

Desoto County School District 2019-2020

Geometry (Semester) Pacing Guide

First & Third Nine Weeks

Review (Algebra I Concepts)

- Evaluate/Simplify algebraic expressions, including those with exponents, absolute value, perfect square roots, and perfect cube roots.
 - Solve, check, and graph multi-step equations and inequalities in one and two-variable with distributive property including rational coefficients in mathematical and real-world situations and interpret the solution.
 - Differentiate among rational, irrational and real numbers.
 - Calculate slope using graphs and formulas.
 - Write equations of lines given a variety of information. (Examples: given a graph, two points, point and slope, slope and y-intercept and/or situation.)
 - Solve formulas and equations for a specific variable.
 - Represent polynomial operations with area models.
 - Apply the concept of slope to determine if lines in a plane are parallel or perpendicular.
- * Note: The standard for Simplifying Radicals is no longer a standard in the 2016 MS CCRS Framework. You will need to teach this skill while reviewing.

Shapes and Transformations (Chapter 1)

- Describe the different types of transformations including translations, reflections, rotations and dilations.
- Describe transformations as functions that take points in the coordinate plane as inputs and give other points as outputs.
- Compare transformations that preserve distance and angle to those that do not (for example, translation versus horizontal stretch).
- Write functions to represent transformations.
- Recall definitions of angles, circles, perpendicular and parallel lines and line segments.
- Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines and line segments.
- Given a geometric figure and a rotation, reflection or translation, draw the transformed figure using graph paper, tracing paper or geometry software.
- Draw transformed figure and specify the sequence of transformations that were used to carry the given figures onto the other.
- Use geometric descriptions of rigid motions to transform figures.
- Predict the effect of a given rigid motion on a given figure and describe the transformation.
- Define congruence in terms of rigid motions (i.e. two figures are congruent if there exists a rigid motion, or composition of rigid motions, that take one figure to the second).
- Use strategies to help visualize relationships between two-dimensional and three-dimensional objects.
- Relate the shapes of two-dimensional cross-sections to their three-dimensional object.
- Find the point on a line segment, given two endpoints, and divides the segment into a given ration.

Angles and Measurement (Chapter 2)

- Use inductive reasoning to identify patterns and make conjectures.
- Find counterexamples to disprove conjectures.
- Write and analyze bi-conditional statements.
- Write the inverse, converse, and contrapositive of a conditional statement.
- Interpret geometric diagrams and determine what can and cannot be assumed.
- Identify and use the properties of congruence and equality (reflexive, symmetric, transitive) in proofs.
- Order statements based on logic when constructing proofs.
- Prove vertical angles are congruent.
- Prove and apply theorems about the angles formed by parallel lines and a transversal.
- Identify and use properties of parallel lines with transversals, corresponding angles, and alternate interior and exterior angles to solve problems.
- Prove points on a perpendicular bisector of a line segment are exactly equidistant from the segment's endpoints.
- Prove the sum of the measures of the interior angles of a triangle is equal to 180° .
- Prove the base angles of isosceles triangles are congruent.
- Prove the segment joining midpoints of two sides of a triangle is parallel to the third side (mid-segment).
- Prove the segment joining the midpoints to two sides of a triangle is half the length of the third side.

Desoto County School District 2019-2020 Geometry (Semester) Pacing Guide

- Prove the medians of a triangle meet at a point called the centroid.
- Use Pythagorean Theorem to solve for unknown side length of a right triangle.

Justification and Similarity (Chapter 3)

- Use a variety of tools (i.e. dynamic Geometry software, compass/straightedge, tracing paper, etc.) to perform the following:
 - Bisect a segment and angle.
 - Construct perpendicular lines including the perpendicular bisector of a segment.
 - Construct a line parallel to a given line through a point not on the line.
- Perform a dilation with a given center and scale factor on a figure in the coordinate plane.
- Verify that when a side passes through the center of dilation, the side and its image lie on the same line.
- Verify that corresponding sides of the pre-image and images are parallel and proportional.
- Define similarity as a composition of rigid motions followed by dilations in which angle measure is preserved and side length is proportional.
- Identify corresponding sides and corresponding angles of similar triangles.
- Determine scale factor between two similar figures and use the scale factor to solve problems.
- Demonstrate that corresponding angles are congruent and corresponding sides are proportional in a pair of similar triangles.
- Determine that two figures are similar by verifying that angle measure is preserved and corresponding sides are proportional.
- Prove a line parallel to one side of a triangle divides the other two proportionally.
- Prove if a line divides two sides of a triangle proportionally; then it is parallel to the third side.
- Use angle congruence and proportional side relationships to prove similarity in geometric figures.
- Use triangle similarity theorems such as AA, SSS and SAS to prove two triangles are similar.
- Show and explain that when two angles measures (AA) are known, the third angle measure is also known. (Third Angle Theorem)
- Describe and illustrate rotations and reflections of a rectangle, parallelogram, trapezoid, or regular polygon that map each figure onto itself.

Trigonometry and Probability (Chapter 4)

- Prove the Pythagorean Theorem using triangle similarity.
- Use Pythagorean Theorem to solve for unknown side length of a right triangle.
- Calculate sine and cosine ratios for acute angles in a right triangle when two side lengths are given.
- Explain and use the relationship between the sine of an acute angle and the cosine of its complement.

Completing the Triangle Toolkit (Chapter 5)

- Recall right triangle trigonometry to solve mathematical problems.
- Calculate sine and cosine ratios for acute angles in a right triangle when two side lengths are given.
- Apply the area of a triangle formula by solving the formula $A = \frac{1}{2}ab \sin(C)$ to solve real world problems.
- Derive the formula $A = \frac{1}{2}ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
- Use the Laws of Sines and Cosines to find missing angles or side length measurements.
- Prove the Law of Sines and Law of Cosines.
- Recognize when the Law of Sines and Law of Cosines can be applied to a problem and solve problems in context using them.
- Determine from given measurements in right and non-right triangles whether it is appropriate to use the Law of Sines or Cosines.
- 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).

Note: State ACT (All Juniors): February 25, 2020

Desoto County School District 2019-2020

Geometry (Semester) Pacing Guide

Second & Fourth Nine Weeks

Congruent Triangles (Chapter 6)

- Identify the ASA, SAS, and SSS theorems.
- Identify corresponding sides and corresponding angles of congruent triangles.
- Explain that in a pair of congruent triangles, corresponding sides are congruent and corresponding angles are congruent.
- Justify that when congruent triangles distance and angles measures are preserved, the triangles must be congruent.
- Identify corresponding pairs of angles and sides of congruent triangles after rigid motions.
- Use definition of congruence in terms of rigid motions to show that two triangles are congruent if corresponding pairs of sides and corresponding pairs of angles are congruent.
- Justify congruency of two triangles using transformations.
- Predict the effects of a given rigid motion.
- Use congruency and similarity theorems for triangles to solve problems and prove relationships in geometric figures.
- Use the vertices of a polygon to find the necessary dimensions for computing the perimeter and area.
- Formulate a model of figures in contextual problems to compute area and/or perimeter.

Proof and Quadrilaterals (Chapter 7)

- Apply geometric methods to solve design problems.

Desoto County School District 2019-2020

Geometry (Semester) Pacing Guide

- Use inductive reasoning to identify patterns and make conjectures.
- Find counterexamples to disprove conjectures.
- Write and analyze bi-conditional statements.
- Write the inverse, converse, and contrapositive of a conditional statement.
- Interpret geometric diagrams and determine what can and cannot be assumed.
- Identify and use the properties of congruence and equality (reflexive, symmetric, transitive) in proofs.
- Order statements based on logic when constructing proofs.
- Prove the opposite sides and angles of a parallelogram are congruent.
- Prove the diagonals of a parallelogram bisect each other.
- Prove rectangles are parallelograms with congruent diagonals.
- Prove the base angles of isosceles triangles are congruent.
- Prove the segment joining midpoints of two sides of a triangle is parallel to the third side (mid-segment).
- Prove the segment joining the midpoints to two sides of a triangle is half the length of the third side.
- Prove or disprove geometric theorems or definitions in relation to the coordinate plane using slope, distance and midpoint formulas.
- Use slope to prove lines are parallel or perpendicular.
- Find the equation of a line parallel or perpendicular to a given line that passes through a given point.

Polygons and Circles (Chapter 8)

- Compute the interior and exterior angle sums of convex polygons.
- Inscribe a regular polygon in a circle and break it into congruent triangles to find its area.
- Explain how the formulas for the area and circumference of a circle were derived.
- Define the radian measure of an angle as the ratio of arc length to its radius, and calculate a radian measure when given an arc length and its radius.
- Use similarity to derive the formula for the area of a sector.
- Use similarity to calculate the length of an arc.
- Find the area of a sector.
- Convert degrees to radians using the constant of proportionality.

Solids and Constructions (Chapter 9)

- Find the surface area of prisms, cylinders, pyramids, spheres and cones.
- Describe the difference between lateral and surface area.
- Develop formulas to calculate the volumes of 3-D figures including spheres, cones, prisms, and pyramids.
- Use the similarity ratio between two solids to find the volume.
- Use geometric shapes, their measures and their properties to describe objects.

Circles (Chapter 10)* ACT

- Identify central angles, inscribed angles, circumscribed angles, diameters, radii, chords, and tangents.
- Describe the relationship between a central angle and its intercepted arc.
- Describe the relationship between an inscribed angle and its intercepted arc.
- Describe the relationship between two secants, a secant and a tangent or two tangents in relation to the intercepted circle.
- Verify that inscribed angles on a diameter are right angles.
- Verify that radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- Construct the inscribed circle whose center is the point of intersection of the angle bisectors (incenter).
- Prove that opposite angles in an inscribed quadrilateral are supplementary.
- Construct the circumscribed circle whose center is the point of intersection of the perpendicular bisectors (circumcenter).

Solids and Circles (Chapter 11)

- Explain the construction of geometric figures using a variety of tools and methods.
- Apply the definitions, properties and theorems about line segments, rays and angles to support geometric constructions.
- Apply properties and theorems about parallel and perpendicular lines to support constructions.
- Find the surface area of prisms, cylinders, pyramids, spheres and cones.
- Describe the difference between lateral and surface area.
- Use geometric shapes, their measures and their properties to describe objects.
- Develop formulas to calculate the volumes of 3-D figures including spheres, cones, prisms, and pyramids.

Desoto County School District 2019-2020 Geometry (Semester) Pacing Guide

- Use the similarity ratio between two solids to find the volume.
- Identify the cross section of a plane with a 3-D solid.
- Recognize the solid formed by revolving a rectangle, a right triangle, and a circle about a line.
- Identify and draw rotations and transformations of figures.
- Inscribe a regular polygon in a circle and break it into congruent triangles to find its area.
- Identify central angles, inscribed angles, circumscribed angles, diameters, radii, chords, and tangents.
- Describe the relationship between a central angle and its intercepted arc.
- Describe the relationship between an inscribed angle and its intercepted arc.
- Describe the relationship between a circumscribed angle and its intercepted arcs.
- Describe the relationship between two secants, a secant and a tangent or two tangents in relation to the intercepted circle.

This pacing calendar follows the CPM Geometry Textbook that the district has adopted as a resource to assist in teaching the MS College & Career Readiness Standards (MS CCRS) for Geometry. The specific lessons addressed in this pacing guide are aligned to the set standards. However, this pacing guide is not meant to be an exhaustive list nor is it a list that limits how the standards are taught in the classroom. This is a sample pacing to help teachers with planning and a guide to understand the knowledge and skills that define the standards.