KIRKWOOD
SCHOOL DISTRICT

HONORS GEOMETRY

Course Description:

In Honors Geometry, students will use inductive and deductive reasoning to develop an axiomatic system which describes the properties of two and three dimensional objects. Students in Geometry Honors will proceed at an accelerated pace. Students will be expected to perform a significant number of proofs of geometric theorems. Students will also engage in the study of elementary analytic geometry by combining their knowledge of and skill in both algebra and geometry.

Grade Levels: 8-10th

Unit Scope and Sequence:
Unit 1: Introduction to Geometry
Unit 2: Reasoning
Unit 3: Lines and Angles
Unit 4: Congruent Triangles
Unit 5: Parallel Lines and Angle Pairs
Unit 6: Triangle Inequality
Unit 7: Transformations
Unit 8: Quadrilaterals
Unit 9: Two-Dimensional Figures
Unit 10: Similarity
Unit 11: Trigonometry
Unit 12: Circles
Unit 13: Geometric Solids
Unit 14: Probability

HONORS GEOMETRY
UNIT 1 INTRODUCTION TO GEOMETRY

Enduring Understandings	*Essential Questions*
• Points, lines, and planes are the foundations of geometry. • Geometry allows measurement of things that can't be measured easily using traditional methods.	• How do I explain my reasoning in Geometry? • What are the building blocks of geometry? • How can I describe the attributes of a segment and an angle? • How are properties of geometric figures related to their measurable attributes?
• ***Students must know:***	• ***Students must be able to:***
• Point • Line • Segment • Plane • Collinear • Noncollinear • Coplanar • Concurrent Lines • Ray • Angle • Polygon • Polyhedron • Construction • Inductive • Deductive • Acute • Right • Obtuse • Equilateral • Equiangular • Scalene triangle	• Construction: Bisect Segment • Construction: Bisect Angle • Use ruler to measure lengths of segments • Use protractor to measure angle measurements in degrees • Name lines, line segments, rays and angle using appropriation notation • Name polygons and polyhedra • Compare and contrast dimensions • Compare and contrast inductive and deductive

Missouri Learning Standards
G.CO.D.11: Make geometric constructions. Construct geometric figures using various tools and methods.

HONORS GEOMETRY
UNIT 1 INTRODUCTION TO GEOMETRY

HONORS GEOMETRY
UNIT 2 REASONING

Unit 2 organizes geometry into a deductive system of definitions, postulates and theorems. Students will apply logic to draw conclusions and will be introduced to proofs as their formal argument.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>

Valid inductive and deductive reasoning are used to develop and prove conjectures.
Understanding the process of deductive reasoning can help you apply logic to solve challenges.

</td><td>

How can I make a conjecture and prove that it is true?
Why is it important to prove every logical step in a proof?
Why might there be more than one correct way to write a proof?
How are proofs constructed?

</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>

Conditional Statements
Hypothesis/ Conclusion
Euler Diagrams
(Converse, Inverse, Contrapositive)
Biconditionals
Syllogism
Direct Proofs
Premises
Theorem
Postulate
Indirect Proof
Counterexample
Contradiction
Deductive Reasoning
Triangle Angle Sum Theorem
Pythagorean Theorem (if time allows)
Area (if time allows)
Circumference (if time allows)
Logical reasoning from one step to another is essential in building proofs. Reasons in a proof include given information, definitions, properties, postulates, and previously proven theorems.
Algebraic properties of equality
Reflexive property
Symmetric property
Transitive property

</td><td>

Write conditional statements and determine their truth value
Create and use Euler Diagrams
Identify Converse and Biconditional statements and how they relate to a conditional
Write geometric definitions as biconditional statements
Write and compare direct and indirect proofs
Identify and explain parts of a deductive system
Compare and contract theorems and postulates
Apply pythagorean theorem (if time allows)
Apply Triangle Angle Sum Theorem
Apply area and circumference of a circle
Use a two-column format to write deductive proofs using algebraic properties
Recognize and develop different styles of proof using deductive reasoning

</td></tr>
</table>

Missouri Learning Standards

HONORS GEOMETRY
UNIT 2 REASONING

CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.
CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.

COURSE TITLE AND GRADE
UNIT 3 LINES AND ANGLES

In unit 3, students will use geometric tools and apply them to measurement of line segments and angles. Ideas will be applied to exploring relationships between angles with respect to both their measures and positions of their sides.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><td>Enduring Understandings</td><td>Essential Questions</td></tr>
<tr><td>Valid deductive reasoning is used to develop and prove conjectures related to lines and angles.
Understanding the process of deductive reasoning can help you apply logic to solve challenges.</td><td>How can I make a conjecture and prove that it is true?
Why is it important to prove every logical step in a proof?
Why might there be more than one correct way to write a proof?
How can geometric properties be used to prove relationships between lines and angles?
How can I describe the attributes of a segment and an angle?</td></tr>
<tr><td>Students must know:</td><td>Students must be able to:</td></tr>
<tr><td>Betweenness of points/ Segment Addition
Betweenness of rays/ Angle Addition
Complementary
Supplementary
Linear Pair
Definition of Vertical Angles
Vertical Angles Theorem
Midpoint
Perpendicular Lines
Parallel Lines
Properties of equality (add, subtr,mult, div)
Reflexive Property
Substitution Property
Transitive Property
Coordinate of a point
Coordinate of a ray
Corollary
Congruent
Equality
Axiom
Opposite Rays</td><td>Apply definitions, theorems, postulates, and properties to defend statements in proofs
Use segments and angle pair relationships and set up and solve problems</td></tr>
</table>

Missouri Learning Standards
G.CO.C.8: Prove geometric theorems. Prove theorems about lines and angles.
G.CO.A.1: Experiment with transformations in the plane. Define angle, circle, perpendicular line,

parallel line, line segment and ray based on the undefined notions of point, line, distance along a line and distance around a circular arc.

HONORS GEOMETRY
UNIT 4 CONGRUENT TRIANGLES

Unit 4 is designed to empower students with the essential knowledge and skills needed to identify and prove triangle congruence. Starting with an exploration of basic triangle properties, students will progress to an in-depth study of congruence criteria.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>Students will be able to craft logical arguments to prove triangle congruence.
Comparing the corresponding parts of two figures can show that the figures are congruent, but two triangles can be proven congruent without showing ALL corresponding parts are congruent.</td><td>How do I use congruence to prove statements about triangles?
How do I recognize congruent figures and their corresponding parts.
How do we use congruent triangles to derive other geometric relationships?</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>Congruence
Included
Corresponding Parts
Scalene
Isosceles
Equilateral
Equiangular
Regular
(Quadrants)
ASA Postulate
SAS Postulate
SSS Theorem
AAS
HL
CPCTC</td><td>Prove two triangles congruent
Apply properties of isosceles and equilateral triangles
Name corresponding parts of congruent triangles
Prove corresponding parts of congruent triangles congruent</td></tr>
</table>

Missouri Learning Standards
G.SRT.B.4: Prove theorems involving similarity. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G.CO.C.9: Prove geometric theorems. Prove theorems about triangles.

HONORS GEOMETRY
UNIT 5 PARALLEL LINES AND ANGLE PAIRS

In Unit 5, students will investigate the relationships between lines and angles on a plane and in space. They will consider a variety of ways to prove that lines are parallel.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>

When a parallel line intersects two or more lines, the angles formed at the intersection points create special angle pairs.
The special angle pairs formed by parallel lines and a transversal are either supplementary or congruent. Central angle pairs can be used to decide whether two lines are parallel.
The sum of the angle measures of a triangle is always the same - 180°.
The midsegment of a triangle or trapezoid is related to the third side.

</td><td>

What are the properties of parallel lines?
How can lines be proved parallel?
How do I write and graph the equation of a line in the coordinate plane?
How do the angles formed by two parallel lines and a transversal relate to each other?
How can I use information about the angles formed by two lines and a transversal to prove the lines are parallel?
What are the properties of parallel lines?
How can lines be proved parallel?
How do I write and graph the equation of a line in the coordinate plane?
How do the angles formed by two parallel lines and a transversal relate to each other?
How can I use information about the angles formed by two lines and a transversal to prove the lines are parallel?

</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>

Transversal
Alternate interior
Alternate exterior
Corresponding angles
Parallel lines
Skew lines
Alternate interior angles
Same side interior angles
Alternate exterior angles
Corresponding Angles Postulate
Same-Side Angles Theorem
Alternate Interior Angles Theorem
Alternate Exterior Angles Theorem
Corresponding Angles Postulate Converse
Same-Side Interior Angles Theorem Converse

</td><td>

Model and solve geometric situations using algebraic properties
Prove lines parallel or perpendicular using angle relationships
Differentiate between parallel, perpendicular, skew, and intersecting lines
Classify angle pairs formed by two lines and a transversal
Constructing parallel and perpendicular lines
Name angle pairs formed from a line intersecting two lines
Identify parallel lines, parallel planes, and skew lines from a given figure
Prove theorems about parallel lines

</td></tr>
</table>

HONORS GEOMETRY
UNIT 5 PARALLEL LINES AND ANGLE PAIRS

• Alternate Interior Angles Theorem Converse • Alternate Exterior Angles Theorem Converse • Parallel Postulate • Triangle Angle-Sum Theorem • Triangle Exterior Angle Theorem • When a parallel line intersects two or more lines, the angles formed at the intersection points create special angle pairs • The special angle pairs formed by parallel lines and a transversal are either supplementary or congruent • Central angle pairs can be used to decide whether two lines are parallel • The sum of the angle measures of a triangle is always the same - 180° • The midsegment of a triangle or trapezoid is related to the third side	• Use properties of parallel lines to find angle measures • Use angle pair relationships to determine whether or not two lines are parallel • Use parallel lines to prove a theorem about triangles • Find measures of angles of triangles

Missouri Learning Standards

- G.CO.C.8: Prove geometric theorems. Prove theorems about lines and angles.

HONORS GEOMETRY
UNIT 6 TRIANGLE INEQUALITY

In Unit 6, students will progress to an in-depth study of the triangle inequality theorem and its variations, while working through additional properties of inequality within geometric structures.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>Relationships that exist between the angles and segments of triangles can be proven.
There are special inequalities that exist between the sides of a triangle, the angles of a triangle, and between angles and their opposite sides.</td><td>How can I use inequalities to describe the relationships among side lengths and angle measures in a triangle?</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>Triangle Inequality Theorem
Whole is Greater than the Parts Theorem
Triangle side and angle inequalities
Properties of inequalities
Any exterior angle of a triangle has a special relationship with the two remote interior angles of a triangle</td><td>Prove triangle inequality
List the order of sides and angles within a triangle
Demonstrate that a whole is greater than its parts</td></tr>
</table>

Missouri Learning Standards
G.CO.C.9 Prove geometric theorems. Prove theorems about triangles.

HONORS GEOMETRY
UNIT 7 TRANSFORMATIONS

UNIT 7 In this unit, students will explore different types of symmetry and become acquainted with their relation to the subject of rigid transformations, including reflections, translations, rotations, as well as non-rigid transformations; dilations. Students will also apply these ideas to widen their understanding of congruence and similarity.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>Scale provides a mechanism by which we can solve problems related to large or small real world objects. This scale represents a constant ratio between corresponding lengths of sides of similar figures.
An object in a plane can be oriented in an infinite number of ways while maintaining its shape.</td><td>What are the effects of performing dilations on geometric figures?
How are transformations and similar figures related?
How can transformations be described mathematically?
How can you change a figure’s position without changing its size and shape?
How can you represent a transformation in a coordinate plane?
How do you recognize symmetry in a figure?</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>Similar polygons have proportional corresponding medians, bisectors, and altitudes
Dilations are similarity transformations
Rigid Transformation
Translation
Reflection
Rotation
Center
Dilation
Isometry
Congruent
Mirror image
Symmetry
Composite transformations</td><td>Draw dilations
Draw dilations in the coordinate plane
Identify and define vectors related to transformations
Reform & analyze transformations (translations, rotations, reflections, and dilations) using coordinate geometry
Translate, reflect, and rotate geometric figures</td></tr>
</table>

Missouri Learning Standards
G.CO.A.5: Experiment with transformations in the plane. Demonstrate the ability to rotate, reflect or translate a figure, and determine a possible sequence of transformations between two congruent figures.
G.CO.A.2: Experiment with transformations in the plane. Represent transformations in the plane, and

describe them as functions that take points in the plane as inputs and give other points as outputs.
G.CO.A.3: Experiment with transformations in the plane. Describe the rotational symmetry and lines of symmetry of two-dimensional figures.
G.CO.A.4: Experiment with transformations in the plane. Develop definitions of rotations, reflections and translations in terms of angles, circles, perpendicular lines, parallel lines and line segments.

HONORS GEOMETRY
UNIT 8 QUADRILATERALS

UNIT 8 In this unit, students will apply what they know about triangles and parallel lines to the geometry of quadrilaterals. Students will learn to see and identify the various types of quadrilaterals and know their properties.

<table>
<tr><th colspan="2">Unit Essential Learning Targets</th></tr>
<tr><th>Enduring Understandings</th><th>Essential Questions</th></tr>
<tr><td>There are different ways to measure different dimensional figures.
The terms characteristics and properties can be used interchangeably to describe quadrilaterals. The term characteristics is used in elementary and middle school mathematics.
Quadrilaterals have a hierarchical nature based on the relationships between their sides, angles, and diagonals.
Characteristics of quadrilaterals can be used to identify the quadrilateral and to find the measures of sides and angles.</td><td>What determines the classification of quadrilaterals?
How does what we measure influence how we measure?
Given a quadrilateral, how is it determined that it is a parallelogram?
How do you determine which special parallelogram is given using properties and/or coordinate geometry?
Why is a trapezoid not a special parallelogram, even though it has parallel sides?</td></tr>
<tr><th>Students must know:</th><th>Students must be able to:</th></tr>
<tr><td>A rectangle, rhombus, and square have all the properties of a parallelogram
A square has all the properties of a parallelogram, rectangle, and a rhombus
Diagonals of a rectangle are congruent and bisect each other
All four angles of a rectangle are right angles
All sides of a rhombus are congruent, diagonals are perpendicular, and each diagonal bisects a pair of opposite angles
In an isosceles trapezoid, both pairs of base angles are congruent and the diagonals are congruent
Comparing the slopes of two lines can show whether the lines are parallel or perpendicular
Slope
Distance
Regular
Parallelogram
Kite
Trapezoid
Rhombus
Rectangle
Square
Isosceles
Midsegment</td><td>Recognize and apply properties of rectangles
Determine whether parallelograms are rectangles
Recognize and apply the properties of rhombi and squares
Determine whether parallelograms are rectangles, rhombi or squares
Apply properties of trapezoids and kites
Prove special parallelograms using coordinate geometry</td></tr>
</table>

HONORS GEOMETRY
UNIT 8 QUADRILATERALS

Missouri Learning Standards
G.CO.C.10: Prove geometric theorems. Prove theorems about polygons.
G.GPE.B.3: Use coordinates to prove geometric theorems algebraically. Use coordinates to prove geometric theorems algebraically.
G.MG.A.3: Apply geometric concepts in modeling situations. Apply geometric methods to solve design mathematical modeling problems.
G.GPE.B.4: Use coordinates to prove geometric theorems algebraically. Prove the slope criteria for parallel and perpendicular lines and use them to solve problems.

HONORS GEOMETRY
UNIT 9 TWO-DIMENSIONAL FIGURES

UNIT 9 In this unit, students derive formulas for area and perimeter through deductive reasoning and use the formulas to solve a variety of problems.

Unit Essential Learning Targets

Enduring Understandings	***Essential Questions***
• Polygons can be described by their perimeter and area.	• How are polygons measured? • What strategies and formulas can be used to find perimeter and area of polygons? • How can you find the area and perimeter of irregular (composite) figures? • How are the formulas for linear measure, area, and volume related to each other? • How can one find the area and/or perimeter of a figure composed of various basic geometric shapes?
Students must know:	***Students must be able to:***
• Apothem • Central angle • Composite figure • Circumference • Diameter • Triangle Midsegment Theorem • Trapezoid Midsegment • Convex • Concave • Perimeter • Area	• Use properties of known figures to find missing measures of composite figures. • Use properties and theorems to find areas of shaded regions • Develop and apply formulas for perimeters and areas of triangles, special quadrilaterals, and polygons • Develop and apply the formula for the area of a regular polygon • Describe the effect on perimeter and area when one or more dimensions are changed • Apply the relationship between perimeter and area when problem solving • Find areas of trapezoids, rhombi, kites, regular polygons, and composite figures • Use properties of midsegments to find segment lengths, angle measures, and coordinates

Missouri Learning Standards

G.MG.A.2: Apply geometric concepts in modeling situations. Apply concepts of density based on area and volume in modeling situations.
G.MG.A.1: Apply geometric concepts in modeling situations.: Use geometric shapes, their measures and their properties to describe objects.

HONORS GEOMETRY
UNIT 10 SIMILARITY

UNIT 10 In this unit, students will explore the properties of similar figures.

Unit Essential Learning Targets

Enduring Understandings	*Essential Questions*
• In similar triangles all pairs of corresponding angles are equal and all pairs of corresponding sides are proportional. • Triangles can be proven similar using AA, SAS, and SSS similarity criterion. • Similar triangles can be used to prove various theorems and solve problems. • Similar triangles can be used to model real-world problems. • Figures are similar if there is a similarity transformation that maps one to the other.	• What are the properties of similar polygons? • How are similar polygons used in real life? • How can I prove properties of similar triangles? • How can similarity transformations be used to explain similarity of triangles? • How do I determine whether two triangles are similar? • What is the relationship between similarity and its effect on scale factors, perimeters, volumes, and areas of polygons? • How can you set up and solve proportions?
Students must know:	***Students must be able to:***
• There are special relationships between parts of a right triangle and the altitude to its hypotenuse • Ratio • Extended proportion • Scale drawing • Similar • Similarity ratio • Golden ratio • AA Similarity Postulate • SSS Similarity Theorem • SAS Similarity Theorem	• Find the geometric mean between two numbers • Explain that in similar triangles, corresponding angles are congruent and corresponding sides are proportional • Prove that two triangles are similar using the similarity criteria • Prove that a line parallel to one side of a triangle divides the other two • Use similar triangles to solve problems • Model and solve real-world problems using similar figures • Identify similarity transformations

Missouri Learning Standards

G.SRT.B.4: Prove theorems involving similarity. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G.SRT.A.1: Understand similarity in terms of similarity transformations. Construct and analyze scale changes of geometric figures.
G.SRT.A.2: Understand similarity in terms of similarity transformations. Use the definition of similarity to decide if figures are similar and to solve problems involving similar figures.

G.SRT.A.3: Understand similarity in terms of similarity transformations. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

HONORS GEOMETRY
UNIT 11 TRIGONOMETRY

UNIT 11 The subject of trigonometry, or triangle measurement, begins with observations about the properties of similar right triangles, which led to the creation of the trigonometric ratios - sine, cosine, and tangent. In this unit, students use these ratios to solve problems with triangles.

Unit Essential Learning Targets	
Enduring Understandings	***Essential Questions***
• Patterns exist in triangles. • Trigonometry can be used to solve various types of problems.	• How do I use right triangles to model and solve real world situations? • How are trigonometric ratios defined? • What is the relationship between cosine and sine in relation to complementary angles? • How can you use angle measures in a triangle to find side lengths of the triangle without measuring them? • When do you use trig ratios, Pythagorean Theorem and special right triangle properties to solve a right triangle?
Students must know:	***Students must be able to:***
• There are common triples that make up the sides of right triangles The types of angles in a triangle and thus the type of triangle can be determined using the converse of the Pythagorean Theorem • Certain right triangles have properties that allow their side lengths to be determined by applying the known rule (without using the Pythagorean Theorem) if you have the lengths of two sides of a right triangle, you can find the third by applying the Pythagorean Theorem • The angles of elevation and depression are the acute angles of a right triangle formed by a horizontal distance and a vertical height • Trigonometric relationships exist between specific angles and sides of triangles	• Solve problems involving relationships between parts of a right triangle and the altitude to its hypotenuse • Use the properties of 45°-45°-90°and 30°-60°-90° triangles • Find trigonometric ratios using right triangles • Use trigonometric ratios to find angle measures in right triangles • Solve problems involving angles of elevation and depression • Use angles of elevation and depression to find distance between two objects • Use the Law of Sines and Cosines to solve triangles

Missouri Learning Standards
G.SRT.C.7: Define trigonometric ratios, solve problems involving right triangles. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles.
G.SRT.C.5: Define trigonometric ratios, solve problems involving right triangles. Understand that side

HONORS GEOMETRY
UNIT 11 TRIGONOMETRY

Missouri Learning Standards
G.SRT.C.7: Define trigonometric ratios, solve problems involving right triangles. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles.
ratios in right triangles define the trigonometric ratios for acute angles.
G.SRT.C.6: Define trigonometric ratios, solve problems involving right triangles. Explain and use the relationship between the sine and cosine of complementary angles.
G.SRT.C.8: Define trigonometric ratios, solve problems involving right triangles. Derive the formula A = 1/2 ab sin(C) for the area of a triangle.

HONORS GEOMETRY
UNIT 12 CIRCLES

UNIT 12 This unit explores the properties of circles, the most symmetric of all two-dimensional geometric figures. Students will look at the properties of circles and their relation to lines and angles. Understanding these properties enables mathematicians to use regular polygons to develop the formulas for the circumference and area of a circle.

Unit Essential Learning Targets

Enduring Understandings	***Essential Questions***
• A circle is a unique geometric shape that appears in nature and in everyday objects. • There is a specific relationship between the circumference and the diameter of a circle. • Relationships exist between angles and arc measurements.	• Why are circles special as a geometric shape? • What is the relationship between the circumference and the diameter of a circle? • How do we know which method to use when solving problems involving circles? • How do we use circles to model and solve real world situations? • How is the equation of a circle derived given the radius and the center coordinates?
Students must know:	***Students must be able to:***
• Circumference and area can be determined from the diameter of a circle • Relationships exist among the many segments, angles and arcs related to a circle • Pi is an irrational number that was discovered thousands of years ago and is still being studied today • Circumference • Central angle • Major arc • Minor arc • Semicircle • Chord • Radius • Diameter • Sector • Secant • Tangent • Inscribed vs. Circumscribed	• Identify and use parts of circles • Solve problems involving the circumference of a circle • Identify central angles, major arcs, minor arcs, and semicircles, and find their measures • Find arc lengths • Recognize and use relationships between arcs, chords, and diameters • Find measures of inscribed angles and angles of inscribed polygon • Use properties of tangents • Solve problems involving circumscribed polygons • Find areas of circles and sectors of circles • Find measures of angles formed by lines intersecting on, inside, or outside a circle • Find measures of segments that intersect in the interior or exterior of a circle

Missouri Learning Standards

G.GPE.B.3: Use coordinates to prove geometric theorems algebraically. Use coordinates to prove geometric theorems algebraically.

HONORS GEOMETRY
UNIT 12 CIRCLES

G.MG.A.3: Apply geometric concepts in modeling situations. Apply geometric methods to solve design mathematical modeling problems.
G.C.A.2: Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii and chords of circles.
G.C.A.3: Understand and apply theorems about circles. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
G.C.B.4: Find arc lengths and areas of sectors of circles. Derive the formula for the length of an arc of a circle.
G.C.B.5: Find arc lengths and areas of sectors of circles. Derive the formula for the area of a sector of a circle.

COURSE TITLE AND GRADE
UNIT 13 GEOMETRIC SOLIDS

Unit 13 invites students to consider familiar three-dimensional figures, the sets of geometric solids known as prisms, pyramids, cylinders, cones, and spheres. Students will become familiar with how to recognize and draw these figures and will learn where the formulas for their surface areas and volumes come from.

Unit Essential Learning Targets

Enduring Understandings	***Essential Questions***
• Geometric solids can be measured using lateral area, surface area and volume.	• How are geometric solids measured? • How do you know which measure or formula to use? • How can we apply formulas for volume to real-world situations?
Students must know:	***Students must be able to:***
• Face • Edge • Vertex • Prism • Cube • Cylinder • Pyramid • Cone • Sphere • Net • Cross section • Surface area • Volume • Lateral area • Slant height • Height • Diameter • Radius	• Classify geometric solids • Use nets and cross sections to analyze three-dimensional figures • Apply formulas for prisms and cylinders to find surface area and volume • Apply formulas for pyramids and cones to find surface area and volume • Apply formulas for cubes and spheres to find surface area and volume • Describe how a change in a linear dimension of a figure affects its surface area or volume • Find a missing measure when given a figure's surface area or volume

Missouri Learning Standards

G.GMD.A.1: Explain volume formulas and use them to solve problems. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid and cone.

HONORS GEOMETRY
UNIT 14 PROBABILITY

In unit 12, students begin to understand independence and conditional probability and use them to interpret data. They use the rules of probability to compute probabilities of compound events in a uniform probability model and use probability to evaluate outcomes of decisions.

Unit Essential Learning Targets

Enduring Understandings	***Essential Questions***
• Probability describes the likelihood that an event will occur, and can be used to make predictions in real-life situations. • Probabilities are always between 0 and 1. • Events are independent of one another if the occurrence of one does not affect the probability of the occurrence of the other. Otherwise, they are dependent upon one another. • Specific formulas can be helpful in calculating various probabilities.	• How do we use geometric probability to predict results in real-world situations? • What is geometric probability?
Students must know:	***Students must be able to:***
• The difference between theoretical, experimental, and geometric probability • How to distinguish between independent and dependent events • How to calculate both theoretical and experimental probabilities • Conditional probability • Conditional relative frequency • Dependent events • Equally likely outcomes • Event • Geometric probability • Independent events • Outcome • Theoretical probability • Trial • Mutually Exclusive • Sample • Compound Events • Counting Principle • Complements • Unions	• Calculate geometric probability • Determine probabilities based on area to solve contextual problems • Use an area model or a tree diagram to compute the desired probability • Use the rules of probability to compute probabilities of compound events • Use the counting principle to determine the number of ways multiple independent events can occur • Use two way tables to approximate probabilities

HONORS GEOMETRY
UNIT 14 PROBABILITY

Missouri Learning Standards
G.CP.A.2: Understand independence and conditional probability and use them to interpret data. Understand the definition of independent events and use it to solve problems.
G.CP.A.5: Understand independence and conditional probability and use them to interpret data. Recognize and explain the concepts of conditional probability and independence in a context.
G.CP.A.1: Understand independence and conditional probability and use them to interpret data. Describe events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections or complements of other events.
G.CP.A.3: Understand independence and conditional probability and use them to interpret data. Calculate conditional probabilities of events.
G.CP.A.4: Understand independence and conditional probability and use them to interpret data. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
G.CP.A.5: Understand independence and conditional probability and use them to interpret data. Recognize and explain the concepts of conditional probability and independence in a context.
G.CP.A.6: Understand independence and conditional probability and use them to interpret data. Apply and interpret the Addition Rule for calculating probabilities.
G.CP.A.7: Understand independence and conditional probability and use them to interpret data. Apply and Interpret the general Multiplication Rule in a uniform probability model.
G.CP.A.8: Understand independence and conditional probability and use them to interpret data. Use permutations and combinations to solve problems.