

MVS Course Alignment Document

GEOMETRY MMC

*Delineates Recommended Content

STRAND 1: QUANTITATIVE LITERACY AND LOGIC

L1 Reasoning About Numbers, Systems, And Quantitative Situations

L1.1	Number Systems and Number Sense	Unit	Lesson	Resources
L1.1.6	Explain the importance of the irrational numbers square root of 2 and square root of 3 in basic right triangle trigonometry; the importance of π because of its role in circle relationships; and the role of e in applications such as continuously compounded interest.	6	6.2, 6.3, 6.4, 6.5, 6.6	United Streaming Video: Why are Triangles Important, Trig Ratios, GPS and Triangles; Holt E-text: Section 5.8, 8.2, 8.3, 8.4, 8.5; GIZMOS: Sine, Cosine, and Tangent
L1.2	Representations and Relationships	Unit	Lesson	Resources
L1.2.3	Use vectors to represent quantities that have magnitude and direction; interpret direction and magnitude of a vector numerically, and calculate the sum and difference of two vectors.	6	6.7	Holt E-text: Section 8.6; GIZMOS: Vectors

L2 Calculation, Algorithms, And Estimation

L2.1	Calculation Using Real and Complex Numbers	Unit	Lesson	Resources
L2.1.6	Recognize when exact answers aren't always possible or practical; use appropriate algorithms to approximate solutions to equations (e.g., to approximate square roots).	6	6.2, 6.3, 6.4, 6.5, 6.6	United Streaming Video: Why are Triangles Important, Trig Ratios, GPS and Triangles; Holt E-text: Section 5.8, 8.2, 8.3, 8.4, 8.5; GIZMOS: Sine, Cosine, and Tangent

L3 Measurement And Precision

L3.1	Measurement Units, Calculations, and Scales	Unit	Lesson	Resources
L3.1.1	Convert units of measurement within and between systems; explain how arithmetic operations on measurements affect units, and carry units through calculations correctly.	10	10.4, 10.5, 10.6, 10.7	Holt E-Text: Sections 10.4, 10.5, 10.6, 10.7

L4 Mathematical Reasoning, Logic, And Proof

L4.1	Mathematical Reasoning	Unit	Lesson	Resources
L4.1.1	Distinguish between inductive and deductive reasoning, identifying and providing examples of each.	2	2.1 - 2.4	Holt E-text: Sections 2.1, 2.2, 2.3, 2.4; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial
L4.1.2	Differentiate between statistical arguments (statements verified empirically using examples or data) and logical arguments based on the rules of logic.	2	2.1 - 2.4	Holt E-text: Sections 2.1, 2.2, 2.3, 2.4; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial
L4.1.3	Define and explain the roles of axioms (postulates), definitions, theorems, counterexamples, and proofs in the logical structure of mathematics; identify and give examples of each.	2	3.2	Holt E-text: Section 2.6
L4.2	Language and Laws of Logic	Unit	Lesson	Resources
L4.2.1	Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).	2 (Logic)	2.1 - 2.4	Holt E-text: Sections 2.1, 2.2, 2.3, 2.4; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial
L4.2.2	Use the connectives "NOT," "AND," "OR," and "IF...THEN," in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.	2 (Logic)	2.1 - 2.3	Holt E-text: Sections 2.1, 2.2, 2.3; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial

L4.2.3	Use the quantifiers “THERE EXISTS” and “ALL” in mathematical and everyday settings and know how to logically negate statements involving them.	2 (Logic)	2.1 - 2.4	Holt E-text: Sections 2.1, 2.2, 2.3, 2.4; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial
L4.2.4	Write the converse, inverse, and contrapositive of an “If..., then...” statement; use the fact, in mathematical and everyday settings, that the contrapositive is logically equivalent to the original while the inverse and converse are not.	2 (Logic)	2.2	Holt E-text: Sections 2.2; Gizmos: Conditional Statements & Biconditional Statements; Expressive Elements: Conditional Statement Tutorial & Contrapositive Inverse Tutorial
L4.3	Proof	Unit	Lesson	Resources
L4.3.1	Know the basic structure for the proof of an “If..., then...” statement (assuming the hypothesis and ending with the conclusion) and know that proving the contrapositive is equivalent.	3 (Proof)	3.1, 3.2, 3.3	Audio File: Proofs Tip; Holt E-text: Section 2.5, 2.6, 2.7,
L4.3.2	Construct proofs by contradiction; use counterexamples, when appropriate, to disprove a statement.	3 (Proof)	3.1, 3.2, 3.3	Audio File: Proofs Tip; Holt E-text: Section 2.5, 2.6, 2.7,
L4.3.3	Explain the difference between a necessary and a sufficient condition within the statement of a theorem; determine the correct conclusions based on interpreting a theorem in which necessary or sufficient conditions in the theorem or hypothesis are satisfied.	3 (Proof)	3.1, 3.2, 3.3	Audio File: Proofs Tip; Holt E-text: Section 2.5, 2.6, 2.7,

STRAND 3: GEOMETRY AND TRIGONOMETRY

G1 Figures And Their Properties

G1.1	Lines and Angles; Basic Euclidean and Coordinate Geometry	Unit	Lesson	Resources
G1.1.1	Solve multi-step problems and construct proofs involving vertical angles, linear pairs of angles supplementary angles, complementary angles, and right angles.	1 and 4	1.4, 4.1, 4.2, 4.3, 4.4	Holt E-text: Section 1.4, 3.1, 3.2, 3.3, 3.4; GIZMOS: Investigating Angle Theorems, Construct Parallel & Perpendicular Lines; SAS Interactivity 15: Parallel Lines
G1.1.2	Solve multi-step problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.	1 and 4	1.4, 4.1, 4.2, 4.3, 4.4	Holt E-text: Section 1.4, 3.1, 3.2, 3.3, 3.4; GIZMOS: Investigating Angle Theorems, Construct Parallel & Perpendicular Lines; SAS Interactivity 15: Parallel Lines
G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.	1	1.2, 1.3	Holt E-text: Section 1.2, 1.3; GIZMOS: Constructing Congruent Segments & Angles
G1.1.4	Given a line and a point, construct a line through the point that is parallel to the original line using straightedge and compass; given a line and a point, construct a line through the point that is perpendicular to the original line; justify the steps of the constructions.	1	1.2, 1.3	Holt E-text: Section 1.2, 1.3; GIZMOS: Constructing Congruent Segments & Angles
G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.	1 and 10	1.5 and 10.3	Holt E-text: Section 1.6,
G1.1.6	Recognize Euclidean Geometry as an axiom system; know the key axioms and understand the meaning of and distinguish between undefined terms (e.g., point, line, plane), axioms, definitions, and theorems.	1	1.1	Holt E-text: Section 1.1
G1.2	Triangles and Their Properties	Unit	Lesson	Resources
G1.2.1	Prove that the angle sum of a triangle is 180° and that an exterior angle of a triangle is the sum of the two remote interior angles.	5	5.1	United Streaming Video: Why are Triangles Important; Holt E-text: Section 5.1; GIZMO: Classifying Triangles

G1.2.2	Construct and justify arguments and solve multi-step problems involving angle measure, side length, perimeter, and area of all types of triangles.	5	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.1, 6.2, 6.3, 6.4, 7.7, 7.10	United Streaming Video: Why are Triangles Important, The Bermuda Triangle - In Math Class, The Pythagorean Theorem Video, The Man Behind the Theorem, Trig Ratios Video; Holt E-text: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 5.7, 5.8, 8.2, 8.3, 9.1, 9.4; GIZMOS: Classifying Triangles, Triangle Angle Sum Activity-A, Pythagorean Theorem - Activity A, Sine, Cosine, and Tangent.
G1.2.3	Know a proof of the Pythagorean Theorem and use the Pythagorean Theorem and its converse to solve multi-step problems.	6	6.1	United Streaming Video: The Pythagorean Theorem Video, the Many Behind the Theorem; Holt E-Text: Section 5.7; GIZMOS: Pythagorean Theorem - Activity A
G1.2.4	Prove and use the relationships among the side lengths and the angles of 30°- 60°- 90° triangles and 45°- 45°- 90° triangles.	6	6.2	Holt E-text: Section 5.8
G1.2.5	Solve multi-step problems and construct proofs about the properties of medians, altitudes, and perpendicular bisectors to the sides of a triangle, and the angle bisectors of a triangle; using a straightedge and compass, construct these lines.	5	5.9, 5.10, 5.11, 5.12	United Streaming Video: Why are Triangles Important; Holt E-text: Section 5.1, 5.2, 5.3, 5.4; GIZMOS: Concurrent Lines, Medians, and Altitudes

G1.3	Triangles and Trigonometry	Unit	Lesson	Resources
G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides; solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.	6	6.3, 6.4, 6.5,	United Streaming Video: Why are Triangles Important, Trig Ratios; Holt E-text: 8.2, 8.3, 8.4; GIZMOS: Sine, Cosine, and Tangent
G1.3.2	Know and use the Law of Sines and the Law of Cosines and use them to solve problems; find the area of a triangle with sides a and b and included angle using the formula Area = $(1/2) a b \sin \theta$.	6	6.6	United Streaming Video: Why are Triangles Important, GPS and Triangles; Holt E-text: Section 8.5
G1.3.3	Determine the exact values of sine, cosine, and tangent for 0°, 30°, 45°, 60°, and their integer multiples, and apply in various contexts.	6	6.2, 6.3, 6.4, 6.5, 6.6	United Streaming Video: Why are Triangles Important, Trig Ratios, GPS and Triangles; Holt E-text: Section 5.8, 8.2, 8.3, 8.4, 8.5; GIZMOS: Sine, Cosine, and Tangent
G1.4	Quadrilaterals and Their Properties	Unit	Lesson	Resources
G1.4.1	Solve multi-step problems and construct proofs involving angle measure, side length, diagonal length, perimeter, and area of squares, rectangles, parallelograms, kites, and trapezoids.	7	7.2, 7.3, 7.4, 7.5, 7.6, 7.7	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 6.2, 6.3, 6.4, 6.5, 6.6, 9.1; GIZMOS: Parallelogram Conditions, Special Quadrilaterals, Classifying Quadrilaterals - Activity B,
G1.4.2	Solve multi-step problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.	7	7.2, 7.3, 7.4, 7.5, 7.6, 7.7	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 6.2, 6.3, 6.4, 6.5, 6.6, 9.1; GIZMOS: Parallelogram Conditions, Special Quadrilaterals, Classifying Quadrilaterals - Activity B,
G1.4.3	Describe and justify hierarchical relationships among quadrilaterals, (e.g. every rectangle is a parallelogram).	7	7.2, 7.3, 7.4, 7.5, 7.6, 7.7	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 6.2, 6.3, 6.4, 6.5, 6.6, 9.1; GIZMOS: Parallelogram Conditions, Special Quadrilaterals, Classifying Quadrilaterals - Activity B,
G1.4.4	Prove theorems about the interior and exterior angle sums of a quadrilateral.	7	7.1	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 6.1
*G1.4.5	Understand the definition of a cyclic quadrilateral, and know and use the basic properties of cyclic quadrilaterals.			
G1.5	Other Polygons and Their Properties	Unit	Lesson	Resources
G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons (e.g., regular octagon, non-regular pentagon).	7	7.9	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 9.3
G1.5.2	Know, justify, and use formulas for the perimeter and area of a regular n-gon and formulas to find interior and exterior angles of a regular n-gon and their sums.	7	7.1	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Section 6.1

G1.6 Circles and Their Properties		Unit	Lesson	Resources
G1.6.1	Solve multi-step problems involving circumference and area of circles.	7	7.8	United Streaming Video: Why are circles Important?; Holt E-text: Section 9.2
G1.6.2	Solve problems and justify arguments about chords (e.g., if a line through the center of a circle is perpendicular to a chord, it bisects the chord) and lines tangent to circles (e.g., a line tangent to a circle is perpendicular to the radius drawn to the point of tangency).	9	9.1, 9.2, 9.6, 9.7	Holt E-Text: Section 11.1, 11.2, 11.7; GIZMO: Chords & Arcs, and Circles; United Streaming Video: Segments & Angles and Why are circles Important?
G1.6.3	Solve problems and justify arguments about central angles, inscribed angles and triangles in circles.	9	9.4, 9.5, 9.6, 9.7	Holt E-text: Section 11.4, 11.5, 11.6, 11.7; GIZMOS: Inscribing Angles, and Circles; United Streaming Video: Segments & Angles and Why are circles Important?
G1.6.4	Know and use properties of arcs and sectors, and find lengths of arcs and areas of sectors.	9	9.3, 9.7	Holt E-text: Section 11.3, 11.7; GIZMO: Circles; United Streaming Video: Why are circles Important?
G1.8 Three- Dimensional Figures		Unit	Lesson	Resources
G1.8.1	Solve multi-step problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	10	10.4, 10.5, 10.6, 10.7, 10.8	United Streaming Video: The Importance of 3-D Figures; Holt E-text: 10.4, 10.5, 10.6, 10.7, 10.8; GIZMOS: Surface and Lateral Area of Prisms & Cylinders, and Surface and Lateral Area of Pyramids & Cones
G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	11	11.5	United Streaming Video: The Importance of 3-D Figures; Holt E-text: Lesson 12.5
G2 Relationships Between Figures				
G2.1 Relationships Between Area and Volume Formulas		Unit	Lesson	Resources
G2.1.1	Know and demonstrate the relationships between the area formula of a triangle, the area formula of a parallelogram, and the area formula of a trapezoid.	7	7.8, 7.9, 7.10, 7.11	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Sections 9.2, 9.3, 9.4, 9.5
G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals (e.g., explain how to find the area of a trapezoid based on the areas of parallelograms and triangles).	7	7.8, 7.9, 7.10, 7.11	United Streaming Video: Why are Quadrilaterals Important; Holt E-text: Sections 9.2, 9.3, 9.4, 9.5
G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).	10	10.6, 10.7	United Streaming Video: The Importance of 3-D Figures; Holt E-text: 10.6, 10.7
G2.2 Relationships Between Two-dimensional and Three-dimensional Representations		Unit	Lesson	Resources
G2.2.1	Identify or sketch a possible 3-dimensional figure, given 2-dimensional views (e.g., nets, multiple views); create a 2-dimensional representation of a 3-dimensional figure.	10	10.1, 10.2	United Streaming Video: The Importance of 3-D Figures and Cross-Sections; Holt E-text: 10.1, 10.2; GIZMO: 3D & Orthographic Views
G2.2.2	Identify or sketch cross-sections of 3-dimensional figures; identify or sketch solids formed by revolving 2-dimensional figures around lines.	10	10.1, 10.2	United Streaming Video: The Importance of 3-D Figures and Cross-Sections; Holt E-text: 10.1, 10.2; GIZMO: 3D & Orthographic Views
G2.1 Congruence and Similarity		Unit	Lesson	Resources
G2.3.1	Prove that triangles are congruent using the SSS, SAS, ASA, and AAS criteria, and for right triangles, the hypotenuse-leg criterion.	5	5.3, 5.4, 5.5	United Streaming Video: Why are Triangles Important; Holt E-text: Section 4.3, 4.4, 4.5
G2.3.2	Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.	5	5.3, 5.4, 5.5, 5.6, 5.7, 5.8	United Streaming Video: Why are Triangles Important; Holt E-text: Section 4.5, 4.4, 4.5, 4.6, 4.7, 4.8
G2.3.3	Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.	8	8.3	United Streaming Video: Why are Triangles Important; Holt E-text: Section 7.3
G2.3.4	Use theorems about similar triangles to solve problems with and without use of coordinates.	8	8.4, 8.5, 8.6, 8.7	United Streaming Video: Why are Triangles Important; Holt E-text: 7.4, 7.5, 7.6, 8.1

G2.3.5	Know and apply the theorem stating that the effect of a scale factor of k relating one two dimensional figure to another or one three dimensional figure to another, on the length, area, and volume of the figures is to multiply each by k , k^2 , and k^3 , respectively.	7	7.11	United Streaming Video: Why are Triangles Important; Holt E-text: Section 9.5
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G3 Transformations Of Figures In The Plane

G3.1	Distance-preserving Transformations: Isometries	Unit	Lesson	Resources
G3.1.1	Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.	11	11.1, 11.2, 11.3, 11.4	United Streaming Video: Why are Transformations Important, Reflections & Animation, Translations - Dinosaurs Walking, Rotations & Animation; Holt E-text: Section 12.1, 12.2, 12.3, 12.4; GIZMOS: Reflections, Translations, and Rotations, Reflections, & Translations
G3.1.2	Given two figures that are images of each other under an isometry, find the isometry and describe it completely.	11	11.1, 11.2, 11.3, 11.4	United Streaming Video: Why are Transformations Important, Reflections & Animation, Translations - Dinosaurs Walking, Rotations & Animation; Holt E-text: Section 12.1, 12.2, 12.3, 12.4; GIZMOS: Reflections, Translations, and Rotations, Reflections, & Translations
G3.1.3	Find the image of a figure under the composition of two or more isometries, and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.	11	11.4	United Streaming Video: Why are Transformations Important; Holt E-text: Section 12.4
G3.2	Shape-preserving Transformations: Dilations and Isometries	Unit	Lesson	Resources
G3.2.1	Know the definition of dilation, and find the image of a figure under a given dilation.	8 and 11	8.6 and 11.7	United Streaming Video: Why are Transformations Important; Holt E-text: Section 7.6 and 12.7; GIZMO: Dilations
G3.2.2	Given two figures that are images of each other under some dilation, identify the center and magnitude of the dilation.	11	11.7	United Streaming Video: Why are Transformations Important; Holt E-text: Section 12.7; GIZMO: Dilations
*G3.2.3	Find the image of a figure under the composition of a dilation and an isometry.	11	11.7	United Streaming Video: Why are Transformations Important; Holt E-text: Section 12.7; GIZMO: Dilations