<td>Complete Practice A worksheet for lesson 1-5 and Problem Solving worksheet for lesson 1-5.</td>
</tr>
<tr>
<td>G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</td>
<td></td>
<td>• Find the length of segments</td>
<td>Show that midpoint is a pattern and use this to find missing endpoints of a segment.</td>
<td></td>
</tr>
<tr>
<td>G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.</td>
<td></td>
<td>• Apply the segment and angle addition properties</td>
<td>Use tracing paper to help demonstrate transformations.</td>
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</tr>
<tr>
<td>A-SSE.1 Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an</td>
<td></td>
<td>• Construct and apply midpoints</td>
<td>Additional strategies will be used as applicable from the iPad HMH Fuse application.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Name and classify angles</td>
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<tr>
<td></td>
<td></td>
<td>• Identify the different types of angles (adjacent, vertical, complementary, supplementary)</td>
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<td></td>
<td></td>
<td>• Use the definitions of complementary and supplementary to write and solve problems</td>
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<tr>
<td></td>
<td></td>
<td>• Find perimeter, circumference and area and apply them to real-life problems</td>
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<tr>
<td></td>
<td></td>
<td>• Find the midpoint of a segment</td>
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<td></td>
<td></td>
<td>• Apply the midpoint formula to</td>
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</tr>
</tbody>
</table>
### Unit of Study: Chapter 1 Foundations for Geometry (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Core Content</th>
<th>Instructional Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concepts</strong></td>
<td><strong>Skills</strong></td>
<td><strong>Activities/Strategies</strong></td>
</tr>
<tr>
<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
</tr>
<tr>
<td><strong>Expression, such as terms, factors, and coefficients.</strong></td>
<td><strong>Find the coordinates of the endpoints of a segment.</strong></td>
<td><strong>Assessment Check Points</strong></td>
</tr>
<tr>
<td>b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <em>For example, interpret ( P(1+r)^n ) as the product of ( P ) and a factor not depending on ( P ).</em></td>
<td>• Use the Pythagorean Theorem and distance formula to find the lengths of segments.</td>
<td></td>
</tr>
<tr>
<td>A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <em>For example, rearrange Ohm's law ( V = IR ) to highlight resistance ( R ).</em></td>
<td>• Identify and describe the different types of transformations.</td>
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<tr>
<td>• Graph transformations on a coordinate plane</td>
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</tr>
</tbody>
</table>

### Resources:
The text, calculator, electronic teaching tools, electronic lesson presentations, online student textbook. Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed. Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- iPad tools and HMH Fuse application will be used when applicable.
- Use "Success for Every Learner" workbook
- Use leveled worksheets as needed
- One-to-one modifications made as needed
- Individual accommodations will be made based on student's Individualized Education Plan or 504 Plan.
**Unit of Study: Chapter 2 Geometric Reasoning**

**Targeted State Standards:** Geometry - Congruence: G-CO Prove geometric theorems.

**Unit Objectives/Enduring Understandings:** Students will be able to apply deductive reasoning to write geometric proofs.

**Essential Questions:** How can deductive reasoning be applied to real-life situations?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
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</thead>
<tbody>
<tr>
<td><strong>G-CO.9. Prove theorems about lines and angles.</strong> Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment’s endpoints.</td>
<td>Concepts: What students will know.</td>
<td>Skills: What students will be able to do.</td>
<td>Activities/Strategies: Technology Implementation/Interdisciplinary Connections</td>
</tr>
<tr>
<td>Students will know: • Unit vocabulary as listed in Skills</td>
<td>Students will be able to: • Recognize and use the following terms in context: a. Inductive/deductive reasoning b. Conjecture c. Counterexample d. Conditional statement e. Hypothesis f. Conclusion g. Truth value h. Converse i. Inverse j. Contrapositive k. Logically equivalent statements l. Biconditional statements m. Definition n. Polygon o. Triangle p. Quadrilateral q. Proof r. Theorem s. Flowchart proof</td>
<td>Have students create their own conditional and biconditional statements and switch with a partner to determine their validity.</td>
<td>Complete “Ready To Go On” on page 103 to demonstrate understanding of 2-1 – 2-4.</td>
</tr>
<tr>
<td>G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</td>
<td>• The converse of a true conditional statement is not necessarily false</td>
<td>• Biconditional statements can be written as: “p if and only if q” “p iff q” p ↔ q</td>
<td>Complete “Ready To Go On” on page 127 to demonstrate understanding of 2-5 – 2-7.</td>
</tr>
<tr>
<td>• Properties of equality and congruence</td>
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<td>What is the difference between inductive and deductive reasoning?</td>
</tr>
<tr>
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<td></td>
<td>Is the converse of a true conditional statement always true? Give examples.</td>
</tr>
</tbody>
</table>

Have students switch with a partner and determine if the statements are true or false. Additional strategies will be used as applicable from the iPad HMH Fuse application.

Complete **Problem Solving 2-7** for flowchart proofs.
## Unit of Study: Chapter 2 Geometric Reasoning (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
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<tr>
<td></td>
<td><strong>What students will know.</strong></td>
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<td>Technology Implementation/ Interdisciplinary Connections</td>
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</tr>
<tr>
<td></td>
<td>• The parts of a flowchart proof</td>
<td>• Identify patterns and make Conjectures</td>
<td></td>
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<tr>
<td></td>
<td>• Theorems of the chapter including: linear pair, congruent supplements and complements, right angle congruence and vertical angles.</td>
<td>• Find counterexamples to disprove conjectures</td>
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<tr>
<td></td>
<td></td>
<td>• Write conditional statements</td>
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<tr>
<td></td>
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<td>• Determine if conditional statements are true</td>
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<tr>
<td></td>
<td></td>
<td>• Write the inverse, converse and contrapositive of a conditional statement</td>
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<td></td>
<td></td>
<td>• Identify a conditional statement and its converse from a biconditional statement</td>
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<tr>
<td></td>
<td></td>
<td>• Write and analyze biconditional statements</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Identify the properties of equality and congruence</td>
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<td></td>
<td>• Write flowchart proofs</td>
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<tr>
<td></td>
<td></td>
<td>• Prove geometric theorems using deductive reasoning</td>
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</tr>
</tbody>
</table>

### Resources:
Text, calculator, electronic teaching tools, electronic lesson presentations, online student text book. Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed.
Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- iPad tools and HMH Fuse application will be used when applicable.
- Use “Success for Every Learner” workbook
- Use leveled worksheets as needed
- One- to-one modifications made as needed
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
Unit of Study: Chapter 3 Parallel and Perpendicular Lines

**Targeted State Standards:**
- **Geometry- Congruence:** G-CO Experiment with transformations in the plane;
- **Geometry- Congruence:** G-CO Prove geometric theorems;
- **Geometry- Congruence:** G-CO Make geometric constructions;
- **Geometry- Expressing Geometric Properties with Equations:** G-GPE Use coordinates to prove simple geometric theorems algebraically.

**Unit Objectives/Enduring Understandings:** Students will be able to apply the properties of parallel lines and the angles formed when cut by a transversal to proofs and algebraic problems and write the equations of lines in different forms.

**Essential Questions:** How can the relationships between the angles formed by parallel lines cut by a transversal help prove theorems involving parallel and perpendicular lines? How can slope be applied to real-life situations?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives.

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts What students will know.</th>
<th>Skills What students will be able to do.</th>
<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points</th>
</tr>
</thead>
</table>
| G-CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. | Students will know:  
- Unit vocabulary as listed in *Skills*  
- The relationship formed when a pair of parallel lines is cut by a transversal.  
- Corresponding, alternate interior/exterior and same-side interior angles can be used to prove lines parallel.  
- The distance from a point to a line is the length of the perpendicular segment from the point to the line.  
- Theorems involving perpendicular lines  
- The formula to find the slope | Students will be able to:  
- Recognize and use the following terms in context:  
  a. Parallel lines/planes  
  b. Perpendicular lines  
  c. Skew lines  
  d. Transversal  
  e. Corresponding angles  
  f. Alternate interior/exterior angles  
  g. Same-side interior angles  
  h. Perpendicular bisector  
  i. Rise/run  
  j. Slope  
- Identify parallel, perpendicular and skew lines and parallel planes  
- Identify the types of angles formed by a pair of parallel lines cut by a transversal | Use GSP to discover the relationships between the angles formed when parallel lines are cut by a transversal. (page 154)  
Complete a graphic organizer of the different types of lines and angles with visual examples.  
Explore the slopes of parallel and perpendicular lines using GSP.  
Complete a graphic organizer for the various theorems relating to parallel and perpendicular lines.  
Additional strategies will be used as applicable from the iPad HMH Fuse application. | Complete “Ready To Go On?” on page 181 to demonstrate understanding of 3-1 – 3-4.  
Complete Ready To Go On? Enrichment” for 3-1 – 3-4.  
Complete “Ready To Go On?” on page 201 to demonstrate understanding of 3-5 – 3-6.  
What does the slope of a line describe? Using their arms, have students show lines with positive, negative,
## Unit of Study: Chapter 3 Parallel and Perpendicular Lines (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts</th>
<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
</tr>
</thead>
</table>
| G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. | of a line  
• The difference in the graphs of lines with positive, negative, 0 and no slope  
• Parallel and perpendicular line theorems  
• Point-slope form versus slope-intercept form  
• Equations of horizontal and vertical lines | Use the angle postulates and theorems relating to the angles formed by parallel lines cut by a transversal to find angle measures  
• Prove angles congruent using parallel lines theorems and postulates  
• Prove lines parallel using corresponding, alternate interior/exterior and same-side interior angle theorems  
• Prove theorems about perpendicular lines  
• Find the slope of a line  
• Use slopes to identify parallel and perpendicular lines  
• Write the equations of lines in point-slope and slope-intercept form | Technology Implementation/Interdisciplinary Connections | 0 and no slope.  
Complete “Multi-Step Test Prep” on page 186.  
“Think and Discuss” on page 193 in partners. |
<table>
<thead>
<tr>
<th>Resources:</th>
<th>Instructional Adjustments:</th>
</tr>
</thead>
</table>
| - Text, calculator, electronic teaching tools, electronic lesson presentations, online student text book. Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed Teacher and students will use the iPad when applicable. | - IPad tools and HMH Fuse application will be used when applicable.  
- Use "Success for Every Learner" workbook  
- Use leveled worksheets as needed  
- One-to-one modifications made as needed  
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan. |
## Unit of Study: Chapter 4 Triangle Congruence

### Targeted State Standards:
- **Geometry - Congruence:** G-CO Understand congruence in terms of rigid motions; G-CO Prove geometric theorems; G-SRT Prove theorems involving similarity; G-CO Prove geometric theorems.
- **Geometry - Similarity, Right Triangles, and Trigonometry:** G-SRT Prove theorems involving similarity; G-CO Prove geometric theorems.
- **Geometry - Expressing Geometric Properties with Equations:** G-GPE Use coordinates to prove simple geometric theorems algebraically.

### Unit Objectives/Enduring Understandings:
Students will be able to apply their understanding of triangles and congruence to various triangle proofs and problems.

### Essential Questions:
How can understanding the properties of triangles help find missing sides and angles? Why are SSS, SAS, ASA, AAS and HL valid methods for proving triangles congruent?

### Unit Assessment:
Teacher-generated review assessment based on unit objectives.

### Core Content

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts</th>
<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
</tr>
</thead>
</table>
| G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. | Students will know:  
- Unit vocabulary as listed in *Skills*  
- Translations, reflections and rotations result in images that are congruent to their preimages.  
- The two ways to classify angles: by angle measure and by side length  
- The sum of the measures of a triangle is $180^\circ$ (Triangle Sum Theorem)  
- The Exterior Angle Theorem  
- The Third Angle Theorem | Students will be able to:  
- Recognize and use the following terms in context:  
  a. Dilation  
  b. Isometry  
  c. Rigid transformation  
  d. Acute/obtuse triangles  
  e. Equiangular/ equilateral triangles  
  f. Right/isosceles/ scalene triangles  
  g. Auxiliary line  
  h. Interior/exterior angles  
  i. Remote interior angle  
  j. Corresponding angles/sides  
  k. Included angle  
  l. CPCTC  
- Draw, identify and describe transformations | Have students complete a graphic organizer of the different types of transformations with examples.  
Have students complete a graphic organizer to show what it means for 2 polygons to be congruent. (List corresponding sides and angles and write a congruence statement.)  
“Geometry Lab” 4-4 on page 248 to show why SSS and SAS are valid methods to prove triangles congruent.  
Use GSP to show why SAA is not a valid method for proving triangles congruent unless it is HL.  
Have students complete a graphic organizer of the different types of transformations with examples.  
 Use the Triangle Sum Theorem to explain the Exterior Angle Theorem.  
4-3 Practice B to demonstrate understanding of angle relationships in triangles.  
What is the relationship between the exterior angle of a triangle and the remote interior angles? |
| G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. | Students will know:  
- Translations, reflections and rotations result in images that are congruent to their preimages.  
- The two ways to classify angles: by angle measure and by side length  
- The sum of the measures of a triangle is $180^\circ$ (Triangle Sum Theorem)  
- The Exterior Angle Theorem  
- The Third Angle Theorem | Students will be able to:  
- Recognize and use the following terms in context:  
  a. Dilation  
  b. Isometry  
  c. Rigid transformation  
  d. Acute/obtuse triangles  
  e. Equiangular/ equilateral triangles  
  f. Right/isosceles/ scalene triangles  
  g. Auxiliary line  
  h. Interior/exterior angles  
  i. Remote interior angle  
  j. Corresponding angles/sides  
  k. Included angle  
  l. CPCTC  
- Draw, identify and describe transformations | Have students complete a graphic organizer of the different types of transformations with examples.  
Have students complete a graphic organizer to show what it means for 2 polygons to be congruent. (List corresponding sides and angles and write a congruence statement.)  
“Geometry Lab” 4-4 on page 248 to show why SSS and SAS are valid methods to prove triangles congruent.  
Use GSP to show why SAA is not a valid method for proving triangles congruent unless it is HL.  
Have students complete a graphic organizer of the different types of transformations with examples.  
Use the Triangle Sum Theorem to explain the Exterior Angle Theorem.  
4-3 Practice B to demonstrate understanding of angle relationships in triangles.  
What is the relationship between the exterior angle of a triangle and the remote interior angles? |
| G-CO.10. Prove theorems about triangles. *Theorems include:* measures of interior angles of a triangle sum to $180^\circ$; base angles of isosceles triangles | Students will know:  
- Unit vocabulary as listed in *Skills*  
- Translations, reflections and rotations result in images that are congruent to their preimages.  
- The two ways to classify angles: by angle measure and by side length  
- The sum of the measures of a triangle is $180^\circ$ (Triangle Sum Theorem)  
- The Exterior Angle Theorem  
- The Third Angle Theorem | Students will be able to:  
- Recognize and use the following terms in context:  
  a. Dilation  
  b. Isometry  
  c. Rigid transformation  
  d. Acute/obtuse triangles  
  e. Equiangular/ equilateral triangles  
  f. Right/isosceles/ scalene triangles  
  g. Auxiliary line  
  h. Interior/exterior angles  
  i. Remote interior angle  
  j. Corresponding angles/sides  
  k. Included angle  
  l. CPCTC  
- Draw, identify and describe transformations | Have students complete a graphic organizer of the different types of transformations with examples.  
Have students complete a graphic organizer to show what it means for 2 polygons to be congruent. (List corresponding sides and angles and write a congruence statement.)  
“Geometry Lab” 4-4 on page 248 to show why SSS and SAS are valid methods to prove triangles congruent.  
Use GSP to show why SAA is not a valid method for proving triangles congruent unless it is HL.  
Have students complete a graphic organizer of the different types of transformations with examples.  
Use the Triangle Sum Theorem to explain the Exterior Angle Theorem.  
4-3 Practice B to demonstrate understanding of angle relationships in triangles.  
What is the relationship between the exterior angle of a triangle and the remote interior angles? |
### Unit of Study: Chapter 4 Triangle Congruence (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts</th>
<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</td>
<td>Corresponding parts from congruent polygons</td>
<td>Classify triangles by angle measure and side length</td>
<td>organizer of the methods to prove triangles congruent with examples.</td>
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</tr>
<tr>
<td></td>
<td>Why SSS, SAS, ASA, AAS and HL are valid methods for proving triangles congruent</td>
<td>Apply triangle classifications to find missing angle measures or side lengths</td>
<td>Point out to students that CPCTC will always follow a congruent triangles statement.</td>
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</tr>
<tr>
<td></td>
<td>HL is the only case of SSA that proves triangles congruent</td>
<td>Apply the triangle sum, exterior angle and third angle theorems to find missing angle measures</td>
<td>Additional strategies will be used as applicable from iPad HMH Fuse application</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parts of an isosceles triangle (legs, base, vertex and base angles)</td>
<td>Use a congruence statement to identify all corresponding parts and vice versa</td>
<td>&quot;Ready To Go On?&quot; on page 247 to demonstrate understanding of 4-1 – 4-4.</td>
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<tr>
<td></td>
<td></td>
<td>Use corresponding parts to find missing sides and angles</td>
<td>What are the ways to prove a triangle congruent?</td>
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<tr>
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<td></td>
<td>Prove triangles congruent by SSS, SAS, ASA, AAS and HL</td>
<td>Why are SSS, SAS, ASA, AAS and HL considered shortcuts to proving triangles congruent?</td>
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<td></td>
<td></td>
<td>Use CPCTC to prove parts of triangles congruent</td>
<td>What does CPCTC stand for?</td>
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<tr>
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<td></td>
<td>Apply the Isosceles Triangle Theorem and its converse to numerical and proof problems</td>
<td>What types of proofs is CPCTC necessary for?</td>
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<td></td>
<td>&quot;Ready To Go On? Quiz&quot; 4B.</td>
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<tr>
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<td></td>
<td>&quot;Ready To Go On?&quot; on page 293 to demonstrate understanding of 4-5 – 4-9.</td>
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</tr>
</tbody>
</table>
## Unit of Study: Chapter 4 Triangle Congruence (cont.)

<table>
<thead>
<tr>
<th>Resources:</th>
<th>Instructional Adjustments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textbook, calculator, graph paper, Textbook, calculator, graph paper, ruler, protractor</td>
<td>• IPad tools and HMH Fuse application will be used when applicable.</td>
</tr>
<tr>
<td>Teachers may use leveled worksheets (Practice A,B, C and Reteach or Challenge)</td>
<td>• Use &quot;Success for Every Learner&quot; workbook</td>
</tr>
<tr>
<td>Teachers will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed</td>
<td>• Use leveled worksheets as needed</td>
</tr>
<tr>
<td>Teacher and students will use the iPad when applicable.</td>
<td>• One-to-one modifications made as needed</td>
</tr>
<tr>
<td></td>
<td>• Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.</td>
</tr>
</tbody>
</table>
### Unit of Study: Chapter 5- Properties and Attributes of Triangles

**Targeted State Standards:**
- **Geometry- Congruence:** G-CO Prove geometric theorems, Make geometric constructions; **Geometry- Similarity, Right Triangles, and Trigonometry:** G-SRT Prove theorems involving similarity; **Geometry- Circles:** G-C Understand and apply theorems about circles

#### Unit Objectives/Enduring Understandings:
The student will understand properties of congruent triangles

#### Essential Questions:
How does our understanding of triangles help to understand and appreciate the environment, such as in nature, construction, and architecture?

#### Unit Assessment:
Teacher-generated review assessment based on unit objectives

<table>
<thead>
<tr>
<th>Core Content</th>
<th>Instructional Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cumulative Progress Indicators</strong></td>
<td><strong>Concepts</strong></td>
</tr>
<tr>
<td><strong>What students will know.</strong></td>
<td><strong>What students will be able to do.</strong></td>
</tr>
<tr>
<td></td>
<td>• unit vocabulary as listed in <strong>Skills</strong></td>
</tr>
<tr>
<td></td>
<td>• theorems of the chapter including: -the perpendicular bisector (and its converse), the angle bisector (and its converse), circumcenter, incenter, centroid, triangle midsegment, angle-side relationships in a triangle, triangle inequality, inequalities in two triangles, hinge (and its converse), and the Pythagorean Theorem</td>
</tr>
<tr>
<td></td>
<td>• how the Pythagorean Theorem is present in nature</td>
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</tbody>
</table>

Students will show mastery of determining an angle and perpendicular bisector by completing pg 341 of textbook.

Students will complete the Reteach worksheet for section 5-2.

“How do you know that you can use the Triangle Midsegment Theorem?” from page 375 of Teacher’s Edition.

Students will answer the “Additional Examples” number 3.
# Unit of Study: Chapter 5- Properties and Attributes of Triangles (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts</th>
<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</td>
<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
<td>How students will demonstrate mastery of skills.</td>
</tr>
<tr>
<td>G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*</td>
<td>• prove and apply theorems about angle bisectors</td>
<td>Think-Pair-Share.</td>
<td>on page 314</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• prove and apply theorems about perpendicular bisectors of a triangle</td>
<td>Give students cut out triangles (on card-stock paper). Have students balance the triangle on a pencil; have students explain that this is the centroid of the circle. Also explain the Physics application (ie in Mobiles)</td>
<td>Students will complete “Check It Out” question 4 page 315</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• prove and apply theorems about angle bisectors of a triangle</td>
<td>Have students explain the real-life application of the Midsegment theorem as in 5-4 Exercise example 17 (carpentry) on page 337.</td>
<td>Class notes and examples will be assessed on tests and quizzes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• apply properties of medians of triangles</td>
<td>Give students measured strips of construction paper. Have students explore which measurements will form triangles and which will not; have students discuss in groups.</td>
<td>Use “Properties and Attributes of Triangles: Ch 5 Performance Assessment” on page 100 of Assessment Resources book.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• apply properties of altitudes of triangles</td>
<td></td>
<td>Use “Medians and Attributes of Triangles” sections 5-3 n page 64 of Success for Every Learner resource book.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• prove and use properties of a triangle midsegment</td>
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<tr>
<td></td>
<td>• apply inequalities in one triangle</td>
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<tr>
<td></td>
<td>• apply the Pythagorean theorem</td>
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</tr>
<tr>
<td></td>
<td>• apply properties of 45-45-90 and 30-60-90 triangles.</td>
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</tr>
</tbody>
</table>

## Resources:
- Text, calculator, electronic teaching tools, electronic lesson presentations, online student text book.
- Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

## Instructional Adjustments:
- iPad tools and HMH Fuse application will be used when applicable.
- Use “Success for Every Learner” workbook
- Use leveled worksheets as needed
- One-to-one modifications made as needed
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
**Unit of Study: Chapter 6- Polygons and Quadrilaterals**

**Targeted State Standards:**
- **Geometry- Congruence:** G-CO Prove geometric theorems, Make geometric constructions;
- **Geometry- Similarity, Right triangles, and Trigonometry:** G-SRT Prove theorems involving similarity;
- **Geometry- Modeling with Geometry:** G- MG: Apply geometric concepts in modeling situations

**Unit Objectives/Enduring Understandings:** The student will have an understanding of quadrilaterals and their properties and will be able to understand and use properties of polygons.

**Essential Questions:** How does knowing about polygons and specific quadrilaterals assist in our reaction to the environment?

**Unit Assessment:** Performance Assessment 4 will be used.

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Core Content</th>
<th>Instructional Actions</th>
<th>Assessment Check Points</th>
</tr>
</thead>
</table>
| **G-CO.9.** Prove theorems about lines and angles. | **Concepts**
Students will know:
- unit vocabulary as listed in *Skills*
- properties of polygons including: square, rectangle, parallelogram, rhombus, trapezoid, kite
- classify polygons
- how to find the sum of the interior angles of a polygon
- how to find exterior angle measurements
- how to apply theorems listed in this chapter | **Skills**
Students will be able to:
- recognize and use the following terms in context:
  - a. polygon
  - b. sides and vertices of a polygon
  - c. diagonal
  - d. convex and concave
  - e. regular
  - f. equiangular
  - g. equilateral
  - h. parallelogram
  - i. rectangle
  - j. square
  - k. rhombus
  - l. kite
  - m. trapezoid
  - n. isosceles trapezoid
  - o. midpoint of a trapezoid
  - p. pentagon
  - q. heptagon
  - r. octagon
  - s. nonagon | Have students make a chart of the number of sides and types of polygons. Give practical examples of each: pentagon in Washington DC, octopus, December was originally the 10th month.
Give students various figures; have them identify if they are polygons and whether they are concave or convex. Have students explain why or why not.
Have students investigate properties of parallelograms. The student will construct a parallelogram, measure the lengths of the sides and compare the angle measure. The student will make conjectures about sides and opposite angles.
Have students complete charts comparing characteristics about |
| **G-CO.11.** Prove theorems about parallelograms. | **Activities/Strategies**
Technology Implementation/Interdisciplinary Connections | **Assessment Check Points**
Students will determine whether or not a given figure is a polygon and will justify the reasoning; students will complete “Additional Examples” 1-3 on page 395 of Teacher’s Edition.
Give students various figures; have them identify if they are polygons and whether they are concave or convex. Have students explain why or why not.
Have students investigate properties of parallelograms. The student will construct a parallelogram, measure the lengths of the sides and compare the angle measure. The student will make conjectures about sides and opposite angles.
Have students complete charts comparing characteristics about |
| **G-CO.12.** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). | | |
| **G-SRT.5.** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. | | |
| **G-MG.1.** Use geometric shapes, their measures, and | | |
| | | |

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For core content:
- Students will know:
  - unit vocabulary as listed in *Skills*
  - properties of polygons including: square, rectangle, parallelogram, rhombus, trapezoid, kite
  - classify polygons
  - how to find the sum of the interior angles of a polygon
  - how to find exterior angle measurements
  - how to apply theorems listed in this chapter

For skills:
- Students will be able to:
  - recognize and use the following terms in context:
    - a. polygon
    - b. sides and vertices of a polygon
    - c. diagonal
    - d. convex and concave
    - e. regular
    - f. equiangular
    - g. equilateral
    - h. parallelogram
    - i. rectangle
    - j. square
    - k. rhombus
    - l. kite
    - m. trapezoid
    - n. isosceles trapezoid
    - o. midpoint of a trapezoid
    - p. pentagon
    - q. heptagon
    - r. octagon
    - s. nonagon

For assessment check points:
- Students will determine whether or not a given figure is a polygon and will justify the reasoning; students will complete “Additional Examples” 1-3 on page 395 of Teacher’s Edition.
- Give students various figures; have them identify if they are polygons and whether they are concave or convex. Have students explain why or why not.
- Have students investigate properties of parallelograms. The student will construct a parallelogram, measure the lengths of the sides and compare the angle measure. The student will make conjectures about sides and opposite angles.
- Have students complete charts comparing characteristics about
<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts: What students will know.</th>
<th>Skills: What students will be able to do.</th>
<th>Activities/Strategies: Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points: How students will demonstrate mastery of skills.</th>
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</thead>
<tbody>
<tr>
<td>their properties to describe objects</td>
<td>t. decagon u. dodecagon v n-gon w. remote interior angles x. midline</td>
<td>calculate the sum measure of the interior angles of a quadrilateral. prove that quadrilaterals are parallelograms using coordinate Geometry: use the distance formula to prove sides are congruent and use the slope formula to prove that sides are parallel. use the following five properties of a parallelogram: opposite sides are parallel; opposite sides are congruent; opposite angles are congruent; consecutive angles are supplementary; and diagonals bisect. use properties of rhombuses, rectangles, and squares: -identify and use the following properties of a rhombus: a rhombus is a parallelogram, has four congruent sides, has perpendicular diagonals, has quadrilaterals. Have students draw a quadrilateral family tree; have students define each quadrilateral. Have students play games requiring students to name a quadrilateral given clues about each. Have students complete Venn diagrams to compare and contrast quadrilaterals including rectangles, squares, parallelograms, and rhombuses. Have students use the Pythagorean theorem to find the side lengths of a kite. Have students investigate the sum of interior angles of a polygon by dividing the polygons into triangles and using protractors. Have students explore the</td>
<td>Use “Think and Discuss” from section 6-1 to describe convex vs. concave polygons. Students will complete Reteach worksheet for section 4 to determine properties of parallelograms. Students will show mastery of properties of angles, sides, diagonals and quadrilaterals by using protractors and rulers to measure given polygons. Use “Ready to Go On?” quiz for sections 6-4 through 6-6. Use “Real World Connections: The Millennium Force Roller Coaster” questions to solve real-world problems involving triangles and angles of elevation and depression. Use the Study Guide (page 450 - 453) practice problems will be used. Use “Polygons and Quadrilaterals: Section A Quiz” on page 105 of Assessment Resource book.</td>
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</table>
# Unit of Study: Chapter 6- Polygons and Quadrilaterals (cont.)

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<thead>
<tr>
<th>Cumulative Progress Indicators</th>
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<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
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<tr>
<td></td>
<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
<td>How students will demonstrate mastery of skills.</td>
</tr>
<tr>
<td></td>
<td>diagonals that bisect angles of the rhombus</td>
<td>supplementary relationship between exterior and interior angles.</td>
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<td>Class notes and examples will be assessed on tests and quizzes.</td>
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<tr>
<td></td>
<td>-identify and use the following properties of a rectangle: a rectangle s a parallelogram; has four right angles; has diagonals equal in length</td>
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<td>-identify and use the following properties of a square: a square is a parallelogram; has parallel opposite sides; has four congruent sides; has four congruent angles (90 degrees); has diagonals that bisect, are congruent, and bisect each angle of the square.</td>
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<td>-identify and use the following properties of a trapezoid: has exactly one pair of parallel sides (called bases); has two pairs of base angles; has non-parallel sides are legs</td>
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<td>-identify and use the following properties of an isosceles trapezoid: has parallel bases; base angles are congruent; an upper and lower base angle pair is supplementary; diagonals are congruent.</td>
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<td>Cumulative Progress Indicators</td>
<td>Concepts</td>
<td>Skills</td>
<td>Activities/Strategies</td>
<td>Assessment Check Points</td>
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<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
<td>How students will demonstrate mastery of skills.</td>
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<td>-identify and use the following properties of a kite: has no parallel sides; upper sides are congruent and lower sides are congruent; has a longer diagonal that bisects the shorter diagonal; has perpendicular diagonals</td>
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<td>-use the midsegment theorem for a trapezoid</td>
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<td>-identify quadrilaterals based on limited information</td>
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<td>-use the following theorems: -The measure of the exterior angle of a triangle is equal to the sum of the two interior angles. -If the midpoints of two sides of a triangle are connected then the segment formed is parallel to the third side of the triangle and is one-half its length</td>
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<td>-find the sum of the interior angles of a polygon using [ S = 180(n - 2) ].</td>
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<td></td>
<td>-use the property that the sum of the exterior angles of</td>
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### Cumulative Progress Indicators

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<th>Concepts</th>
<th>Skills</th>
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<tr>
<td>What students will know.</td>
<td>What students will be able to do.</td>
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</table>

- any polygon is $360^\circ$.
- find an interior or exterior angle of a regular polygon using $I = \frac{180(n-2)}{n}$ and $E = \frac{360}{n}$
- find the number of diagonals using $d = \frac{n(n-3)}{2}$

### Resources:
- Text, calculator, electronic teaching tools, electronic lesson presentations, online student text book.
- Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- Discuss “Common Error” hints in Teacher’s Edition to prevent possible misunderstandings.
- Use “Construct Regular Polygons” activity 1 and 2 plus “Try This” page 392
- Leveled worksheets will be used
- One- to-one modifications will be made as needed
- Use “Success for Every Learner” workbook.
- Use leveled worksheets as needed.
- Provide students with handout of notes
- Provide a graphic organizer for set up of word problems
- iPad tools and HMH Fuse application will be used when applicable.
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
# Unit of Study: Chapter 7 - Similarity

**Targeted State Standards:**
- **Geometry- Congruence:** G-CO Prove geometric theorems, Make geometric constructions; Geometry- Similarity, Right triangles, and Trigonometry: G-SRT Prove theorems involving similarity; Geometry- Modeling with Geometry: G- MG: Apply geometric concepts in modeling situations; Geometry- Circles: Understand and apply theorems about circles

**Unit Objectives/Enduring Understandings:** The student will have an understanding of similarity of polygons

**Essential Questions:** How does knowing about similarity help us solve real-life problems involving ratios, proportions, dilations, and scale factors? In what other contexts can ratios and dilations be used and how?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives.

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Core Content</th>
<th>Instructional Actions</th>
<th>Assessment Check Points</th>
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</thead>
<tbody>
<tr>
<td>G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).</td>
<td>Students will know:</td>
<td>Students will be able to:</td>
<td>Use 7-1 Exercises #5 to have students set up and solve proportions.</td>
</tr>
<tr>
<td>G-MG.1. Use geometric shapes, their measures, and their properties to describe objects</td>
<td>how to set up and solve proportions.</td>
<td>recognize and use the following terms in context:</td>
<td>Use Practice A, B, and/or C from lesson 7-3 to explain why two polygons are or are not congruent.</td>
</tr>
<tr>
<td>G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the</td>
<td>how to use ratios in context.</td>
<td>Similar polygons</td>
<td>Use “Ready to Go On?” quiz for sections 7-4 through 7-6 to apply properties of similar triangles, use proportions, and to understand dilations.</td>
</tr>
<tr>
<td></td>
<td>SAS and SSS properties of similar triangles.</td>
<td>Similarity ratio</td>
<td>Use Study Guide and/or Chapter test pages 520-524 of the textbook.</td>
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<tr>
<td></td>
<td>properties of similar triangles.</td>
<td>proportion</td>
<td>Use “Similarity: Section B Quiz” on page 126 in Assessment Resources book.</td>
</tr>
<tr>
<td>Cumulative Progress Indicators</td>
<td>Concepts</td>
<td>Skills</td>
<td>Activities/Strategies</td>
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<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
</tr>
<tr>
<td>meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.</td>
<td>corresponding sides. -ratio of areas is the square of the ratio of their perimeters • identify similar triangles using the definition of similar triangles and AA Similarity Postulate. • identify similar triangles using the SSS theorem and the SAS theorem. • use the Proportionality theorems (Triangle Proportionality Theorem, Angle Bisector Theorem, and Three Parallel Lines Theorem) to solve problems.</td>
<td>triangles. Additional strategies will be used as applicable from the iPad HMH Fuse application.</td>
<td>Class notes and examples will be assessed on tests and quizzes.</td>
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<tr>
<td>G-SRT.4. Prove theorems about triangles.</td>
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<td>G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</td>
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<tr>
<td>G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</td>
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<tr>
<td>G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in</td>
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### Unit of Study: Chapter 7- Similarity (cont.)

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<tr>
<td><strong>Cumulative Progress Indicators</strong></td>
<td><strong>Concepts</strong></td>
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<td></td>
<td>What students will know.</td>
</tr>
<tr>
<td>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).</td>
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<tr>
<td>G-C.1. Prove that all circles are similar.</td>
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**Resources:**
- Text, calculator, electronic teaching tools, electronic lesson presentations, online student text book.
- Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

**Instructional Adjustments:**
- Leveled worksheets will be used
- One-to-one modifications will be made as needed
- Use "Success for Every Learner" workbook.
- Use leveled worksheets as needed.
- iPad tools and HMH Fuse application will be used when applicable.
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
### Unit of Study: Chapter 8 - Right Triangles and Trigonometry

**Targeted State Standards:**
- **Geometry - Congruence:** G-CO Prove geometric theorems, Make geometric constructions;
- **Geometry - Similarity, Right triangles, and Trigonometry:** G-SRT Prove theorems involving similarity;
- **Geometry - Modeling with Geometry:** G-MG: Apply geometric concepts in modeling situations

**Unit Objectives/Enduring Understandings:** The student will be able to apply trigonometric relationships to right triangles

**Essential Questions:** How can we apply general knowledge of triangles to properties of right triangles? How will the foundations of right triangles be used later in life (i.e., in Trigonometry)? What are real-world applications of right triangle measurements?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives

<table>
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<tr>
<th>Core Content</th>
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<th>Assessment Check Points</th>
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<tbody>
<tr>
<td><strong>Cumulative Progress Indicators</strong></td>
<td><strong>Concepts</strong> What students will know.</td>
<td><strong>Skills</strong> What students will be able to do.</td>
</tr>
</tbody>
</table>
| G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). | Students will know:  
- unit vocabulary (as listed in Skills)  
- how to calculate angles of elevation and depression  
- how to use the calculator to find trigonometric ratios  
- how to break down a vector into its two components (horizontal and vertical)  
- how to use trig ratios and vectors in real-world applications. | Students will be able to:  
- recognize and use the following terms in context:  
  a. geometric mean  
  b. trigonometric ratios  
  c. angle of elevation  
  d. angle of depression  
  e. vector  
  f. component form  
  g. magnitude  
  h. direction  
  i. equal vectors  
  j. parallel vectors  
  k. resultant vectors  
- calculate missing sides of right triangles using the geometric mean.  
- find the sine, cosine, and tangent of a triangle.  
- use trigonometric ratios to find angle measures in right triangles and to solve | Provide groups of students with several size right triangles cut out of construction paper; have students fold the triangles on the altitude.  
Discuss how these triangles are similar and discuss how the two smaller triangles formed within each triangle are similar as well.  
Have students complete the graphic organizer: “Think and Discuss #3” on page 544.  
Have students draw a diagram of a wheelchair ramp increasing with an angle of 4.8° to a doorway that is 1.2 feet above the ground. Have students calculate how long the ramp will be.  
Additional strategies will be used as applicable from the iPad HMH Fuse application. |
| G-MG.1. Use geometric shapes, their measures, and their properties to describe objects | | | Use Practice A, B, and/or C from 8-1 to calculate geometric mean and to write proportionality statements.  
Students will solve trigonometric ratios using sine, cosine, and tangents; use 8-2 Exercises.  
Use example 5 in section 8-3 “Travel Application” on page 554 to apply trig ratios in real-life situations.  
Use the “Ready To Go On?” quiz on page 587 for sections 8-4 through 8-6. |
| G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. | | | Class notes will be assessed on tests and quizzes. |
# Unit of Study: Chapter 8 - Right Triangles and Trigonometry (cont.)

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<tr>
<td>G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</td>
<td>What students will know.</td>
<td>What students will be able to do.</td>
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<tr>
<td>G-SRT.7. Explain and use the relationship between the sine and cosine of complementary angles.</td>
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<tr>
<td>G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</td>
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<tr>
<td>G-SRT.10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.</td>
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### Core Content

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<tr>
<td>real-world problems.</td>
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<tr>
<td>• apply the definitions of angle of elevation and angle of depression to solve real-world problems.</td>
</tr>
<tr>
<td>• use the Law of Sines and the Law of Cosines to solve triangles.</td>
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<tr>
<td>• find the magnitude and direction of a vector.</td>
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<tr>
<td>• use vectors and vector addition to solve real-world problems.</td>
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### Instructional Actions

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<tr>
<td>Resources:</td>
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<tr>
<td>- Text, calculator, electronic teaching tools, electronic lesson presentations, online student textbook.</td>
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<tr>
<td>Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed</td>
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<tr>
<td>Teacher and students will use the iPad when applicable.</td>
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<th>Assessment Check Points</th>
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<td>How students will demonstrate mastery of skills.</td>
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<th>Instructional Adjustments:</th>
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<td>- Leveled worksheets will be used</td>
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<td>- One-to-one modifications will be made as needed</td>
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<tr>
<td>- Use &quot;Success for Every Learner&quot; workbook.</td>
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<tr>
<td>- Use leveled worksheets as needed.</td>
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<tr>
<td>- iPad tools and HMH Fuse application will be used when applicable.</td>
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<tr>
<td>- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.</td>
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### Unit of Study: Chapter 9- Extending Transformational Geometry

**Targeted State Standards:** Geometry-Congruence: G-CO: Experiment with Transformations in the Plane, Understand Congruence in Terms of Rigid Motions

**Unit Objectives/Enduring Understandings:** The student will have an understanding of the results of different types of transformations within the coordinate plane. They will identify, describe and predict how transformations will change a particular pre-image to its image.

**Essential Questions:** How does understanding transformations help to interpret and see patterns in our environment? Where can we find evidence of transformations in the real world?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives.

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</table>
| G-CO 2. 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). | Students will know:  
- unit vocabulary as listed in **SKILLS**  
- a pre-image is a shape that undergoes a transformation.  
- an isometry is a transformation that does not change the size or shape of a figure.  
- two figures are congruent if and only if there is an isometry that maps one figure to the other.  
- how reflecting a figure across the x-axis is different from reflecting a figure across the y-axis  
- in a translation all points of a figure are moved the same | Students will be able to:  
- recognize and use the following terms in context:  
  a. pre-image  
  b. image  
  c. isometry  
  d. transformation  
  e. rigid motion  
  f. reflection  
  g. translation  
  h. vector notation  
  i. rotation  
  j. symmetry  
  k. line of symmetry  
  l. angle of symmetry  
  m. tessellation  
  n. frieze pattern  
  o. dilation  
- identify an isometry as a reflection, translation, rotation or glide reflection (slide)  
- draw a reflection | Use Geometry software wherever possible to assist students to visualize different types of transformations.  
Consider using Chapter Resources Reteach worksheets for any section that needs additional clarification.  
Use blank transparencies on a whiteboard to perform transformations.  
Cut shapes out of paper to model different transformations.  
Have students identify examples of transformations that are found in the real world (rotation of car tires, rotation of hands on clock, reflection in a mirror, etc.)  
Students will show mastery of being able to determine the coordinates of an. |
| G-CO 3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. |  |  | Use Chapter Resources workbook leveled Practice A, B, or C for any section of the chapter as needed depending on students' skill level.  
Have students find the coordinates of an image after different reflections, such as over the x-axis, over the y-axis and over particular lines.  
Consider using Warm Up Exercise on page 611 of Teacher's Edition. |
| G-CO 5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure |  |  |  |
### Unit of Study: Chapter 9- Extending Transformational Geometry (cont.)

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<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
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<tr>
<td>using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another</td>
<td>What students will know.</td>
<td>What students will be able to do.</td>
<td>Technology Implementation/Interdisciplinary Connections</td>
<td>image after different transformations. Consider using Warm Up Exercise on page 626 of Teacher’s Edition.</td>
</tr>
<tr>
<td>G-CO 6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.</td>
<td>• distance in the same direction.</td>
<td>• Identify and draw translation.</td>
<td>Have students determine what quadrant a figure will be in after a particular transformation.</td>
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<td>• how to use vector (arrow) notation.</td>
<td>• draw a translation in the coordinate plane.</td>
<td>Suggest that students use a paper-folding technique to identify reflections of a particular figure.</td>
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<td>• the center of rotation is called a fixed point because it does not move when a figure is rotated about that point.</td>
<td>• identify and draw rotations.</td>
<td>Have students determine the final position of an object moved by a given vector as well as identify the vector that moved a figure from a set starting position to its final position.</td>
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<td>• rotations can be clockwise or counter clockwise.</td>
<td>• identify and draw line symmetry in geometric figures.</td>
<td>Have students draw figures with no or a specific number of lines of symmetry.</td>
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<td>• a line of symmetry divides a figure into two congruent parts.</td>
<td>• tell if a figure has rotational symmetry and if it does the angle of rotational symmetry.</td>
<td>Have students identify which letters of the alphabet have symmetry.</td>
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<td>• a figure has rotational symmetry if it can be rotated about a point by an angle between 0 and 360 degrees so that the image matches the preimage.</td>
<td>• perform composite transformations such as reflecting a figure over a line and then rotating it a given degree and direction.</td>
<td>Have students identify product brand logos or symbols that contain rotational symmetry.</td>
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<td>• a tessellation is a repeating pattern that completely covers a plane with no gaps or overlaps.</td>
<td>• use transformations to draw a tessellation.</td>
<td>Have students view a website with examples of tessellations. Then, have the students create their own tessellation by cutting out a figure and repeating a transformation (rotate, slide or</td>
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<td>• a dilation enlarges or reduces all dimensions</td>
<td>• identify and describe a dilation.</td>
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<td>• determine if a given polygon can be used to draw a tessellation.</td>
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</table>
### Unit of Study: Chapter 9- Extending Transformational Geometry (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts</th>
<th>Skills</th>
<th>Activities/Strategies</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>proportionately. A scale factor of greater than 1 is an <strong>enlargement</strong> while less than 1 is a <strong>reduction.</strong></td>
<td>reflect) to completely fill a given space without gaps or overlapping. Allow students to color or decorate their creation and display around the classroom. Additional strategies will be used as applicable from iPad HMH Fuse application.</td>
<td>Technology Implementation/ Interdisciplinary Connections</td>
<td></td>
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</tbody>
</table>

### Resources:
- Essential Materials, Supplementary Materials, Links to Best Practices
- Textbook, calculator, graph paper, geometry software, Tessellation website, transparencies, overhead projector, patty paper.
- Teachers may use leveled worksheets (Practice A,B, C and Reteach or Challenge)
- Teachers will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- Modifications, student difficulties, possible misunderstandings
- One-to-one modifications will be made as needed.
- Use “Success for Every Learner” workbook
- Use manipulative such as cut outs of letters or simple figures on transparency or overhead projector to demonstrate different transformations.
- To assist students in drawing reflection of a shape, have them fold paper along line of reflection and trace pre-image.
- iPad tools and HMH Fuse application will be used when applicable.
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
# Unit of Study: Chapter 10 - Extending Perimeter, Circumference, and Area

## Targeted State Standards
- **Algebra - Seeing Structure in Expressions:** A-SSE - Interpret the structure of expressions; A- CED - Create Equations that Describe Numbers or Relationships.
- **Geometry - Expressing Geometric Properties with Equations:** G-GPE - Use coordinates to prove simple geometric theorems algebraically.
- **Geometry - Geometric Measurement and Dimension:** G-GMD - Explain volume formulas and use them to solve problems.
- **Geometry - Modeling with Geometry:** G-MG - Apply geometric concepts in modeling situations.
- **Statistics and Probability - Conditional Probability and the Rules of Probability:** S-CP - Understand independence and conditional probability and use them to interpret data.

## Unit Objectives/Enduring Understandings
Students will understand how to develop and apply formulas to find area, perimeter or circumference of different geometric figures.

### Essential Questions
How does knowledge about perimeter, circumference, and area translate to solving problems in real life (i.e. carpeting a room, planting a garden)?

## Unit Assessment
Teacher-generated review assessment based on unit objectives

## Core Content

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts What students will know.</th>
<th>Skills What students will be able to do.</th>
<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. SSE.1- Interpret expressions that represent a quantity in terms of its context</td>
<td>Students will know: • unit vocabulary as listed in Skills</td>
<td>Students will be able to: • recognize and use the following terms in context: a. perimeter b. area c. circumference d. composite figure e. circle f. regular polygon g. apothem h. geometric probability</td>
<td>Review how to solve a formula for a particular variable.</td>
<td>Use Chapter Resources workbook leveled Practice A, B, or C depending on students skill level,</td>
</tr>
<tr>
<td>A. CED.4- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</td>
<td>• the Area Addition Postulate helps explain that the area of a region is equal to the sum of the areas of its non-overlapping parts.</td>
<td>• apply formulas to find the area of different figures including circle, triangle, square, rectangle, parallelogram, rhombus, trapezoid, kite, regular polygons, and equilateral triangle.</td>
<td>Demonstrate that the area of a composite figure is found by breaking the irregular figure into several regular figures. Have groups of students break an irregular figure in different ways, find the area and compare results.</td>
<td>Students will show mastery of using formulas for area and perimeter by completing selected problems from Guided practice 10-1 exercises on page 681 #1-10 or Reteach worksheet 10-1</td>
</tr>
<tr>
<td>G.GPE. 7-Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.</td>
<td>• how the formulas for the area of a parallelogram, triangle, trapezoid and rhombus relate to the formula for the area of a rectangle.</td>
<td></td>
<td>Consider having students complete the Geometry Lab-“Develop ( \pi )” as explained on page 686 by calculating the circumference and diameter of circular objects such as plastic lids of different sizes.</td>
<td>Students will find the area of regular polygons by using</td>
</tr>
<tr>
<td>G.GMD. 1. Give an informal argument for the formulas for the circumference of a circle, area of a circle,</td>
<td>• the height of a triangle is always measured along a</td>
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</table>
### Unit of Study: Chapter 10- Extending Perimeter, Circumference, and Area (cont.)

<table>
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<tr>
<th>Cumulative Progress Indicators</th>
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<th>Activities/Strategies</th>
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<tbody>
<tr>
<td>volume of a cylinder, pyramid, and cone.</td>
<td>segment perpendicular to the base.</td>
<td>find the area of a regular polygon using the apothem and the perimeter</td>
<td>When using formulas for a circle with ( \pi ) remind students not to round until final step or to leave answer in terms of ( \pi ).</td>
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<tr>
<td>G.MG.3. 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).</td>
<td>the area of an irregular shaped region can be broken down into familiar figures whose formula is known and then added together</td>
<td>find areas and perimeters of figures whose vertices are given by ordered pairs</td>
<td>Put figures on graph paper and find area using coordinate geometry.</td>
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<tr>
<td>S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (&quot;or,&quot; &quot;and,&quot; &quot;not&quot;).</td>
<td>how to find the area of a circle when given its circumference and how to find its circumference when given the circle’s area</td>
<td>solve problems involving perimeters and areas of triangles and special quadrilaterals.</td>
<td>Stress the use of the correct units of measure (units for perimeter, square units for area and cubic units for volume).</td>
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<td>find the width of a rectangle given its perimeter and height.</td>
<td>Put irregular figures on graph paper to assist students in estimating unit area by counting boxes (units).</td>
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<td>solve for unknown measures</td>
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<td>find perimeter and area when one or more dimensions of a figure are changed.</td>
<td>Section 10-6 on Geometric Probability can be introduced at a different time when/if covering Chapter 13 on Probability.</td>
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<td>describe the effects on perimeter and area when one or more dimensions of a figure are changed.</td>
<td>Additional strategies will be used as applicable from iPad HMH Fuse application.</td>
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<td>apply the relationship between perimeter or circumference and area in</td>
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<td>Class notes and examples will be assessed on quizzes and tests.</td>
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</table>
### Unit of Study: Chapter 10- Extending Perimeter, Circumference, and Area (cont.)

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<tr>
<td></td>
<td>problem solving.</td>
<td>• determine the effect on perimeter and area when one or more dimensions of a figure are changed</td>
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</tbody>
</table>

**Resources:** Essential Materials, Supplementary Materials, Links to Best Practices
Textbook, calculator, graph paper, ruler
Teachers may use leveled worksheets (Practice A, B, C and Reteach or Challenge)
Teachers will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
Teacher and students will use the iPad when applicable.

**Instructional Adjustments:** Modifications, student difficulties, possible misunderstandings
• One-to-one modifications will be made as needed.
• Use “Success for Every Learner” workbook
• iPad tools and HMH Fuse application will be used when applicable.
• Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
## Unit of Study: Chapter 11 - Spatial Reasoning

**Targeted State Standards:** GEOMETRY- GMD-Geometric Measurement and Dimension - Explain volume formulas and use them to solve problems, Visualize relationships between two-dimensional and three-dimensional objects  
G-MG Modeling with Geometry - Apply geometric concepts in modeling situations

**Unit Objectives/Enduring Understandings:** Students will understand how to classify and apply formulas for volume of three-dimensional figures.

**Essential Questions:** How can we build upon our knowledge of two-dimensional figures to understand three-dimensional figures?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives

### Core Content

<table>
<thead>
<tr>
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<th>Activities/Strategies</th>
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</tr>
</thead>
</table>
| G. GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. | Students will know:  
- unit vocabulary as listed in Skills  
- a net is a diagram of the surfaces of a three-dimensional figure that can be folded to form the three-dimensional figure  
- how the number of faces relate to the shape of its base for a pyramid and a prism  
- similarities and differences between prisms, cylinders, pyramids and cones  
- how to use volume formulas  
- the volume of a three-dimensional figure can be thought of as the number | Students will be able:  
- recognize and use the following terms in context:  
  a. face  
  b. edge  
  c. vertex  
  d. prism  
  e. cylinder  
  f. pyramid  
  g. cone  
  h. cube  
  i. net  
  j. cross section  
  k. volume  
  l. sphere  
  m. hemisphere  
- classify three-dimensional figures according to their properties and characteristics.  
- Classify three-dimensional figures from a drawing and name the vertices, edges | Have students practice classifying three-dimensional figures using Power Point demonstrations.  
Have students look at sketches on page 742 of textbook or sketches using computer software to visualize how prisms and pyramids are named for the shape of their bases.  
Use the following website to print out different type of nets that students can cut out and fold to assemble different three-dimensional figures  
http://www.senteacher.org/Worksheet/12/Nets.xhtml  
Emphasize that the correct unit of measure for volume is cubic units.  
Use a set of wooden or plastic geometry models to demonstrate the meaning of face, edge, vertex | Use Chapter Resources workbook leveled Lesson 11-1 Practice A to determine mastery of Solid Geometry.  
Use selected questions from Guided practice on page 745 for classifying three-dimensional figures and their nets  
Have the students classify and name three-dimensional figures such as from Additional Examples #1 and 2 on page 743 of Teacher's Edition.  
Use graphic organizer such as in problems |
| G. GMD. 3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. |  |  |  |  |
| G. GMD. 4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects |  |  |  |  |
| G. MG 1. Use geometric shapes, their measures, and their properties to describe objects |  |  |  |  |
## Unit of Study: Chapter 11- Spatial Reasoning (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
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<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
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<tr>
<td>G. MG 2. Apply concepts of density based on area and volume in modeling situations</td>
<td>of non-overlapping unit cubes of a given size that will exactly fill the interior of a composite figure. • the volume of a composite figure is the sum of the volumes of the different parts that make up the composite figure.</td>
<td>and bases. • Use nets and cross sections to analyze three dimensional figures • Apply the formulas for volume of a prism, a cylinder, a pyramid and a cone • Find the volume of a composite figure • Use the formula for volume and surface area of a sphere</td>
<td>Use a globe as a model of a sphere; use other common objects to demonstrate three-dimensional figures. Have students find examples of three dimensional figures in everyday items. Additional strategies will be used as applicable from iPad HMH Fuse application.</td>
<td>#29-32 on page 772 to have students find circumference, surface area and volume of different sports balls (spheres). Assess mastery of concepts by using selected questions from “Ready to Go On?” quiz on page 777. Class notes and examples will be assessed on quizzes and tests.</td>
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<tr>
<td>G. MG.3. Apply geometric methods to solve design problems</td>
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</table>

### Resources:
- Essential Materials
- Supplementary Materials
- Links to Best Practices
- Textbook
- Calculator
- Graph paper
- Wooden or plastic three dimensional models
- Teachers may use leveled worksheets (Practice A,B, C and Reteach or Challenge)
- Teachers will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- Modifications, student difficulties, possible misunderstandings
  • One-to-one modifications will be made as needed.
  • Use models of three dimensional figures where possible.
  • iPad tools and HMH Fuse application will be used when applicable.
  • Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
# Unit of Study: Chapter 12- Circles

**Targeted State Standards:**  
- **Geometry- Circles:** G-C Understand and apply theorems about circles  
- **Geometry- Congruence:** G-CO Make geometric constructions  
- **Geometry- Expressing Geometric Properties with Equations:** G-GPE Translate between the geometric description and the equation for a conic section

**Unit Objectives/Enduring Understandings:** Students will understand and apply theorems about circles.

**Essential Questions:** How can we make comparisons between polygons and circles? How does knowing properties of circles help make connections to real life problems and situations?

**Unit Assessment:** Teacher-generated review assessment based on unit objectives

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td><strong>Concepts</strong></td>
<td><strong>What students will know.</strong></td>
<td><strong>What students will be able to do.</strong></td>
<td>Use graphic organizers to assist students to define terms associated with a circle and to identify the terms on a diagram. Use Geometry software if possible to make suggestions from Textbook chapter. If appropriate, make geometric constructions such as tangents to a circle using Exploration Activity 12-1 or 12-2 to learn about arcs and chords. Try the activity described on bottom of page 793 of Teacher’s Edition – Reaching All Learners with groups or partners. Reinforce the Pythagorean theorem. Use workbook lesson 12-1 Practice A or B depending on students skill level Use selected questions from Guided Practice page 806 # 5-18 to find demonstrate understanding of finding measure of arcs and central angles. Consider using Additional Examples from page 811 or Teacher’s Edition Use Worksheet Lesson 12-4 Practice A or B to check mastery of finding inscribed angles or...</td>
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</table>
| G.C. 2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.* | Students will know:  
- unit vocabulary as listed in **Skills**  
- radius of a circle is half of the diameter and either of these measurements can be used in a formula  
- the similarities and differences between a secant, chord, diameter, radius and tangent | Students will be able to:  
- recognize and use the following terms in context  
  - a. diameter  
  - b. radius  
  - c. chord  
  - d. secant  
  - e. tangent  
  - f. point of tangency  
  - g. congruent circles  
  - h. concentric circles  
  - i. tangent circles  
  - j. common tangents  
  - k. central angle  
  - l. arc  
  - m. minor arc  
  - n. major arc  
  - o. semicircle  
  - p. adjacent arcs  
  - q. sector  
  - r. arc length  
  - s. inscribed angle | |
| G. C. 3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. | **Skills** | **Activities/Strategies** | **Technology Implementation/Interdisciplinary Connections** |
| G.C. 4. Construct a tangent line from a point outside a | | | |

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*Includes the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
### Unit of Study: Chapter 12- Circles (cont.)

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<td>Technology Implementation/ Interdisciplinary Connections</td>
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<td>given circle to the circle.</td>
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<tr>
<td>G.C.5 Find arc lengths and areas of sectors of circles -. 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.</td>
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<tr>
<td>G. GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.</td>
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<tr>
<td>G.CO-12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).</td>
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<tr>
<td>G. CO 13.- Construct the</td>
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- theorem- If two segments are tangent to a circle from the same external point, they are congruent
- minor arcs are named by 2 points while major arcs and semicircles are named by 3 points
- the measure of a central angle is equal to its intercepted arc
- the measure of an arc formed by 2 adjacent arcs is the sum of the measure of the 2 arcs (arc addition postulate)
- the difference between a central angle and an inscribed angle
- the measure of an inscribed angle is half the measure of its intercepted arc.
- an inscribed angle intercepts a semicircle if and only if the angle is a right angle.
- if a quadrilateral is inscribed in a circle, its opposite angles are supplementary.

- identify lines and segments that intersect a circle including diameters, radii, chords, tangents and secants.
- identify and draw common tangents to two circles.
- Use Circle theorems and their converse
- use the properties of tangents to solve problems
- make a circle graph and match the graph with their data.
- apply the properties of arcs and chords.
- find the measure of arcs and identify them as minor, major or semicircles.
- use the arc addition postulate
- apply the formula to find the area of a sectors
- find the measure of an intercepted arc

Consider using the Circle Graph Activity on page 801.

Review chart on page 833 which models angle relationships in circles.

Teachers should use their discretion in deciding how detailed to go into sections 12-5, 12-6 and 12-7.

Additional strategies will be used as applicable from iPad HMH Fuse application

Have students demonstrate mastery of finding angle and arc measures by completing selected questions from page 834, questions # 1-10 or page 835 questions 16-25.

Class notes and examples will be assessed on quizzes and tests.
## Unit of Study: Chapter 12 - Circles (cont.)

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</table>
| inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. | • inscribed angle  
• use inscribed angles and their properties to solve problems  
• find the angle measures of an quadrilateral inscribed in a circle.  
• find the measure of angles formed by lines that intersect circles | | | |

### Core Content
- inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

### Skills
- inscribed angle
- use inscribed angles and their properties to solve problems
- find the angle measures of an quadrilateral inscribed in a circle.
- find the measure of angles formed by lines that intersect circles

### Resources:
- Essential Materials, Supplementary Materials, Links to Best Practices
- Textbook, calculator, graph paper, Textbook, calculator, graph paper, ruler, protractor
- Teachers may use leveled worksheets (Practice A,B, C and Reteach or Challenge)
- Teachers will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed
- Teacher and students will use the iPad when applicable.

### Instructional Adjustments:
- Modifications, student difficulties, possible misunderstandings
- One-to-one modifications will be made as needed.
- Use the “Success for Every learner” workbook as appropriate.
- iPad tools and HMH Fuse application will be used when applicable.
- Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.
Unit of Study: Chapter 13- Probability

Targeted State Standards: Statistics and Probability - Interpreting Categorical and Quantitative Data: S-ID - Summarize, represent, and interpret data on two categorical and quantitative variables; Statistics and Probability- Conditional Probability and the Rules of Probability: S-CP-Understand independence and conditional probability and use them to interpret data. Use the rules of probability to compute probabilities of compound events in a uniform probability model; Statistics and Probability- Using Probability to Make Decisions: S-MD- Use probability to evaluate outcomes of decisions

Unit Objectives/Enduring Understandings: The students will be able to analyze and understand various topics related to probability and apply this to solve problems.

Essential Questions: How can understanding probability help us predict future outcomes? How can our knowledge of probability lead us to make mathematically informed decisions?

Unit Assessment: Teacher-generated review assessment based on unit objectives

<table>
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<td>What students will know.</td>
<td>What students will be able to.</td>
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</table>
| S. ID. 5.- Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. | Students will know:  
- unit vocabulary as listed in **Skills**  
- how to create and interpret tree diagrams  
- how to use counting principle to solve problems  
- a permutation is a selection of a group of objects in which order is important  
- the formula to find the number of permutations of n terms taken r at a time is $P_r = \frac{n!}{(n-r)!}$ | Students will be able to:  
- recognize and use the following terms in context:  
  a. permutation  
  b. combination  
  c. counting principle  
  d. tree diagram  
  e. factorial  
  f. outcome  
  g. sample space  
  h. event  
  i. equally likely outcome  
  j. theoretical probability  
  k. experimental probability  
  l. complement of an event  
  m. geometric probability  
  n. experiment  
  o. trial  
  p. independent events  
  q. dependent events  
  r. conditional probability |
| S.CP.3.- Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability | Review operations (adding, subtracting, multiplying and dividing) with fractions.  
Review simplifying fractions.  
Have students draw a tree diagram to model a simple situation in order to visualize how the Counting Principle works.  
Remind students that the Counting Principle involves multiplying the different ways to choose outcomes  
Model how to use a scientific calculator to find factorial, permutations and combinations | Have students demonstrate mastery of using the counting principal by completing problems such as Example 1 a and b on page 871 of Teachers Edition.  
Selected questions from Practice on page 883 ( #14-22) after Guided practice on page 882.  
Guided practice questions #2-9 on page 891 or similar questions.  
Students can demonstrate mastery |
### Unit of Study: Chapter 13- Probability (cont.)

<table>
<thead>
<tr>
<th>Cumulative Progress Indicators</th>
<th>Concepts What students will know.</th>
<th>Skills What students will be able to do.</th>
<th>Activities/Strategies Technology Implementation/Interdisciplinary Connections</th>
<th>Assessment Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>of $A$, and the conditional probability of $B$ given $A$ is the same as the probability of $B$.</td>
<td>• a combination is a grouping of items in which order does not matter</td>
<td>s. compound event</td>
<td>useful for practice for Standardized test questions.</td>
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<tr>
<td>S.CP.6- Find the conditional probability of $A$ given $B$ as the fraction of $B$'s outcomes that also belong to $A$, and interpret the answer in terms of the model.</td>
<td>• the formula to find the number of combinations of $n$ terms taken $r$ at a time is $^nC_r = \frac{n!}{r!(n-r)!}$</td>
<td>t. mutually exclusive events</td>
<td>Use manipulative where possible to model probability concepts such as marbles in a bag, coins, number cubes, spinning wheel and dice.</td>
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<tr>
<td>S.CP.9.- Use permutations and combinations to compute probabilities of compound events and solve problems</td>
<td>• whether to solve for a permutation or a combination for a given problem</td>
<td></td>
<td>For further information on Geometric Probability, refer to section 10-6 in textbook.</td>
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<tr>
<td>S.MD.7.- Analyze decisions and strategies using probability concepts</td>
<td>• probabilities are written as fractions or decimals from 0 to 1, or as percents from 05 to 100%</td>
<td>• find the ratio of a shaded area to the entire</td>
<td>Consider using Reading Strategy for lesson 13-4 from Chapter resources book to assist students in reading a table in order to create two-way tables.</td>
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<td></td>
<td>• the difference between theoretical and experimental probability</td>
<td>• solve problems using the counting principle</td>
<td>Additional strategies will be used as applicable from iPad HMH Fuse application.</td>
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<td></td>
<td>• geometric probability is a form of theoretical probability determined by a ratio of lengths, areas or volumes</td>
<td>• calculate permutations and combinations</td>
<td>of compound events by completing Practice A for lesson 13-5 from Chapter Resource book.</td>
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<td></td>
<td>• a Venn diagram can be used to display and calculate probability of inclusive events</td>
<td>• how to calculate theoretical probability for equally likely outcomes</td>
<td>Class notes and examples will be assessed on quizzes and tests.</td>
<td></td>
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<tr>
<td>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</td>
<td>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</td>
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<td>Teacher will incorporate chapter resources (study guide, college entrance tests, test tackler, standardized test prep) as needed.</td>
<td>• One-to-one modifications will be made as needed.</td>
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<td>Teacher and students will use the iPad when applicable.</td>
<td>• Use the “Success for Every learner” workbook as appropriate.</td>
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<tr>
<td>Textbook, calculator, graph paper, Textbook, calculator, graph paper, ruler, protractor</td>
<td>• iPad tools and HMH Fuse application will be used when applicable.</td>
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<td>Teachers may use leveled worksheets (Practice A, B, C and Reteach or Challenge)</td>
<td>• Individual accommodations will be made based on student’s Individualized Education Plan or 504 Plan.</td>
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