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| Created on: | July, 2015 |
| Created by:  | Kellie Keiser, Central; Juliet Pender, Plumsted; Michele Colon, Vo-Tech; Robin Kelly, Vo-Tech |
| Revised on: |  |
| Revised by: |  |

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| **OCEAN COUNTY MATHEMATICS****CURRICULUM** |
| **Content Area:** High School Mathematics**Note: highlighted standards will be evaluated on the PARCC**  |
| **Course Title:** Geometry | **Grade Level:** High School |
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|  | Essentials of Geometry: Definitions, Angle Relationships, and Reasoning |  | 6 weeks |  |
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|  | Triangle Properties & Congruence |  | 4 – 5 weeks |  |
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|  | Right Triangle Trigonometry |  | 4 – 5 weeks |  |
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|  | Polygons and Quadrilaterals |  | 5 – 6 weeks |  |
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|  | Circles |  | 4 – 5 weeks  |  |
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|  | Area and Perimeter  |  | 3 – 4 weeks |  |
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|  | Solids |  | 3 – 4 weeks |  |
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|  | Similarity and Transformations |  | 4 – 5 weeks |  |
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The following Standards for Mathematical Practice and select Common Core Content Standards should be covered throughout the various units of the curriculum.

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| Standards for Mathematical Practices |
| MP.1 | Make sense of problems and persevere in solving them. | * Find meaning in problems
* Look for entry points
* Analyze, conjecture and plan solution pathways
* Monitor and adjust
* Verify answers
* Ask themselves the question: “Does this make sense?”
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| MP.2 | Reason abstractly and quantitatively. | * Make sense of quantities and their relationships in problems
* Learn to contextualize and decontextualize
* Create coherent representations of problems
 |
| MP.3 | Construct viable arguments and critique the reasoning of others. | * Understand and use information to construct arguments
* Make and explore the truth of conjectures
* Recognize and use counterexamples
* Justify conclusions and respond to arguments of others
 |
| MP.4 | Model with Mathematics. | * Apply mathematics to problems in everyday life
* Make assumptions and approximations
* Identify quantities in a practical situation
* Interpret results in the context of the situation and reflect on whether the results make sense
 |
| MP.5 | Use appropriate tools strategically. | * Consider the available tools when solving problems
* Are familiar with tools appropriate for their grade or course (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer programs, digital content located on a website, and other technological tools)
* Make sound decisions of which of these tools might be helpful
 |
| MP.6 | Attend to precision. | * Communicate precisely to others
* Use clear definitions, state the meaning of symbols and are careful about specifying units of measure and labeling axes
* Calculate accurately and efficiently
 |
| MP.7 | Look for and make use of structure. | * Discern patterns and structures
* Can step back for an overview and shift perspective
* See complicated things as single objects or as being composed of several objects
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| MP.8 | Look for and express regularity in repeated reasoning. | * Notice if calculations are repeated and look both for general methods and shortcuts
* In solving problems, maintain oversight of the process while attending to detail
* Evaluate the reasonableness of their immediate results

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| Technology goals for Geometry: |
| Students will be able to use a scientific or graphing calculator to evaluate trigonometric and inverse trigonometric functions. |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** High School Mathematics **Grade:** High School |
| **Unit:** Essentials of Geometry; Definitions, Angle Relationships, and Reasoning |
| **Domain:** Congruence/ Expressing Geometric Properties with Equations/ Geometric Measurement and Dimension/Modeling with Geometry |
| **Unit Summary:** Introduce geometric concepts that students will use throughout the course. Focus on the role of reasoning in proof in geometry. Apply the special relationships created by intersecting lines including angle pairs and parallel and perpendicular lines. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| 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. |
| G-CO.9 | Prove theorems about lines and angles. 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 segment’s endpoints. |
| 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,  |
| G-CO.13 | Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. |
| G-GPE.5 | Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). |
| G-GPE.6 | Find the point on a directed line segment between two given points that partitions the segment into a given ratio. |
| G-MG.1 | Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ |
| **Unit Essential Questions*** What are the building blocks of geometry?
* In what ways can congruence be useful?
* How can you describe the attributes of a segment or angle?
* What is the value of knowing how to do a geometric construction?
* How can you make a conjecture and prove that it is true?
* How do you prove that two lines are parallel or perpendicular?
 | **Unit Enduring Understandings***Students will understand that…** geometric figures can be named, defined, sketched labeled and measured.
* drawings can be utilized as a tool for problem solving.
* slopes can be used to identify parallel and perpendicular lines.
* reasoning must be used to reach valid conclusions.
 |
| **Unit Objectives***Students will know…** undefined terms such as point, line and plane.
* special angle pairs can be used to identify geometric relationships to find angle measures (complementary, supplementary, linear pair, vertical, corresponding, alternate interior, etc.).
* the difference between congruence and equality.
* the meaning of conjecture and the difference between inductive and deductive reasoning.
* the format of a simple proof.
* properties of parallel and perpendicular lines.
* how to prove relationships between lines using angles.
 | **Unit Objectives***Students will be able to…** recognize, name, draw sketch, label and communicate geometric figures.
* find and compare lengths of segments with and without a coordinate grid.
* use the midpoint and distance formula.
* measure angles using a protractor and classify angles.
* observe patterns leading to making conjectures.
* solve equations giving their reasons for each step and connect this to simple proofs.
* prove geometric relationships using given information, definitions, properties, postulates and theorems.
* find slopes of lines, identify parallel and perpendicular lines and write the equations of those lines.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
| **Formative Assessments** |
| * Observation
* Homework
* Class participation
* Whiteboards/communicators
* Think-Pair-Share
 | * DO-NOW
* Notebook
* Writing prompts
* Exit passes
* Self-assessment
 |
| **Summative Assessments*** Chapter/Unit Test
* Quizzes
* Presentations
* Unit Projects
* Mid-Term and Final Exams
 |
| **Modifications (ELLs, Special Education, Gifted and Talented)*** Teacher tutoring
* Peer tutoring
* Cooperative learning groups
* Modified assignments
* Alternative assessments
* Group investigation
* Differentiated instruction
* Native language texts and native language to English dictionary
* **Follow all IEP modifications/504 plan**
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** High School Mathematics **Grade:** High School |
| **Unit:** Triangle Properties & Congruence |
| **Domain:** Congruence/ Expressing Geometric Properties with Equations/ Geometric Measurement and Dimension/Modeling with Geometry |
| **Unit Summary:** Understand angle properties of a triangle, including properties of isosceles and equilateral triangles. Justify that two triangles are congruent using minimal requirements. Relate side length and angle measures of a triangle. Explore the properties of concurrent lines in a triangle. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| G.CO.6 | Use geometric descriptions of rigid motions to transform figures and to predict the effect of a rigid motion on a figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. |
| G.CO.7 | Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. |
| G.CO.8 | Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence. |
| G.CO.10 | Prove theorems about triangles. Theorems include: measures of interior angles of atriangle 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. |
| **Unit Essential Questions*** What are the significant properties associated with triangles?
* What are the minimal conditions needed to prove 2 triangles are congruent?
* What are the methods used to determine that two triangles are congruent?
* What are the special segments of a triangle that are concurrent?
* How can you use coordinate geometry to investigate triangle relationships?
* How do you solve problems that involve measurements of triangles?
 | **Unit Enduring Understandings***Students will understand that…** minimal conditions are needed to prove triangles congruent.
* there are a variety of ways to write a proof.
* isosceles and equilateral triangles have special properties.
* side lengths and angle measures of a triangle are related.
* there are real world implications of the points of concurrency of a triangle.
* midsegments are parallel to the third side and half its length.
* congruent corresponding parts of two figures determine congruency.
 |
| **Unit Objectives***Students will know…** if two triangles are congruent, then every pair of their corresponding parts are congruent.
* methods used to prove triangles congruent, such as SSS, SAS, ASA, AAS, and HL
* the angles and sides of isosceles and equilateral triangles have special relationships.
* corresponding parts of one pair of congruent triangles can sometimes be used to prove another pair of triangles congruent. This often includes overlapping triangles.
* how to organize information logically in the form of a proof.
* how to identify when not enough information is provided.
* how to use inequalities to make comparisons in triangles.
* any point on the perpendicular bisector is equidistant to the two endpoints.
 | **Unit Objectives***Students will be able to…** find measures of angles of triangles.
* classify triangles according to their angles and sides, and understand the important characteristics of a triangle in geometry.
* identify corresponding parts of congruent triangles.
* use reasoning skills to prove triangles congruent.
* find possible side lengths of the third side of a triangle.
* use points of concurrency and the midsegment to find missing side lengths and angle measures in a triangle.
* use the medians of a triangle to find the centroid and segment lengths.
* use the midpoint formula to find midsegments of triangles.
* use the distance formula to examine the relationships in triangles.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
| **Formative Assessments** |
| * Observation
* Homework
* Class participation
* Whiteboards/communicators
* Think-Pair-Share
 | * DO-NOW
* Notebook
* Writing prompts
* Exit passes
* Self-assessment
 |
| **Summative Assessments*** Chapter/Unit Test
* Quizzes
* Presentations
* Unit Projects
* Mid-Term and Final Exams
 |
| **Modifications (ELLs, Special Education, Gifted and Talented)*** Teacher tutoring
* Peer tutoring
* Cooperative learning groups
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview** |
| **Content Area:** High School Mathematics **Grade:** High School |
| **Unit:** Right Triangle Trigonometry |
| **Domain**: Similarity, Right Triangles, and Trigonometry |
| **Unit Summary:** Explore concepts related to right triangles. Discover the Pythagorean theorem. Use the Pythagorean Theorem to find missing lengths in a triangle, and apply problem solving skills. Identify and use properties of special right triangles. Introduce right triangle trigonometry. Apply trigonometric properties to find angle measures and missing sides. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| 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 |
| G.SRT.7 | Explain and use the relationship between the sine and cosine of complementary angles.  |
| G.SRT.8 | Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. |
| **Unit Essential Questions*** How do you find the side length or angle measure in a right triangle?
* How can we find the distance between two points on the coordinate plane?
* What are some real life applications using right triangles?
* How do trigonometric ratios relate to similar right triangles?
 | **Unit Enduring Understandings***Students will understand that…** if certain combinations of side lengths and angles measures of a right triangle are known, trigonometric ratios can be used to find other side lengths and angles measures.
* if the lengths of any two sides of a right triangle are known then the length of the third side can be found using the Pythagorean Theorem.
* certain right triangles have properties that allow their side lengths to be determined without using the Pythagorean Theorem(30,60,90 and 45,45,90).
* trigonometric ratios remain constant within a group of similar right triangles.
 |
| **Unit Objectives***Students will know…** how to use the Pythagorean Theorem and its converse
* how to find side lengths of special right triangles.
* how to use trigonometric functions in right triangles to find missing side lengths.
* how to use inverse trigonometric functions to find unknown acute angle measures.
* how to find distance on a coordinate plane using the Pythagorean Theorem.
* how to use trigonometric functions to determine the sine and cosine of complementary angles.
 | **Unit Objectives***Students will be able to…** use Pythagorean Theorem.
* use the converse of the Pythagorean Theorem to classify a triangle as right, acute, or obtuse.
* use properties of 45,45,90 and 30,60,90 triangles.
* use sine, cosine, and tangent ratios to determine side lengths.
* use sine, cosine, and tangent ratios to determine angle measures.
* solve real world problems using right triangle properties.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
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* Class participation
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* Think-Pair-Share
 | * DO-NOW
* Notebook
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| **Summative Assessments*** Chapter/Unit Test
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** Mathematics  **Grade:** High School |
| **Unit:** Polygons and Quadrilaterals |
| **Domain:** Congruence/ Expressing Geometric Properties with Equations/ Geometric Measurement and Dimension/Modeling with Geometry |
| **Cluster Summary:** Students will find angle measures in polygons. They will investigate properties of parallelograms and learn what information they can use to conclude that a quadrilateral is a parallelogram. Students will also study special quadrilaterals, such as rhombus, rectangles, squares, trapezoids and kites. Apply these properties to real-world applications of special polygons. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| G-CO.11 | Prove theorems about parallelograms. *Theorems include: opposite sides are* *congruent, opposite angles are congruent, the diagonals of a parallelogram bisect* *each other, and conversely, rectangles are parallelograms with congruent* *diagonals.* |
| G-GPE.4 | Use coordinates to prove simple geometric theorems algebraically.  |
| G-GPE.7 | Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. |
| G-MG.1 | Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). |
| 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). |
| **Unit Essential Questions*** How can you classify quadrilaterals?
* How can you use properties of polygons in real world Applications?
* How can coordinate geometry be used to prove general relationships?
* How can you find the sum of the measures of polygon angles?
 | **Unit Enduring Understandings***Students will understand that…** interior and exterior angle sums of any polygon can be calculated.
* there exist properties of parallelograms, trapezoids and kites.
* the properties of midsegments in trapezoids can be used to find missing lengths.
* special quadrilaterals properties have real world applications.
* use geometric shapes and their measures to model real world objects.
 |
| **Unit Objectives***Students will know…** the properties of quadrilaterals including angles relationships, side relationships, and diagonals.
* the formula for angle measures of a polygon can be derived using diagonals.
* how to use the properties of parallel and perpendicular lines and diagonals to classify quadrilaterals.
* how to use coordinate geometry to classify special parallelograms.
 | **Unit Objectives***Students will be able to…** calculate the interior and exterior angles of any polygon.
* apply properties of polygons to solve real world problems.
* identify quadrilaterals by their characteristics.
* classify figures in the coordinate plane using formulas for slope, distance, and midpoint.
* determine the number of diagonals in a polygon based on the number of sides.
* use coordinates to compute perimeter and area of polygons.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
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* Notebook
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** High SchoolMathematics  **Grade:** High School |
| **Unit**: Circles |
| **Domain:** Circles / Geometric Measurement and Dimension / Modeling with Geometry |
| **Unit Summary:** Students will discover relationships among chords, arcs and angles, and properties of tangent lines. Students will learn how to calculate the circumference, length of an arc, and how to write the equation of a circle.  |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| G.C.1 | Prove that all circles are similar. |
| 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. |
| G.C.3 | Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. |
| G.C.4 | (+) Construct a tangent line from a point outside a given circle to the circle. |
| G.C.5 | Derive using similarity the fact that the length of the arc intercepted by an angleis 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. |
| 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 anequation. |
| G.MG.1 |  Use geometric shapes, their measures, and their properties to describe objects  (e.g.,modeling a tree trunk or a human torso as a cylinder).★ |
| **Unit Essential Questions*** When lines intersect a circle, or within a circle, how do you find the measures of resulting angles, arcs and segments?
* What special relationship exists between the tangent of a circle and the radius?
* What is the relationship between the circumference and the diameter of a circle?
* What is the relationship between the length of an arc and its central angle measures?
* How can you prove relationships between angles and arcs in a circle?
* How do you find the equation of a circle in the coordinate plane?
* What information can you extract from the algebraic standard equation of a circle?
 | **Unit Enduring Understandings***Students will understand that…** a radius of a circle and the tangent that intersects the endpoint of the radius on the circle have a special relationship.
* information about congruent parts of a circle (or congruent circles) can be used to find information about other parts of the circle (or circles).
* pi is always the same ratio, the circumference of a circle to the circle’s diameter.
* use of drawing as a problem solving approach to problems associated with circles.
* the measure of arc equals the measure of its central angle.
* the information in the equation of a circle allows the circle to be graphed.
* the equation of a circle can be written if its center and radius are known.
 |
| **Unit Objectives***Students will know…** how to identify and use characteristics of circles (tangent segments, radius, chords, etc…).
* the relationship between tangent lines and radii at their point of tangency.
* how to apply circumference to real world problems.
* inscribed angles that intercept the same arc are congruent.
* the information obtained from the equation of a circle can be used to graph the circle on the coordinate plane.
 | **Unit Objectives***Students will be able to…** write the equation of a circle.
* find the measure of an angle formed at the center of the circle, on the circle, interior and exterior of a circle.
* identify and use the relationship amongst chords, tangents, arcs, and central angles to solve problems.
* understand the origin of pi and its relationship to the circumference and diameter of a circle.
* construct geometric figures, perpendicular bisector of a segment, chords, secants, tangents, etc…
* use algebra and problem solving skills (solve problems with angles formed by secants and tangents and problems involving arc length).
* identify and define characteristics of circles and angles, lines and line segments associated with circles.
* identify the radius and center of a circle.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
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| * Observation
* Homework
* Class participation
* Whiteboards/communicators
* Think-Pair-Share
 | * DO-NOW
* Notebook
* Writing prompts
* Exit passes
* Self-assessment
 |
| **Summative Assessments*** Chapter/Unit Test
* Quizzes
* Presentations
* Unit Projects
* Mid-Term and Final Exams
 |
| **Modifications (ELLs, Special Education, Gifted and Talented)*** Teacher tutoring
* Peer tutoring
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* Group investigation
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* Native language texts and native language to English dictionary
* **Follow all IEP modifications/504 plan**
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** Mathematics  **Grade:** High School |
| **Unit:** Area and Perimeter |
| **Domain:** Congruence/ Expressing Geometric Properties with Equations/ Geometric Measurement and Dimension/Modeling with Geometry |
| **Cluster Summary:** Investigate and apply area formulas for triangles, quadrilaterals, other polygons and circles. Utilize area formulas to calculate area of a shaded region. Use the area of regions to calculate geometric probability. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| G-C.5 | 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. |
| G-GPE.7 | Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. Understand independence and conditional probability and use them to interpret data. |
| **Unit Essential Questions*** How do you find the area of a polygon or find the circumference or area of a circle?
* How do we determine the area or perimeter of any plane figure?
* How is area or perimeter utilized in real world applications?
* How can you use area to determine geometric probabilities?
* How do perimeters and areas of similar figures compare?
 | **Unit Enduring Understandings***Students will understand that…** area of a parallelogram or triangle can be found when the length of the base and height are known.
* area of a trapezoid can be found when the height and the length of the bases are known.
* area of a rhombus or kite can be found when the lengths of its diagonals are known.
* the area of parts of the circle formed by radii and arcs can be found when the circle’s radius is known.
* certain problems in probability can be solved by modeling the situation with geometric measures.
* ratios can be used to compare the perimeters and areas of similar figures.
 |
| **Unit Objectives***Students will know…** how to identify the appropriate formula and utilize it to solve area problems.
* how to find the area or circumference of a circle.
* how to find the area of a region.
* terms associated with geometric probability.
 | **Unit Objectives***Students will be able to…** recognize the basic properties of area and identify how figures differ in calculating area. Students will then use these properties to determine area of real problems.
* utilize the appropriate formula to solve area problems.
* calculate the geometric probability of events.
* calculate area in real life problems.
* calculate perimeter and circumference.
* given a figure and its perimeter or area, student’s will be able to find the perimeter or area of a figure similar to the original figure.
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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Evidence of Learning** |
| **Formative Assessments** |
| * Observation
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* Class participation
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* Think-Pair-Share
 | * DO-NOW
* Notebook
* Writing prompts
* Exit passes
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| **Summative Assessments*** Chapter/Unit Test
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** High School Mathematics **Grade:** High School |
| **Unit:** Solids |
| **Domain:** Geometric Measurement and Dimension/Modeling with Geometry |
| **Unit Summary:** Explore and define three dimensional solids. Discover and apply surface area and volume formulas for prisms, pyramids, cylinders, cones, and spheres. |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| 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. *Use dissection arguments, Cavalieri’s principle, and informal limit arguments.*  |
| G-GMD.2 | (+) Give an informal argument using Cavalieri’s principle for the formulas  for the volume of a sphere and other solid figures. |
| G-GMD.3 | Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. Apply geometric concepts in modeling situations |
| 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 (e.g., modeling a tree trunk or a human torso as a cylinder). |
| G-MG.2 | Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). |
| **Unit Essential Questions*** What is surface area?
* What is volume?
* Why is surface area and volume essential in the real world?
* How do the surface areas and volumes of similar solids compare?
 | **Unit Enduring Understandings***Students will understand that…** a three-dimensional figure can be analyzed by describing the relationships among its vertices, edges, and faces.
* surface area of a three dimensional figure is equal to the sum of the areas of each surface of the figure.
* the volume of a prism and cylinder can be found when its height and area of its base are known.
* the volume of a cone and pyramid can be found when its height and area of its base are known.
* the volume and surface area of a sphere can be found when the length of the radius is known.
* ratios can be used to compare the areas and volumes of similar solids.
 |
| **Unit Objectives***Students will know…** the properties of three-dimensional shapes.
* name and classify three-dimensional shapes.
* units of measurement associated with surface area and volume.
* the basic formulas for surface area and volume of polyhedrons.
 | **Unit Objectives***Students will be able to…** identify a solid by its properties.
* calculate surface area and volume using a formula.
* apply surface area and volume formulas to real life problems.
* find the surface area and volume of a solid similar to a given solid.
* informally prove geometric formulas using Cavalieri’s principles.
* apply concepts of density to real-life problems.
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| **Teacher Notes:** |

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| **OCEAN COUNTY MATHEMATICS CURRICULUM****Unit Overview**  |
| **Content Area:** Mathematics  **Grade:** High School |
| **Unit:** Similarity and Transformations |
| **Domain:**Geometric Measurement and Dimension/Modeling with Geometry |
| **Unit Summary:** Discover basic properties of transformations and symmetry. Review ratio and proportion, define similar polygons, discover shortcuts for similar triangles, utilize indirect measurement to find lengths.  |
| **Primary interdisciplinary connections:** Infused within the unit are connections to the 2014 NJCCCS for Mathematics, Language Arts Literacy, Science and Technology. |
| **21st century themes:** The unit will integrate the 21st Century Life and Career standards:CRP2. Apply appropriate academic and technical skills.CRP4. Communicate clearly and effectively and with reasonCRP6. Demonstrate creativity and innovation.CRP7. Employ valid and reliable research strategies.CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.CRP11. Use technology to enhance productivity. |
| **Learning Targets** |
| **Content Standards** |
| **Number** |  **Common Core Standard for Mastery** |
| G-CO.2 | Model 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 stretch in a specific direction). |
| G.CO.3 | Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. |
| G.CO.4 | Develop definitions of rotations, reflections and translations in terms of angles, circles, perpendicular lines, parallel lines and line segments. |
| G.CO.5 | Given a specified rotation, reflection or translation and a geometric figure, construct the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Construct a sequence of transformations that will carry a given figure onto another |
| G-CO.6 | Use geometric descriptions of rigid motions to transform figures and to predict the effect of a rigid motion on a figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. |
| G-SRT.1 | Verify experimentally the properties of dilations given by a center and a scale factor. |
| G-SRT.1a | A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.  |
| G-SRT.1b | The dilation of a line segment is longer or shorter in the ratio given by the scale factor. |
| 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 meaning of similarity for triangles as the equality of all pairs of angles and the proportionality of all pairs of sides. |
| G-SRT.3 | Use the properties of similarity transformations to establish the AA criterion for similarity of triangles. |
| G.SRT.4 | Prove theorems about triangles using similarity transformations. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean theorem proved using triangle similarity. |
| G.SRT.5 | Use triangle congruence and similarity criteria to solve problems and to prove relationships in geometric figures. |
| 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. |
| **Unit Essential Questions*** What are some basic properties of transformations and symmetry?
* How can you represent a transformation in a coordinate plane?
* How can you change a figures position without changing its size and shape?
* How can you change a figures size without changing its shape?
* How do you use proportions to find side lengths in similar polygons?
* How do you show two triangles are similar?
* How do you identify corresponding parts of similar triangles?
 | **Unit Enduring Understandings***Students will understand that…** reflections rotations and translations are isometries
* figures with symmetry appear unchanged when reflected across a line or rotated about a point.
* ratios and proportions can be used to decide whether two polygons are similar and to find unknown side lengths of similar figures.
* triangles can be shown to be similar based on the relationship of two or three pairs of corresponding parts.
* a scale factor can be used to make a larger or smaller copy of a figure that is also similar to the original figure.
 |
| **Unit Objectives***Students will know…** how to translate, rotate, reflect, glide reflections and dilate geometric figures in a plane.
* how to use coordinate and vector notation to describe translations.
* the difference between line and rotational symmetry.
* the theorems that can be used to prove triangles are similar.
* the difference between congruence and similarity.
 | **Unit Objectives***Students will be able to…** perform transformations given specific criteria.
* identify transformations from visual representations.
* identify lines of symmetry from real-world representations.
* draw lines of symmetry for given figures.
* justify that triangles are similar using definitions, properties, and theorems in real world problems.
* use scale factor to determine if polygons are similar, and be able to find the missing lengths.
* perform dilations on figures about a center.
* identify three-dimensional objects generated by rotations of two-dimensional objects.
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| **Teacher Notes:** |

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| **Common Core State Standards for Mathematics (High School)** |
| **Progression of Standards** |
|   | **Algebra I** | **Geometry** | **Algebra II** | **Pre Calculus** | **Calculus** |
| **Number & Quantity**  |   |   |   |   |   |
| ***The Real Number System (N-RN)*** |   |   |   |   |   |
| Extend the properties of exponents to rational exponents | I | D | M |   |   |
| Use properties of rational and irrational numbers | I | D | M |   |   |
| ***Quantities (N-Q)*** |   |   |   |   |   |
| Reason quanitatively and use units to solve problems | I | D | M |   |   |
| ***The Complex Number System (N-CN)*** |   |   |   |   |   |
| Perform arithmetic operations with complex numbers |   | I | D | M |   |
| Represent complex numbers and their operations on the complex plane |   |   | I | D | M |
| Use complex numbers in polynomial identities and equations |   |   | I | D | M |
| ***Vector and Matrix Quantities (N-VM)*** |   |   |   |   |   |
| Represent and model with vector quantities |   | I |   | D | M |
| Perform operations on vectors |   | I | D | M |   |
| Perform operations on matrices and use matrices in applications | I |   | D | M |   |
| **Algebra** |   |   |   |   |   |
| ***Seeing Structure in Expressions (A-SSE)*** |   |   |   |   |   |
| Interpret the structure of expressions | I | D | M |   |   |
| Write expressions in equivalent forms to solve problems | I | D | M |   |   |
| ***Arithmetic with Polynomials and Rational Expressions (A-APR)*** |   |   |   |   |   |
| Perform arithmetic operations on polynomials | I | D | M |   |   |
| Understand the relationship between zeros and factors of polynomials | I |   | D | M |   |
| Use polynomial identities to solve problems | I |   | D | M |   |
| Rewrite rational expressions | I | D | M |   |   |
| ***Creating Equations (A-CED)*** |   |   |   |   |   |
| Create equations that describe numbers or relationships | I | D | M |   |   |
| ***Reasoning with Equations and Inequalities (A-REI)*** |   |   |   |   |   |
| Understand solving equations as a process of reasoning and explain the reasoning | I | D | M |   |   |
| Solve equations and inequalities in one variable | I | D | M |   |   |
| Solve systems of equations | I |   | D | M |   |
| Represent and solve equations and inequalities graphicallly | I |   | D | M |   |
| **Functions**  |   |   |   |   |   |
| ***Interpreting Functions (F-IF)*** |   |   |   |   |   |
| Understand the concept of a function and use function notation | I | D | M |   |   |
| Interpret functions that arise in applications in terms of the context | I | D | M |   |   |
| Analyze functions using different representations |   |   |   |   |   |
| ***Building Functions (F-BF)*** | I |   | D | M |   |
| Build a function that models a relationship between two quantities | I | D | M |   |   |
| Build new functions from existing functions | I |   | D | M |   |
| ***Linear, Quadratic, and Exponential Models (F-LE)*** |   |   |   |   |   |
| Construct and compare linear, quadratic, and exponential models and solve problems | I |   | D | M |   |
| Interpret expressions for functions in terms of the situation they model | I |   | D | M |   |
| ***Trigonometric Functions (F-TF)*** |   |   |   |   |   |
| Extend the domain of trigonometric functions using the unit circle |   | I | D | M |   |
| Model periodic phenomena with trigonometric function |   | I | D | M |   |
| Prove and apply trigonometric identities |   | I |   | D | M |
| **Geometry** |   |   |   |   |   |
| ***Congruence (G-CO)*** |   |   |   |   |   |
| Experiment with transformations in the plane |   | I |   | D | M |
| Understand congruence in terms of rigid motions |   | I |   | D | M |
| Prove geometric theorems |   | I |   | D | M |
| Make geometric constructions |   | I |   | D | M |
| ***Similarity, Right Triangles, and Trigonometry (G-SRT)*** |   |   |   |   |   |
| Understand similarity in terms of similarity transformations |   | I |   | D | M |
| Prove theorems involving similarity |   | I |   | D | M |
| Define trigonometric ratios and solve problems involving right triangles | I | D |   | M |   |
| Apply trigonometry to general triangles |   | I |   | D | M |
| ***Circles (G-C)*** |   |   |   |   |   |
| Understand an apply theroems about circles |   | I |   | D | M |
| Find arc lenghts and areas of sectors of circles |   | I |   | D | M |
| ***Expressing Geometric Properties with Equations (G-GPE)*** |   |   |   |   |   |
| Translate between the geometric description and the equation for a conic section |   | I |   | D | M |
| Use coordinates to prove simple geometric theorems algebraically |   | I |   | D | M |
| ***Geometric Measurement and Dimension (GGMD)*** |   |   |   |   |   |
| Explain volume formulas and use them to solve problems |   | I |   | D | M |
| Visualize relationships between two-dimensional and three-dimensional objects |   | I |   | D | M |
| ***Modeling With Geometry (G-MG)*** |   |   |   |   |   |
| Apply geometric concepts in modeling situations |   | I |   | D | M |
| **Statistics and Probability**  |   |   |   |   |   |
| ***Interpreting Categorical and Quantative Data S-ID)*** |   |   |   |   |   |
| Summarize, represent, and interpret data on a single count or measurement variable | I |   | D | M |   |
| Summarize, represent, and interpret data on two categorical and quantitative variables | I |   | D | M |   |
| Interpret linear models | I |   | D | M |   |
| ***Making Inferences and Justifying Conclusions (S-IC)*** | I |   | D | M |   |
| Understand and evaluate random processes underlying statistical experiments | I |   | D | M |   |
| Make inferences and justify conclusions from sample surveys, experiments and observational studies | I |   | D | M |   |
| ***Conditional Probability and the Rules of Probability S-CP)*** |   |   |   |   |   |
| Understand independence and conditional probability and use them to interpret data | I |   | D | M |   |
| Use the rules of probability to compute probabilities of compound events in a uniform probability model | I |   | D | M |   |
| ***Using Probability to Make Decisions (S-MD)*** |   |   |   |   |   |
| Calculate expected values and use them to solve problems | I |   | D | M |   |
| Use probability to evaluate outcomes of decisions | I |   | D | M |   |