Missouri Learning Standards: Grade-Level Expectations for Mathematics (Adopted April 2016 for implementation in the 2016 – 2017 school year, assessed beginning in the 2017 – 2018 school year.)		Missouri Learning Standards: Mathematics (Adopted 2010, transitioning out, assessed through the 2016 – 2017 school year.)	
Code	**Adopted Standards**	**Code**	**Current MLS**
G.CO.A	**Experiment with transformations in the plane.**		
G.CO.A.1	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.	**HSG-CO.A.1**	Know the 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.A.2	Represent transformations in the plane, and describe them as functions that take points in the plane as inputs and give other points as outputs.	**HSG-CO.A.2**	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
G.CO.A.3	Describe the rotational symmetry and lines of symmetry of two-dimensional figures.	**HSG-CO.A.3**	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
G.CO.A.4	Develop definitions of rotations, reflections and translations in terms of angles, circles, perpendicular lines, parallel lines and line segments.	**HSG-CO.A.4**	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G.CO.A.5	Demonstrate the ability to rotate, reflect or translate a figure, and determine a possible sequence of transformations between two congruent figures.	**HSG-CO.A.5**	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
G.CO.B	**Understand congruence in terms of rigid motions.**		
G.CO.B.6	Develop the definition of congruence in terms of rigid motions.	**HSG-CO.B.6**	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
		HSG-CO.B.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.B.7	Develop the criteria for triangle congruence from the definition of congruence in terms of rigid motions.	**HSG-CO.B.8**	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
G.CO.C	**Prove geometric theorems.**		

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G.CO.C.8	Prove theorems about lines and angles.	**HSG-CO.C.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 the segment's endpoints*.
G.CO.C.9	Prove theorems about triangles.	**HSG-CO.C.10**	Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point*.
G.CO.C.10	Prove theorems about polygons.	**HSG-CO.C.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.CO.D	**Make geometric constructions.**		
G.CO.D.11	Construct geometric figures using various tools and methods.	**HSG-CO.D.12**	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line*.
		HSG-CO.D.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.
		HSG-C.A.4	Construct a tangent line from a point outside a given circle to the circle.
G.SRT.A	**Understand similarity in terms of similarity transformations.**		
G.SRT.A.1	Construct and analyze scale changes of geometric figures.	**HSG-SRT.A.1**	Verify experimentally the properties of dilations given by a center and a scale factor: a. 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. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

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G.SRT.A.2	Use the definition of similarity to decide if figures are similar and to solve problems involving similar figures.	**HSG-SRT.A.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 corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	**HSG-SRT.A.3**	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
G.SRT.B	**Prove theorems involving similarity.**		
G.SRT.B.4	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**HSG-SRT.B.5**	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
G.SRT.C	**Define trigonometric ratios, and solve problems involving right triangles.**		
G.SRT.C.5	Understand that side ratios in right triangles define the trigonometric ratios for acute angles.	**HSG-SRT.B.4**	Prove theorems about triangles. *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.*
		HSG-SRT.C.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.C.6	Explain and use the relationship between the sine and cosine of complementary angles.	**HSG-SRT.C.7**	Explain and use the relationship between the sine and cosine of complementary angles.
G.SRT.C.7	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles.	**HSG-SRT.C.8**	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G.SRT.C.8	Derive the formula A = 1/2 ab sin(C) for the area of a triangle.	**HSG-SRT.D.9**	Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
G.C.A	**Understand and apply theorems about circles.**		
G.C.A.1	Prove that all circles are similar using similarity transformations.	**HSG-C.A.1**	Prove that all circles are similar.
G.C.A.2	Identify and describe relationships among inscribed angles, radii and chords of circles.	**HSG-C.A.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.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	**HSG-C.A.3**	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
G.C.B	**Find arc lengths and areas of sectors of circles.**		

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G.C.B.4	Derive the formula for the length of an arc of a circle.	**HSG-C.B.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.C.B.5	Derive the formula for the area of a sector of a circle.		
G.GPE.A	**Translate between the geometric description and the equation for a conic section.**		
G.GPE.A.1	Derive the equation of a circle.	**HSG-GPE.A.1**	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
G.GPE.A.2	Derive the equation of a parabola given a focus and directrix.	**HSG-GPE.A.2**	Derive the equation of a parabola given a focus and directrix.
G.GPE.B	**Use coordinates to prove geometric theorems algebraically.**		
G.GPE.B.3	Use coordinates to prove geometric theorems algebraically.	**HSG-GPE.B.4**	Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2).*
G.GPE.B.4	Prove the slope criteria for parallel and perpendicular lines and use them to solve problems.	**HSG-GPE.B.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.B.5	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	**HSG-GPE.B.6**	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
G.GPE.B.6	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.	**HSG-GPE.B.7**	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
G.GMD.A	**Explain volume formulas and use them to solve problems.**		
G.GMD.A.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.	**HSG-GMD.A.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.A.2	Use volume formulas for cylinders, pyramids, cones, spheres and composite figures to solve problems.	**HSG-GMD.A.3**	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems
G.GMD.B	**Visualize relationships between two-dimensional and three-dimensional objects.**		
G.GMD.B.3	Identify the shapes of two-dimensional cross-sections of three-dimensional objects.	**HSG-GMD.B.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.GMD.B.4	Identify three-dimensional objects generated by transformations of two-dimensional objects.		

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G.MG.A	**Apply geometric concepts in modeling situations.**		
G.MG.A.1	Use geometric shapes, their measures and their properties to describe objects.	**HSG-MG.A.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.A.2	Apply concepts of density based on area and volume in modeling situations.	**HSG.MG.A.2**	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot)
G.MG.A.3	Apply geometric methods to solve design mathematical modeling problems.	**HSG-MG.A.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).
G.CP.A	**Understand independence and conditional probability and use them to interpret data.**		
G.CP.A.1	Describe events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections or complements of other events.	**HSS-CP.A.1**	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
G.CP.A.2	Understand the definition of independent events and use it to solve problems.	**HSS-CP.A.2**	Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
G.CP.A.3	Calculate conditional probabilities of events.	**HSS-CP.A.3**	Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.
G.CP.A.4	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.	**HSS-CP.A.4**	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. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

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G.CP.A.5	Recognize and explain the concepts of conditional probability and independence in a context.	**HSS-CP.A.5**	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*
		HSS-CP.B.6	Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A,* and interpret the answer in terms of the model.
G.CP.A.6	Apply and interpret the Addition Rule for calculating probabilities.	**HSS-CP.B.7**	Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.
G.CP.A.7	Apply and Interpret the general Multiplication Rule in a uniform probability model.	**HSS-CP.B.8**	Apply the general Multiplication Rule in a uniform probability model, P(A and B)=P(A)P(B|A)=P(B)P(A|B), and interpret the answer in terms of the model.
G.CP.A.8	Use permutations and combinations to solve problems.	**HSS-CP.B.9**	Use permutations and combinations to compute probabilities of compound events and solve problems.
The following from the 2010 MLS have no corresponding standard in the 2016 updated Missouri Learning Standards.			
		HSG-SRT.D.10	Prove the Laws of Sines and Cosines and use them to solve problems.
		HSG-SRT.D.11	Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).
		HSS-MD.B.6	Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
		HSS-MD.B.7	Analyze decisions and strategies using probability concepts(e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).