PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Concepts of Geometry

Curriculum Writing Committee:

Jonathan McElhaney

Grade Level: 11, 12

Date of Board Approval: _____

Course Weighting: Concepts of Geometry

Weekly Cumulative Exams	90%
Weekly Participation	10%

Curriculum Map

Overview: This course follows Algebra 2. The course of study focuses on the major topics of Euclidean Geometry, Probability, and Statistics, including segments and angles, polygons and congruence/similarity, descriptive statistics, measures of center and spread, regressions, parallel lines and angle relationships, right triangle relationships, circles, and measurements in multidimensional figures. Students will receive interactive, group-based, collaborative discovery education to engage thinking, retention, and preparation for standardized tests. Students enrolled will receive practice and hands-on exploration necessary for them to succeed in further studies and important standardized tests.

Goals:

- **Marking Period 1 (45 days) -** Students will be able to…
  - **Unit 1: Probability and Statistics - 35 Days**
    - Gather, organize,represent with descriptive statistics, and analyze categorical and quantitative data.
    - Organize and analyze data from tables, venn diagrams, and descriptive statistics to determine simple and compound probabilities.
    - Use Desmos calculator to determine and analyze a linear regression and goodness of fit.
  - **Unit 2: Geometry Basics - 10 Days**
    - Identify and name points, lines, planes, rays, angles, lines with correct symbols and nomenclature.
    - Apply algebraic processes to determine segment lengths, congruence, and angles measures
- **Marking Period 2 (45 days)** - Students will be able to…
  - **Unit 3: Logic, Proofs, and Parallel Lines - 20 days**
    - Understand, identify, and utilize logical reasoning and proof
    - Prove theorems involving parallel lines cut by a transversal
    - Apply theorems involving parallel lines
  - Unit # 4 Triangle congruence
  - **Unit 4 Parallelograms - 10 Days**
    - Utilize algebra to determine lengths and angles of parallelograms
    - Identify, prove, and apply properties of parallelograms
    - Use rules of all quadrilaterals to determine angle measures, side lengths, and areas to determine measures, perimeter, and areas of composite shapes

    - **Unit 5 Triangles - 15 Days**
        - Students will apply geometric theorems involving special relationships within triangles algebraically.
        - Students will prove and apply theorems involving similar triangles.
- **Marking Period 3 (45 Days)** - Students will be able to…
    - **Unit 5 Triangles (continued) - 30 Days**
        - Use the Pythagorean Theorem, special right triangles, or trigonometry to "solve" right triangles
    - **Unit 6 Circles - 15 Days**
        - Determine the circumference, diameter, radius, and area of circles and their relationships to each other
        - Solve multistep problems involving circles
- **Marking Period 4 (45 Days)** - Students will be able to…
    - **Unit 6 Circles continued - 15 Days**
        - Determine the measurements of angles, arcs and segments within circles
        - Use circle measurements to solve problems
    - **Unit 7 Solids - 30 Days**
        - Calculate the perimeter, area, surface area, and volume of two and three dimensional objects
        - Use calculations of solids to solve real-world problems

Big Ideas:

- Big Idea #1: There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.
- Big Idea #2: Mathematical statements can be justified through deductive and inductive reason and proof.
- Big Idea #3: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools
- Big Idea #4: Euclid's fifth postulate, known as the parallel postulate, is an essential axiom in Euclidean Geometry. Angle measurements are derived from the relationships of parallel and perpendicular lines. The parallel postulate allows these fundamental relationships to hold true.
- Big Idea #5: Patterns exhibit relationships that can be extended, described, and generalized.
- Big Idea #6: Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization

Textbook and Supplemental Resources:

- **Primary Textbook Name**
    - Textbook ISBN:McGraw-Hill Education, 978-0-07-903994-1
    - Textbook Publisher/Year of Publication: 2018

- **Supplemental Resources:**

- Math Medic
- Delta Math
- Desmos Graphing Calculator
- Kuta Software - Geometry
- Peter Liljedahl Good Problems Website
- Peter Lilhedahl: Mathematic Tasks for a Thinking Classroom, Corwin Publishing, ISBN 9781544374833

Curriculum Plan

Unit 1: Probability and Statistics 35 Days

- **Standards:**
  - CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.
  - CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.
  - C.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.
  - CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.
  - CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.
  - CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.
  - CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data. A
  - CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Objectives:

- Create and interpret a histogram, boxplot, dotplot, and linear regression. (DOK 1, 2, &3)
- Determine if two variables correlate linearly. (DOK 1 & 2)
- Use data to make predictions about the future. (DOK 1, 2, &3)
- Determine probabilities for independent, dependent, and conditional situations. (DOK 1, 2, &3)

Core Activities and Corresponding Instructional Methods:

- Students will collect data from their classmates about social media preferences and organize the results into frequency and relative frequency tables. They will create and interpret bar graphs and pie charts to represent the distribution of categorical data. Students will also compare different displays and discuss how graphs can sometimes be misleading.
  - **Example Activity:** Math Medic: What's Your Favorite Social Media Platform? Categorical Data and Displays (Lesson 10.1)
- Students will gather quantitative data and represent the data using dot plots. They will calculate the mean and median and discuss how each measure describes the center of a distribution. Students will compare which measure is more appropriate based on the shape of the data and the presence of outliers.
  - **Example Activity:** Math Medic: How Many Hours Do You Watch Netflix? Measures of Center for Quantitative Data (Lesson 10.2)
- Students will participate in a hands-on activity collecting data on how much candy individuals can grab, then analyze the variability in the data. They will calculate

measures of spread including range, interquartile range, and standard deviation. Students will interpret these values to describe how consistent or variable the data set is.
    - **Example Activity:** Math Medic: How Much Candy Can You Grab? Measures of Spread for Quantitative Data (Lesson 10.3)
- Students will explore relationships between variables by making predictions based on a line of best fit. They will calculate residuals and interpret whether predictions are overestimates or underestimates. Students will analyze patterns in residuals to assess how well a model fits the data.
    - **Example Activity:** Math Medic: How Much Candy Can Lebron Grab? Predictions and Residuals (Lesson 10.5)
- Students will investigate probability through a game-based activity involving outcomes like odds and evens. They will develop probability models and calculate theoretical probabilities for different events. Students will apply probability rules, including addition and multiplication, to determine the likelihood of combined events.
    - **Example Activity:** Math Medic: Odds or Evens, Who Will Win? Probability Models and Rules (Lesson 10.7)
- Students will collect data on two categorical variables and then organize data into a two-way table. They will calculate joint, marginal, and conditional probabilities from the table. Students will interpret these probabilities to analyze relationships between the variables.
    - **Example Activity:** Math Medic: What is Your Pizza Preference? Probability Using Two-Way Tables (Lesson 10.8)
- Students will model probability scenarios involving multiple stages using tree diagrams. They will calculate probabilities of compound events by following different branches of the diagram. Students will compare tree diagrams to other methods and explain how they represent all possible outcomes.
    - **Example Activity:** Math Medic: The Starburst Grab Bag. Probability Using Tree Diagrams (Lesson 10.9)
- Students will explore how to collect representative data using random sampling techniques. They will simulate sampling methods and discuss how bias can affect results. Students will compare samples to populations and evaluate how well a sample reflects the larger group.
    - **Example Activity:** Math Medic: Who Are the Best Lyricists in Hip Hop? Random Sampling (Lesson 10.10)

Assessments:

- **Diagnostic:**
    - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)

    - Warm Ups
    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Probability Unit Common Assessment (Chapter 12 Sections 12.2, 12.5-12.8)
    - Tools of Geometry Common Assessment (Chapter 1 Sections 1.1-1.5)
    - Logic Common Assessment (Chapter 2 Sections 2.1-2.5)
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
    - Peter Lilhedahl Good Problems (website)
    - Peter Lilhedahl Mathematical Tasks (book)

Unit 2: Geometry Basics 10 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.0.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.

Objectives:

- Identify and name points, lines, planes, rays, angles, lines with correct symbols and nomenclature.
- Apply algebraic processes to determine segment lengths, congruence, and angles measures

Core Activities and Corresponding Instructional Methods:

- Students will work collaboratively to match diagrams with their correct geometric names and descriptions, including points, lines, segments, and rays. They will practice using proper notation and vocabulary to describe geometric figures. Through discussion and justification, students will refine their understanding of how these foundational elements are represented.
  - **Example Activity:** Math Medic: Points, Lines, Segments, and Rays Match Mine Activity (Lesson 2.1)
- Students will use coordinate grids to explore and calculate midpoints between pairs of points. They will apply the midpoint formula to solve problems and interpret the meaning of the midpoint in real-world situations. Students will also check their work visually and algebraically to confirm accuracy.
  - **Example Activity:** Math Medic: Coordinate Connection: Midpoint Wild Wonders Amusement Park Activity (Lesson 2.2)
- Students will identify, name, and classify angles based on their measures, including acute, right, obtuse, and straight angles. They will engage in a competitive activity where they compare and categorize angles using diagrams. Students will justify their classifications and practice using correct geometric terminology.
  - **Example Activity:** Math Medic: Naming and Classifying Angles: The Angle Competition Activity (Lesson 2.3)

Assessments:

- **Diagnostic:**
  - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
  - Teacher observations, questions, discussions
  - Teacher assigned homework
  - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
  - Warm Ups
  - Weekly participation evaluation/Notebook check

- **Summative:**
  - Congruent Triangles Common Assessment (Chapter 4 Sections 4.1-4.7) Parallel Lines Common Assessment (Chapter 2 Sections 2.6-2.9)
  - Weekly Cumulative Assessments

- **Correctives:**
  - Kuta generated practice
  - Delta Math lessons and practice
  - Individual white board practice

- **Extensions:**
  - Peter Lilhedahl Good Problems (website)
  - Peter Lilhedahl Mathematical Tasks (book)

Unit 3: Logic, Proofs, and Parallel lines 20 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.0.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.
  - CC.23.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.

Objectives:

- Students will be able to use deductive reasoning to construct a logical argument, including algebraic properties when appropriate. (DOK – 3)
- Students will be able to use postulates involving points, lines, and planes. (DOK – 3)
- Students will be able to apply properties of special pairs of angles. (DOK – 4)
- Students will be able to identify angle pairs formed by two lines cut by a transversal. (DOK – 1)
- Students will be able to use angles formed by parallel lines and transversals. (DOK – 2)
- Students will be able to use angle relationships to demonstrate whether lines are parallel. (DOK – 4)
- Students will be able to apply theorems involving perpendicular lines. (DOK – 2)

Core Activities and Corresponding Instructional Methods:

- Students will investigate relationships between angles formed by intersecting lines, focusing on vertical angles and linear pairs. They will measure, compare, and make conjectures about angle relationships based on diagrams. Students will justify why certain angles are equal or supplementary using geometric reasoning.
  - **Example Activity:** Math Medic: Vertical Angles and Linear Pairs: Angle Pairs Activity (Lesson 2.4)
- Students will explore angle relationships created when a transversal intersects parallel lines. They will identify corresponding, alternate interior, and alternate exterior angles and determine their measures. Students will use these relationships to solve for unknown angles and explain their reasoning.
  - **Example Activity:** Math Medic: Angles on Parallel Lines: Painting Stripes Activity (Lesson 2.6)
- Students will analyze slopes of lines on a coordinate plane to determine whether lines are parallel or perpendicular. They will calculate slope and compare relationships between different lines. Students will apply these concepts to classify and create equations of parallel and perpendicular lines.

    - **Example Activity:** Math Medic: Coordinate Connection: Parallel vs. Perpendicular: Fall in Line Activity (Lesson 2.7)
- Students will examine pairs of geometric figures to determine whether they are congruent. They will compare corresponding sides and angles and justify their conclusions. Students will develop a clear understanding of congruence as a precise mathematical definition rather than just visual similarity.
    - **Example Activity:** Math Medic: Definition of Congruence: Congruent or Not Activity (Lesson 3.6)

Assessments:

- **Diagnostic:**
    - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
    - Warm Ups
    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Congruent Triangles Common Assessment (Chapter 4 Sections 4.1-4.7) Parallel Lines Common Assessment (Chapter 2 Sections 2.6-2.9)
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
    - Peter Lilhedahl Good Problems (website)
    - Peter Lilhedahl Mathematical Tasks (book)

Unit 4: Parallelograms 10 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.
  - CC.23.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.

Objectives:

- Students will be able to calculate interior and exterior angle measures in polygons, including angles in regular polygons. (DOK – 1)
- Students will be able to identify, prove, and then apply properties of parallelograms to determine angle and side measures. (DOK – 1)
- Students will be able to use properties to identify special parallelograms. (DOK – 2)
- Students will be able to identify, prove, and then apply properties of rhombuses, rectangles, and squares. (DOK – 4)
- Students will be able to identify and apply properties of trapezoids. (DOK – 4)
- Students will be able to identify special quadrilaterals, given specific properties. (DOK – 2)

Core Activities and Corresponding Instructional Methods:

- Students will explore the relationships between different types of quadrilaterals by organizing them into a hierarchy. They will analyze properties of shapes such as parallelograms, rectangles, rhombi, and squares to determine how they are related. Students will justify their placement of each shape and explain how properties overlap.
  - **Example Activity:** Math Medic: Quadrilateral Hierarchy: Who's in Command? Activity (Lesson 5.1)
- Students will investigate and prove key properties of parallelograms, including relationships between sides, angles, and diagonals. They will use diagrams and logical reasoning to construct arguments supporting these properties. Students will begin formalizing their proofs using clear mathematical statements and justifications.
  - **Example Activity:** Math Medic: Proving Parallelogram Properties: Parallelograhams Activity (Lesson 5.2)
- Students will examine rectangles, rhombi, and squares to identify properties that make them special types of parallelograms. They will compare and contrast these shapes by analyzing angles, sides, and diagonals. Students will use these properties to solve problems and determine the most specific classification for a given quadrilateral.
  - **Example Activity:** Math Medic: Properties of Special Parallelograms: Special! Special! Activity (Lesson 5.3)

- Students will use coordinate geometry to classify quadrilaterals on the coordinate plane. They will calculate slopes, side lengths, and midpoints to determine properties such as parallel sides and congruent segments. Students will use their findings to identify the most specific name for each quadrilateral and justify their reasoning.
    - **Example Activity:** Math Medic: Coordinate Connection: Quadrilaterals on the Plane: What Am I Activity (Lesson 5.4)

Assessments:

- **Diagnostic:**
    - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
    - Warm Ups
    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Quadrilaterals Common Assessment (Chapter 6 Sections 6.1-6.6)
    - Relationships in Triangles Common Assessment (Chapter 5 Sections 5.1-5.3, 5.6)
    - Similarity Common Assessment (Chapter 7 Sections 7.2-7.6)
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
    - Peter Lilhedahl Good Problems (website)
    - Peter Lilhedahl Mathematical Tasks (book)

Unit 5: Triangles 45 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.
  - CC.23.HS.A.1 Use geometric figures and their properties to represent transformations in the plane.
  - C.2.2.HS.C.9 Prove the Pythagorean identity and usee it to calculate trigonometric ratios.

Objectives:

- Algebra applications with similarity.Students will be able to classify triangles and find measures of their angles. (DOK – 2)
- Students will be able to identify congruent figures, accurately stating the congruence relationship. (DOK – 3)
- Students will be able to use sides and angles to show triangles are congruent. (DOK – 4)
- Students will be able to use congruent triangles to identify whether corresponding parts are congruent. (DOK – 4)
- Students will be able to use properties of isosceles and equilateral triangles to find missing sides and angles. (DOK – 4
- Students will be able to find possible side lengths of a triangle (Triangle Inequality Theorem). (DOK – 3)
- Students will be able to apply the Pythagorean Theorem to find side lengths in right triangles. (DOK – 4)
- Students will be able to classify a triangle by applying the converse of the Pythagorean Theorem. (DOK – 4)
- Students will be able to use the relationships between the sides of special right triangles. (DOK – 2)
- Students will be able to apply the sine, cosine, and tangent ratios to find the side lengths in right triangles. (DOK – 4)
- Students will be able to apply the inverse sine, cosine, and tangent ratios to find angle measures. (DOK – 4)

Core Activities and Corresponding Instructional Methods:

1. Investigate the rules for special right triangles. Use the Pythagorean theorem to show that for similar triangles the relationship between angles and sides are always the same.
2. Tell the story of Soh-Cah-Toa to build the trigonometric ratios in right triangles. Build off previous knowledge of special right triangles.

3. Apply trigonometric functions to real-world scenarios that require the calculation of a specific distance or angle measure.
4. Discover the formulas for polygons (number of diagonals, interior, and exterior angles) through examples and deductive reasoning.
5. Students will investigate What We Know Problems to identify conclusions from knowing the given information.
6. Prove that the sum of the interior angles in a triangle are 180 degrees by having the students "rip" the angles of a triangle and making the angles adjacent
7. Students will solve algebra applications with triangle properties, including ratio, systems, and linear equations.
8. Discover methods to prove polygons similar via Geometer's Sketchpad
9. Applications with Angle-Angle similarity to use with similar triangles.
10. Problem solving activities with polygons that challenge students to apply the formulas to solve.

- Students will explore the conditions necessary to form a triangle by experimenting with different side lengths. They will determine when three segments can and cannot create a triangle and develop the Triangle Inequality Theorem. Students will justify their conclusions using both numerical and visual reasoning.
    - **Example Activity:** Math Medic: What Makes a Triangle: The Making of a Triangle (Lesson 4.1)
- Students will investigate the sum of the interior angles of a triangle through measurement and pattern recognition. They will discover and verify that the angles always add to a constant value. Students will apply this knowledge to find missing angle measures in various triangles.
    - **Example Activity:** Math Medic: Triangle Properties: What's the Magic Number? Activity (Lesson 4.2)
- Students will explore the relationship between exterior angles and remote interior angles of a triangle. They will construct logical arguments to prove the Exterior Angle Theorem. Students will practice organizing their reasoning into clear mathematical justifications.
    - **Example Activity:** Math Medic: Proving Exterior Angle Conjecture: How Do We Prove It? Activity (Lesson 4.3)
- Students will examine how side lengths and angle measures in a triangle are related. They will compare triangles to determine how changes in one part affect the others. Students will use these relationships to make predictions and solve problems.
    - **Example Activity:** Math Medic: Angle Side Relationships: Relatively Speaking Activity (Lesson 4.4)
- Students will explore the relationship between the sides of right triangles through hands-on and visual models. They will discover and apply the Pythagorean Theorem to solve for missing side lengths. Students will check their solutions and interpret their results in context.
    - **Example Activity:** Math Medic: Right Triangles and Pythagorean Theorem: A Pythagorean Puzzle Activity (Lesson 4.5)
- Students will identify corresponding parts of congruent triangles and understand how congruence applies to entire figures. They will justify why certain parts must be equal once triangles are proven congruent. Students will use this reasoning to solve for unknown measures.

    - **Example Activity:** Math Medic: Establishing Congruent Parts in Triangles: Dealing with Parts and Wholes Activity (Lesson 4.7)
- Students will investigate triangle congruence criteria such as SSS, SAS, and ASA through hands-on construction tasks. They will determine which sets of measurements guarantee a unique triangle. Students will justify why these shortcuts are sufficient for proving congruence.
    - **Example Activity:** Math Medic: Triangle Congruence Short Cuts: Builders for Hire! Activity (Lesson 4.8)
- Students will extend their understanding of congruence shortcuts to include AAS and HL. They will analyze given information to decide whether triangles can be proven congruent. Students will explain their reasoning and identify when information is insufficient.
    - **Example Activity:** Math Medic: More Triangle Congruence Short Cuts: Essentials Only Activity (Lesson 4.9)
- Students will apply triangle congruence criteria in a project-based setting to solve complex problems. They will select appropriate methods and justify their reasoning in a structured format. Students will present their findings and critique the reasoning of others.
    - **Example Activity:** Math Medic: Practicing Congruence Short Cuts: Triangle Congruence Project (Lesson 4.10)
- Students will explore the consistent side length ratios in 45-45-90 triangles. They will use patterns to derive relationships between the legs and hypotenuse. Students will apply these relationships to solve problems involving missing side lengths.
    - **Example Activity:** Math Medic: 45-45-90: Special Right Triangles Activity (Lesson 7.1)
- Students will investigate the side length relationships in 30-60-90 triangles. They will identify patterns and use them to calculate unknown side lengths. Students will compare these triangles to other right triangles to deepen their understanding.
    - **Example Activity:** Math Medic: 30-60-90: Special Right Triangles (Part 2) Activity (Lesson 7.2)
- Students will explore ratios of side lengths in right triangles and connect them to trigonometric functions. They will define sine, cosine, and tangent based on triangle relationships. Students will practice identifying and using the correct ratio in different contexts.
    - **Example Activity:** Math Medic: Trigonometric Ratios: Is There a Name for That Activity (Lesson 7.3)
- Students will apply trigonometric ratios to solve for missing side lengths in right triangles. They will set up and solve equations using sine, cosine, and tangent. Students will interpret their answers and check for reasonableness.
    - **Example Activity:** Math Medic: Using Trigonometric Ratios to Solve for Missing Sides: Unlocking the Triangle Activity (Lesson 7.4)
- Students will use inverse trigonometric functions to find missing angle measures. They will apply technology or tables to evaluate inverse functions. Students will connect their answers to triangle diagrams and justify their results.
    - **Example Activity:** Math Medic: Inverse Trigonometric Ratios: Can Someone Look That Up? Activity (Lesson 7.5)

- Students will apply trigonometric concepts to a real-world scenario involving angles of elevation and distance. They will model the situation using right triangles and solve for unknown values. Students will interpret their results and discuss how trigonometry can be used in practical situations.
    - **Example Activity:** Math Medic: Applications of Trigonometry: Miracle on the Hudson Activity (Lesson 7.6)

Assessments:

- **Diagnostic:**
    - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
    - Warm Ups
    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Congruent Triangles Common Assessment (Chapter 4 Sections 4.1-4.7)
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
    - Peter Lilhedahl Good Problems (website)
    - Peter Lilhedahl Mathematical Tasks (book)

Unit 6: Circles 15 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.
  - CC.23.HS.A.8 Apply geometric theorems to verify properties of circles
  - CC.2.3.HS-A.9 Extend the concept of similarity to determine arc lengths and areas of sectors.

Objectives:

- Students will be able to apply the properties of a tangent within a circle. (DOK – 4)
- Students will be able to use the measures of central angles to calculate arc measures. (DOK – 1)
- Students will be able to apply the relationships between arcs and chords in a circle. (DOK – 4)
- Students will be able to calculate the measure of an arc or an angle using inscribed angles of a circle. (DOK – 1)
- Students will be able to calculate segment length in circles. (DOK – 1)

Core Activities and Corresponding Instructional Methods:

1. Use Geometer's Sketchpad to discover relationships between angles and segments in circles.
2. Algebra applications with circles including writing the equation of a circle. solve.

- Students will explore the equation of a circle using a real-world delivery radius scenario. They will identify the center and radius and use these to write equations of circles on the coordinate plane. Students will determine whether given points lie inside, on, or outside the circle and justify their reasoning.
  - **Example Activity:** Math Medic: Coordinate Connection: Equation of a Circle: Will Insomnia Cookies Deliver to Your House? Activity (Lesson 8.1)
- Students will learn and apply key circle vocabulary such as radius, diameter, chord, and central angle. They will identify these elements in diagrams and real-world contexts. Students will use correct terminology to describe relationships within circles.
  - **Example Activity:** Math Medic: Circle Vocabulary: A Spin on the Ferris Wheel Activity (Lesson 8.2)
- Students will investigate the properties of tangents to circles, focusing on their relationship to radii. They will discover that a tangent is perpendicular to the radius at the point of tangency. Students will apply these properties to solve for unknown lengths and justify their solutions.

    - **Example Activity:** Math Medic: Tangents to Circles: Gimme 10! Activity (Lesson 8.3)
- Students will explore relationships between chords and arcs within a circle. They will compare arc measures and chord lengths to determine fairness in partitioning a circle. Students will use these relationships to solve problems and explain their reasoning.
    - **Example Activity:** Math Medic: Chords and Arcs: Is the Cookie Split Fairly? Activity (Lesson 8.4)
- Students will investigate how to calculate the circumference and area of a circle. They will connect these formulas to real-world contexts. Students will solve problems involving circles and interpret their results.
    - **Example Activity:** Math Medic: Area and Circumference of a Circle: What's the Size of the Pizza? Activity (Lesson 8.7)
- Students will explore how to calculate the area of a sector by relating it to the area of the entire circle. They will use proportions and angle measures to determine partial areas. Students will apply these concepts to solve real-world problems involving sectors.
    - **Example Activity:** Math Medic: Area of a Sector: Pizza! Pizza! Activity (Lesson 8.8)
- Students will learn how to calculate arc length using the circumference of a circle and central angles. They will apply proportional reasoning to find distances along circular paths. Students will interpret arc length in real-world contexts and explain their solutions.
    - **Example Activity:** Math Medic: Arc Length: How Far Apart Are the Exits? Activity (Lesson 8.9)

Assessments:

- **Diagnostic:**
    - Teacher questioning and observation on vertical non-permanent surfaces problem solving

- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
    - Warm Ups
    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Circle Common Assessment (Chapter 9 Sections 9.2 – 9.1)
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
  - Peter Lilhedahl Good Problems (website)
  - Peter Lilhedahl Mathematical Tasks (book)

Unit 7: Solids 30 Days

- **Standards:**
  - CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems
  - CC.2.2.HS.8 Apply inverse operations to solve equations or formulas for a given variable.
  - CC.2.3.HS.A.3 Verify and apply geometric theorems as they relate to geometric figures.
  - CC.23.HS.A.6 Verify and apply theorems involving similarity as they relate to plane figures.
  - CC.23.HS.A.14 Apply geometric concepts to model and solve real world problems.
  - CC.23.HS.A.8 Apply geometric theorems to verify properties of circles
  - CC.23.HS.A.12 Explain volume formulas and use them to solve problems.
  - CC.23.llS.A.13 Analyze relationships between two-dimensional and three-dimensional objects

Objectives:

- Students will be able to calculate the area of regular polygons inscribed in circles. (DOK – 4)
- Students will be able to identify solids. (DOK – 2)
- Students will be able to calculate the surface areas of prisms, cylinders, pyramids, cones, and spheres. (DOK – 1)
- Students will be able to calculate the volume of prisms, cylinders, pyramids, cones, and spheres. (DOK – 1)

Core Activities and Corresponding Instructional Methods:

3. Use Geometer's Sketchpad to show how regular polygons get closer to a circle as the number of sides increases. Make the connection to limits for the future.
4. Discover the formulas for regular polygons area and perimeter.
5. Discover formulas for arc length, area of a sector, and segment of a circle.
6. Discover formulas for volume and surface area of solids
7. Real world applications with solids

- Students will explore the concept of volume by modeling and measuring prisms and cylinders in a hands-on context. They will develop formulas for volume by connecting area of the base to height. Students will apply these formulas to solve real-world problems and explain their reasoning.
  - **Example Activity:** Math Medic: Introducing Volume with Prisms and Cylinders: How to Win at Baby Shower Games Activity (Lesson 9.1)
- Students will calculate both surface area and volume of prisms and cylinders in practical contexts. They will analyze how changes in dimensions affect both measurements. Students will compare and interpret results to better understand the relationship between surface area and volume.
  - **Example Activity:** Math Medic: Surface Area and Volume of Prisms and Cylinders: Popcorn, Anyone? Activity (Lesson 9.2)

- Students will investigate the relationship between the volume of pyramids and cones and their corresponding prisms and cylinders. Through hands-on exploration, they will discover the one-third volume relationship. Students will apply this understanding to calculate volumes and solve problems.
    - **Example Activity:** Math Medic: Volume of Pyramids and Cones: It's Pouring Rice! Activity (Lesson 9.3)
- Students will determine the surface area of pyramids and cones by analyzing their faces and lateral surfaces. They will break down complex solids into simpler shapes to calculate total area. Students will apply formulas and justify their reasoning.
    - **Example Activity:** Math Medic: Surface Area of Pyramids and Cones: What's on the Surface? Activity (Lesson 9.4)
- Students will explore how to calculate the volume of spheres and relate it to real-world objects. They will investigate how radius affects volume and apply the formula to solve problems. Students will interpret their results and compare volumes of different spheres.
    - **Example Activity:** Math Medic: Volume of Spheres: Tennis Love Volume? Activity (Lesson 9.5)
- Students will examine the formula for the surface area of a sphere and how it relates to its radius. They will apply the formula in various contexts and solve problems involving spherical objects. Students will analyze how changes in dimensions impact surface area.
    - **Example Activity:** Math Medic: Surface Area of Spheres: An "Appealing" Look at Surface Area Activity (Lesson 9.6)
- Students will apply their knowledge of volume to solve multi-step, real-world problems. They will analyze situations, choose appropriate formulas, and justify their solutions. Students will collaborate to compare strategies and evaluate the efficiency of different approaches.
    - **Example Activity:** Math Medic: Problem Solving with Volume: The Joy of Jenga Activity (Lesson 9.7)
- Students will explore how scaling dimensions affects the volume of similar solids. They will discover the relationship between scale factors and volume changes. Students will apply this understanding to solve problems involving proportional reasoning and make real-world comparisons.
    - **Example Activity:** Math Medic: Volume of Similar Solids: What's a Fair Price? Activity (Lesson 9.8)

Assessments:

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- **Formative:**
    - Teacher observations, questions, discussions
    - Teacher assigned homework
    - Teacher prepared assessments weekly cumulative assessments(quizzes and graded assignments)
    - Warm Ups

    - Weekly participation evaluation/Notebook check

- **Summative:**
    - Area and Perimeter Common Assessment (Sections 1.6, 9.1, 10.1-10.5)
    - Surface Area and Volume Common Assessment (Sections 1.8-1.9, 10.6, 11.2-11.4)
    - Final Exam Common Assessment
    - Weekly Cumulative Assessments

- **Correctives:**
    - Kuta generated practice
    - Delta Math lessons and practice
    - Individual white board practice

- **Extensions:**
    - Peter Lilhedahl Good Problems (website)
    - Peter Lilhedahl Mathematical Tasks (book)