

GEOMETRY LEARNING PROGRESSIONS

How are these progressions organized?
By Strand - colors as designated below.

**Geometric
Reasoning**

Trigonometry

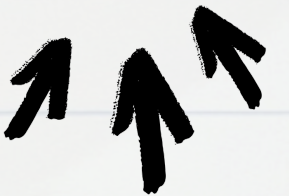
**Logic and
Discrete Theory**

These categories are directly outlined in the following documents from the Florida Department of Education:

[Test Item Specifications](#)
[Test Design Summary and Blueprint](#)

(click links above to view these documents)

[Click here for the B1G-M](#)
[\(B.E.S.T. Instructional Guide for Mathematics\)](#)
[document available on Turnkey.](#)



Geometric Reasoning

MA.912.GR.1.1 Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating); Secondary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test hypotheses about new angle relationships by exploring complex geometric configurations, and devise multiple proof strategies to verify conjectures about lines and angles using different logical approaches.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN prove relationships and theorems about lines and angles, and solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall definitions of angle types (acute, right, obtuse, straight, complementary, supplementary, vertical, adjacent, linear pair).
- I CAN recall postulates about lines and angles (segment addition, angle addition, linear pair postulate).
- I CAN recall theorems about angles (vertical angles theorem, congruent supplements theorem, congruent complements theorem).
- I CAN recognize angle relationships in diagrams (vertical angles, linear pairs, complementary, supplementary).
- I CAN execute the procedure of writing two-column proofs, paragraph proofs, or flowchart proofs.
- I CAN execute the procedure of solving equations to find unknown angle measures.
- I CAN recall properties of equality and congruence used in proofs.
- I CAN identify given information and what needs to be proven.
- I CAN execute the procedure of applying angle relationships to set up equations.
- I CAN recognize when to apply specific theorems and postulates.

Geometric Reasoning

MA.912.GR.1.2 Prove triangle congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for proving triangle congruence or similarity in complex diagrams, determine which theorem provides the most efficient proof strategy, and justify my choice by analyzing the given information and geometric relationships present.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN prove triangle congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the congruence theorems (SSS, SAS, ASA, AAS, HL).
- I CAN recall the similarity theorems (SSS~, SAS~, AA~).
- I CAN recall the definition of congruent triangles (corresponding sides and angles are congruent).
- I CAN recall the definition of similar triangles (corresponding angles are congruent and corresponding sides are proportional).
- I CAN recognize corresponding parts of triangles in diagrams.
- I CAN identify given information about sides and angles in triangles.
- I CAN execute the procedure of marking congruent parts on diagrams.
- I CAN execute the procedure of writing two-column, paragraph, or flowchart proofs.
- I CAN recall that HL (Hypotenuse-Leg) applies only to right triangles.
- I CAN recognize when sufficient information is provided to prove congruence or similarity.

Geometric Reasoning

MA.912.GR.1.3 Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating); Secondary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test hypotheses about new triangle relationships by exploring complex geometric configurations, devise multiple proof strategies to verify conjectures about triangles, and determine which approach provides the most elegant or efficient demonstration.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN prove relationships and theorems about triangles, and solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall triangle theorems (Triangle Sum Theorem, Exterior Angle Theorem, Triangle Inequality Theorem, Base Angles Theorem for isosceles triangles).
- I CAN recall properties of special triangles (isosceles, equilateral, right triangles).
- I CAN recall theorems about triangle sides and angles (larger angle opposite longer side, larger side opposite larger angle).
- I CAN recall the Pythagorean Theorem and its converse.
- I CAN recognize triangle types and their properties in diagrams.
- I CAN execute the procedure of writing two-column, paragraph, or flowchart proofs.
- I CAN execute the procedure of solving equations to find unknown side lengths or angle measures.
- I CAN identify given information and what needs to be proven.
- I CAN recall properties of medians, altitudes, angle bisectors, and perpendicular bisectors.
- I CAN execute the procedure of applying triangle theorems to set up equations in real-world contexts.

Geometric Reasoning

MA.912.GR.1.4 Prove relationships and theorems about parallelograms. Solve mathematical and real-world problems involving postulates, relationships and theorems of parallelograms.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating); Secondary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test hypotheses about parallelogram relationships by exploring special cases (rectangles, rhombi, squares), devise multiple proof strategies to verify conjectures, and determine which properties are sufficient to prove a quadrilateral is a parallelogram.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN prove relationships and theorems about parallelograms, and solve mathematical and real-world problems involving postulates, relationships and theorems of parallelograms.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a parallelogram (quadrilateral with both pairs of opposite sides parallel).
- I CAN recall properties of parallelograms (opposite sides congruent, opposite angles congruent, consecutive angles supplementary, diagonals bisect each other).
- I CAN recall theorems for proving a quadrilateral is a parallelogram (both pairs of opposite sides congruent, both pairs of opposite angles congruent, one pair of opposite sides both parallel and congruent, diagonals bisect each other).
- I CAN recall properties of special parallelograms (rectangles, rhombi, squares).
- I CAN recognize parallelograms and their properties in diagrams.
- I CAN execute the procedure of writing two-column, paragraph, or flowchart proofs.
- I CAN execute the procedure of solving equations to find unknown side lengths, angle measures, or diagonal lengths.
- I CAN identify given information and what needs to be proven.
- I CAN recognize when sufficient information is provided to prove a quadrilateral is a parallelogram.
- I CAN execute the procedure of applying parallelogram theorems to set up equations in real-world contexts.

Geometric Reasoning

MA.912.GR.1.5 Prove relationships and theorems about trapezoids. Solve mathematical and real-world problems involving postulates, relationships and theorems of trapezoids.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating); Secondary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test hypotheses about trapezoid relationships by exploring special cases (isosceles trapezoids), devise multiple proof strategies to verify conjectures about trapezoids and their midsegments, and determine which properties distinguish trapezoids from other quadrilaterals.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN prove relationships and theorems about trapezoids, and solve mathematical and real-world problems involving postulates, relationships and theorems of trapezoids.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a trapezoid (quadrilateral with exactly one pair of parallel sides).
- I CAN recall the definition of bases and legs of a trapezoid.
- I CAN recall properties of isosceles trapezoids (legs congruent, base angles congruent, diagonals congruent).
- I CAN recall the Trapezoid Midsegment Theorem (midsegment is parallel to bases and its length is the average of the base lengths).
- I CAN recognize trapezoids and isosceles trapezoids in diagrams.
- I CAN identify the bases, legs, base angles, and midsegment of a trapezoid.
- I CAN execute the procedure of writing two-column, paragraph, or flowchart proofs.
- I CAN execute the procedure of solving equations to find unknown side lengths, angle measures, or midsegment length.
- I CAN execute the procedure of calculating the average of two numbers.
- I CAN identify given information and what needs to be proven.
- I CAN execute the procedure of applying trapezoid theorems to set up equations in real-world contexts.

Geometric Reasoning

MA.912.GR.1.6 Solve mathematical and real-world problems involving congruence or similarity in two-dimensional figures.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for solving congruence or similarity problems in complex real-world contexts, determine whether congruence or similarity is the appropriate relationship to apply, and justify my strategic choices using mathematical reasoning and contextual constraints.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving congruence or similarity in two-dimensional figures.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of congruent figures (same size and shape, corresponding parts congruent).
- I CAN recall the definition of similar figures (same shape, corresponding angles congruent, corresponding sides proportional).
- I CAN recognize congruent and similar figures in diagrams and real-world contexts.
- I CAN identify corresponding parts of congruent or similar figures.
- I CAN execute the procedure of writing and solving proportions for similar figures.
- I CAN execute the procedure of using congruence to find unknown side lengths or angle measures.
- I CAN recall the scale factor relationship in similar figures.
- I CAN execute the procedure of applying triangle congruence theorems (SSS, SAS, ASA, AAS, HL).
- I CAN execute the procedure of applying triangle similarity theorems (SSS~, SAS~, AA~).
- I CAN interpret solutions in the context of real-world problems.
- I CAN recognize when problems involve indirect measurement using similar figures.

Geometric Reasoning

MA.912.GR.2.1 Given a preimage and image, describe the transformation and represent the transformation algebraically using coordinates.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast multiple transformations to explain how different algebraic representations produce different geometric effects, and determine which transformation or sequence of transformations maps one figure onto another by analyzing coordinate patterns.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN describe the transformation and represent the transformation algebraically using coordinates given a preimage and image.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the types of transformations (translation, reflection, rotation, dilation).
- I CAN recognize the characteristics of each transformation type.
- I CAN identify corresponding points between preimage and image.
- I CAN recall the coordinate notation for translations: $(x, y) \rightarrow (x + a, y + b)$.
- I CAN recall the coordinate notation for reflections over x-axis: $(x, y) \rightarrow (x, -y)$, y-axis: $(x, y) \rightarrow (-x, y)$, $y = x$: $(x, y) \rightarrow (y, x)$.
- I CAN recall the coordinate notation for rotations about the origin (90° , 180° , 270°).
- I CAN recall the coordinate notation for dilations: $(x, y) \rightarrow (kx, ky)$.
- I CAN execute the procedure of determining the rule by comparing coordinates.
- I CAN recognize rigid transformations (preserve size and shape) versus non-rigid transformations (dilations).
- I CAN identify the center of rotation or dilation, line of reflection, or direction and distance of translation.

Geometric Reasoning

MA.912.GR.2.2 Identify transformations that do or do not preserve distance.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple transformations and sequences of transformations to form general conclusions about which properties are preserved (distance, angle measure, parallelism, orientation), and create principles that explain why rigid transformations preserve distance while non-rigid transformations do not.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN identify transformations that do or do not preserve distance.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of distance-preserving transformations (isometries or rigid transformations).
- I CAN recall that translations preserve distance.
- I CAN recall that reflections preserve distance.
- I CAN recall that rotations preserve distance.
- I CAN recall that dilations do not preserve distance (unless scale factor = 1).
- I CAN recognize rigid transformations (translations, reflections, rotations).
- I CAN recognize non-rigid transformations (dilations with scale factor $\neq 1$).
- I CAN execute the procedure of calculating distances between points using the distance formula or coordinate plane.
- I CAN identify corresponding segments in preimage and image.
- I CAN recognize that distance-preserving transformations produce congruent figures.
- I CAN recall that dilations produce similar (but not congruent) figures when scale factor $\neq 1$.

Geometric Reasoning

MA.912.GR.2.3 Identify a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple possible sequences of transformations that could map one figure onto another, determine which sequence is most efficient or elegant, and justify my choice by explaining why certain transformation orders produce different results than others.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN identify a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the types of transformations (translation, reflection, rotation, dilation).
- I CAN recall that rigid transformations (translations, reflections, rotations) produce congruent figures.
- I CAN recall that dilations produce similar figures (or congruent if scale factor = 1).
- I CAN recognize corresponding points and parts between figures.
- I CAN identify the orientation of figures (same or opposite).
- I CAN recognize when a figure maps onto itself (symmetry).
- I CAN identify lines of symmetry and centers of rotation for figures.
- I CAN execute the procedure of describing transformations using coordinate notation.
- I CAN recognize that the order of transformations can affect the final result.
- I CAN identify whether figures are congruent or similar by comparing corresponding parts.

Geometric Reasoning

MA.912.GR.2.5 Given a geometric figure and a sequence of transformations, draw the transformed figure on a coordinate plane.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain how the order of transformations in a sequence affects the final image, describe why certain transformation orders produce different results, and predict the outcome of transformation sequences before drawing them.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN draw the transformed figure on a coordinate plane given a geometric figure and a sequence of transformations.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the coordinate rules for translations: $(x, y) \rightarrow (x + a, y + b)$.
- I CAN recall the coordinate rules for reflections (over x-axis, y-axis, $y = x$, $y = -x$).
- I CAN recall the coordinate rules for rotations about the origin (90° , 180° , 270° , clockwise and counterclockwise).
- I CAN recall the coordinate rules for dilations: $(x, y) \rightarrow (kx, ky)$.
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of applying transformation rules to coordinates.
- I CAN execute the procedure of connecting points to form geometric figures.
- I CAN recognize that transformations must be applied in the order given.
- I CAN identify the vertices of the preimage.
- I CAN execute the procedure of labeling preimage and image with appropriate notation (A, A', A'', etc.).

Geometric Reasoning

MA.912.GR.2.6 Apply rigid transformations to map one figure onto another to justify that the two figures are congruent.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test multiple sequences of rigid transformations to determine all possible ways to map one figure onto another, and devise strategies for finding the most efficient transformation sequence based on the orientation and position of the figures.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN apply rigid transformations to map one figure onto another to justify that the two figures are congruent.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of rigid transformations (translations, reflections, rotations - transformations that preserve distance).
- I CAN recall the definition of congruent figures (same size and shape).
- I CAN recall that rigid transformations preserve distance, angle measure, and shape.
- I CAN recognize corresponding parts of figures.
- I CAN identify the orientation of figures (same or opposite).
- I CAN execute the procedure of applying translations, reflections, and rotations.
- I CAN execute the procedure of describing transformation sequences using coordinate notation or geometric descriptions.
- I CAN recognize when a sequence of rigid transformations successfully maps one figure onto another.
- I CAN recall that if one figure can be mapped onto another using rigid transformations, the figures are congruent.
- I CAN identify which rigid transformation or sequence is needed based on figure positions and orientations.

Geometric Reasoning

MA.912.GR.2.8 Apply an appropriate transformation to map one figure onto another to justify that the two figures are similar.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test multiple sequences of transformations (including dilations and rigid transformations) to determine all possible ways to map one figure onto another similar figure, and devise strategies for finding the scale factor and transformation sequence based on corresponding parts.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN apply an appropriate transformation to map one figure onto another to justify that the two figures are similar.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of similar figures (same shape, corresponding angles congruent, corresponding sides proportional).
- I CAN recall that similarity transformations include dilations and rigid transformations (translations, reflections, rotations).
- I CAN recall that dilations change size but preserve shape and angle measures.
- I CAN recall the coordinate notation for dilations: $(x, y) \rightarrow (kx, ky)$, where k is the scale factor.
- I CAN recognize corresponding parts of similar figures.
- I CAN execute the procedure of determining the scale factor by comparing corresponding side lengths.
- I CAN execute the procedure of applying dilations and rigid transformations.
- I CAN identify the center of dilation.
- I CAN recall that if one figure can be mapped onto another using a similarity transformation, the figures are similar.
- I CAN recognize when a sequence of transformations successfully maps one figure onto another.

Geometric Reasoning

MA.912.GR.3.1 Determine the weighted average of two or more points on a line.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain how weighted averages partition a line segment based on given ratios, describe the relationship between weights and the position of the resulting point, and interpret weighted averages in real-world contexts such as center of mass or balance points.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN determine the weighted average of two or more points on a line.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of weighted average (average that accounts for different weights or importance of values).
- I CAN recognize points on a line represented as coordinates.
- I CAN execute the procedure of calculating a simple average (mean).
- I CAN execute the procedure of multiplying coordinates by weights.
- I CAN execute the procedure of adding weighted values.
- I CAN execute the procedure of dividing by the sum of weights.
- I CAN recall the weighted average formula: $(w_1x_1 + w_2x_2 + \dots + w_nx_n)/(w_1 + w_2 + \dots + w_n)$.
- I CAN identify the coordinates of given points.
- I CAN recognize the weights assigned to each point.
- I CAN execute the procedure of simplifying fractions and decimals.

Geometric Reasoning

MA.912.GR.3.2 Given a mathematical context, use coordinate geometry to classify or justify definitions, properties and theorems involving circles, triangles or quadrilaterals.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Investigating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN generate and test conjectures about geometric properties using coordinate geometry, devise multiple approaches for proving theorems algebraically versus synthetically, and determine which method provides the most efficient or elegant proof for specific geometric relationships.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN use coordinate geometry to classify or justify definitions, properties and theorems involving circles, triangles or quadrilaterals given a mathematical context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
- I CAN recall the midpoint formula: $M = ((x_1 + x_2)/2, (y_1 + y_2)/2)$.
- I CAN recall the slope formula: $m = (y_2 - y_1)/(x_2 - x_1)$.
- I CAN recall that perpendicular lines have slopes that are negative reciprocals.
- I CAN recall that parallel lines have equal slopes.
- I CAN recall the equation of a circle: $(x - h)^2 + (y - k)^2 = r^2$.
- I CAN execute the procedure of plotting points on a coordinate plane.
- I CAN execute the procedure of calculating distances, midpoints, and slopes.
- I CAN identify vertices and key points of geometric figures on a coordinate plane.
- I CAN recognize properties of triangles (isosceles, equilateral, right, scalene) and quadrilaterals (parallelograms, rectangles, rhombi, squares, trapezoids).
- I CAN execute the procedure of constructing logical arguments using coordinate geometry.

Geometric Reasoning

MA.912.GR.3.3 Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple coordinate geometry approaches for solving complex geometric problems, determine which formulas and strategies are most efficient for specific problem types, and justify my strategic choices based on the given information and desired outcomes.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
- I CAN recall the midpoint formula: $M = ((x_1 + x_2)/2, (y_1 + y_2)/2)$.
- I CAN recall the slope formula: $m = (y_2 - y_1)/(x_2 - x_1)$.
- I CAN recall the equation of a circle: $(x - h)^2 + (y - k)^2 = r^2$.
- I CAN recall slope-intercept form and point-slope form of linear equations.
- I CAN execute the procedure of finding equations of lines (parallel, perpendicular, through given points).
- I CAN execute the procedure of finding intersection points of lines or circles.
- I CAN execute the procedure of calculating perimeter and area using coordinates.
- I CAN identify appropriate formulas and strategies for given problem types.
- I CAN recognize when problems involve perpendicularity, parallelism, distance, or midpoint.
- I CAN interpret solutions in the context of real-world problems.

Geometric Reasoning

MA.912.GR.3.4 Use coordinate geometry to solve mathematical and real-world problems involving perimeter or area of polygons.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple methods for finding perimeter and area of polygons on a coordinate plane (distance formula, decomposition, shoelace formula), determine which method is most efficient for different polygon types and contexts, and justify my strategic choice based on the complexity and characteristics of the polygon.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN use coordinate geometry to solve mathematical and real-world problems involving perimeter or area of polygons.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
- I CAN recall area formulas for common polygons (triangle, rectangle, parallelogram, trapezoid).
- I CAN recognize vertices of polygons on a coordinate plane.
- I CAN execute the procedure of calculating distances between consecutive vertices to find side lengths.
- I CAN execute the procedure of adding side lengths to find perimeter.
- I CAN execute the procedure of decomposing irregular polygons into triangles or rectangles.
- I CAN execute the procedure of using the formula for area of a triangle given coordinates: $A = \frac{1}{2}|x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$.
- I CAN execute the procedure of counting grid squares or using base and height to find area.
- I CAN identify appropriate strategies based on polygon type and given information.
- I CAN interpret solutions in the context of real-world problems (fencing, flooring, land area).

Geometric Reasoning

MA.912.GR.4.1 Identify the shapes of two-dimensional cross-sections of three-dimensional figures.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple cross-sections of various three-dimensional figures to form general conclusions about how the angle and position of the cutting plane affects the resulting cross-sectional shape, and create principles that predict cross-sections for any plane orientation.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN identify the shapes of two-dimensional cross-sections of three-dimensional figures.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the names and properties of three-dimensional figures (prisms, pyramids, cylinders, cones, spheres).
- I CAN recall the names and properties of two-dimensional shapes (circles, triangles, rectangles, squares, trapezoids, ellipses, etc.).
- I CAN recognize common three-dimensional figures and their components (bases, faces, edges, vertices).
- I CAN identify the orientation of a cutting plane (horizontal, vertical, diagonal, parallel to base, perpendicular to base).
- I CAN recognize cross-sections parallel to the base of a figure.
- I CAN recognize cross-sections perpendicular to the base of a figure.
- I CAN visualize how a plane intersects a three-dimensional figure.
- I CAN identify the resulting two-dimensional shape from various plane positions.
- I CAN recognize that different plane orientations produce different cross-sectional shapes.

Geometric Reasoning

MA.912.GR.4.2 Identify three-dimensional objects generated by rotations of two-dimensional figures.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Matching)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple rotations of two-dimensional figures around different axes to form general conclusions about how the shape, position, and axis of rotation affect the resulting solid of revolution, and create principles that predict three-dimensional objects from any two-dimensional figure and axis combination.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN identify three-dimensional objects generated by rotations of two-dimensional figures.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the names and properties of three-dimensional figures (cylinders, cones, spheres, toruses).
- I CAN recall the names and properties of two-dimensional shapes (rectangles, triangles, circles, semicircles).
- I CAN recognize the axis of rotation in a diagram.
- I CAN recall that rotating a rectangle around one of its sides generates a cylinder.
- I CAN recall that rotating a right triangle around one of its legs generates a cone.
- I CAN recall that rotating a circle or semicircle around its diameter generates a sphere.
- I CAN recall that rotating a circle around an external axis generates a torus (doughnut shape).
- I CAN visualize the three-dimensional solid created by rotating a two-dimensional figure.
- I CAN identify the axis of rotation (horizontal, vertical, or edge of the figure).
- I CAN recognize that different axes of rotation produce different solids.

Geometric Reasoning

MA.912.GR.4.3 Extend previous understanding of scale drawings and scale factors to determine how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN analyze multiple examples of dilations with various scale factors to form general conclusions about the relationships between linear scale factor, area scale factor (k^2), and volume scale factor (k^3), and create principles that explain why these exponential relationships exist geometrically.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN extend my previous understanding of scale drawings and scale factors to determine how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of scale factor (ratio of corresponding lengths in similar figures).
- I CAN recall the definition of dilation (transformation that changes size but preserves shape).
- I CAN recall that dilations produce similar figures.
- I CAN recall formulas for area of two-dimensional figures (rectangles, triangles, circles, etc.).
- I CAN recall formulas for surface area and volume of three-dimensional figures (prisms, pyramids, cylinders, cones, spheres).
- I CAN execute the procedure of calculating area and volume.
- I CAN recognize that when the scale factor is k , areas are multiplied by k^2 .
- I CAN recognize that when the scale factor is k , volumes are multiplied by k^3 .
- I CAN execute the procedure of applying scale factors to linear dimensions.
- I CAN execute the procedure of squaring or cubing scale factors for area and volume calculations.

Geometric Reasoning

MA.912.GR.4.4 Solve mathematical and real-world problems involving the area of two-dimensional figures.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for finding the area of complex or composite figures (decomposition, subtraction, coordinate methods), determine which strategy is most efficient for specific figure types and contexts, and justify my strategic choice based on the given information and problem constraints.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving the area of two-dimensional figures.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall area formulas for common two-dimensional figures (square, rectangle, triangle, parallelogram, trapezoid, circle, regular polygons).
- I CAN recognize two-dimensional figures and their components.
- I CAN identify given information (base, height, radius, side lengths, apothem).
- I CAN execute the procedure of substituting values into area formulas.
- I CAN execute the procedure of decomposing composite figures into simpler shapes.
- I CAN execute the procedure of finding area by subtraction (removing a smaller area from a larger area).
- I CAN execute the procedure of calculating with rational numbers and π .
- I CAN recognize when to use special formulas (Heron's formula, area using coordinates).
- I CAN identify appropriate units for area (square units).
- I CAN interpret solutions in the context of real-world problems (flooring, painting, landscaping).

Geometric Reasoning

MA.912.GR.4.5 Solve mathematical and real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple approaches for finding the volume of complex or composite three-dimensional figures (decomposition, addition, subtraction), determine which strategy is most efficient for specific problem types and contexts, and justify my strategic choice based on the given information and real-world constraints.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving)

- I CAN solve mathematical and real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the volume formula for prisms: $V = Bh$ (where B is the area of the base).
- I CAN recall the volume formula for cylinders: $V = \pi r^2 h$.
- I CAN recall the volume formula for pyramids: $V = (1/3)Bh$.
- I CAN recall the volume formula for cones: $V = (1/3)\pi r^2 h$.
- I CAN recall the volume formula for spheres: $V = (4/3)\pi r^3$.
- I CAN recognize three-dimensional figures and identify their components (base, height, radius).
- I CAN execute the procedure of calculating the area of polygon bases.
- I CAN execute the procedure of substituting values into volume formulas.
- I CAN execute the procedure of finding volume of composite solids by adding or subtracting.
- I CAN execute the procedure of calculating with rational numbers and π .
- I CAN identify appropriate units for volume (cubic units).
- I CAN interpret solutions in the context of real-world problems (capacity, storage, materials needed).

Geometric Reasoning

MA.912.GR.4.6 Solve mathematical and real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple approaches for finding the surface area of complex or composite three-dimensional figures (net method, formula method, decomposition), determine which strategy is most efficient for specific problem types and contexts, and justify my strategic choice based on the given information and real-world constraints.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving)

- I CAN solve mathematical and real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the surface area formula for prisms: $SA = 2B + Ph$ (where B is base area, P is base perimeter, h is height).
- I CAN recall the surface area formula for cylinders: $SA = 2\pi r^2 + 2\pi rh$ or $SA = 2\pi r(r + h)$.
- I CAN recall the surface area formula for pyramids: $SA = B + (1/2)Pl$ (where B is base area, P is base perimeter, l is slant height).
- I CAN recall the surface area formula for cones: $SA = \pi r^2 + \pi rl$ or $SA = \pi r(r + l)$.
- I CAN recall the surface area formula for spheres: $SA = 4\pi r^2$.
- I CAN recognize three-dimensional figures and identify their components (base, height, radius, slant height).
- I CAN execute the procedure of calculating the area of polygon bases and lateral faces.
- I CAN execute the procedure of substituting values into surface area formulas.
- I CAN execute the procedure of using nets to find surface area.
- I CAN execute the procedure of calculating with rational numbers and π .
- I CAN identify appropriate units for surface area (square units).
- I CAN interpret solutions in the context of real-world problems (painting, wrapping, material needed).

Geometric Reasoning

MA.912.GR.5.1 Construct a copy of a segment or an angle.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain why the compass and straightedge construction procedures for copying segments and angles work, describe the geometric principles that guarantee the copy is congruent to the original, and connect these constructions to properties of congruence and rigid transformations.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN construct a copy of a segment or an angle.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of congruent segments (segments with equal length).
- I CAN recall the definition of congruent angles (angles with equal measure).
- I CAN recognize the tools used for geometric constructions (compass, straightedge, pencil).
- I CAN execute the procedure of using a compass to measure and transfer distances.
- I CAN execute the procedure of using a straightedge to draw line segments and rays.
- I CAN execute the procedure of constructing a segment congruent to a given segment (measuring with compass and marking the distance).
- I CAN execute the procedure of constructing an angle congruent to a given angle (creating an arc, transferring the arc distance).
- I CAN identify the components of an angle (vertex, rays, arc).
- I CAN recognize when a construction is complete and accurate.
- I CAN recall that constructions should use only compass and straightedge (no measuring tools).

Geometric Reasoning

MA.912.GR.5.2 Construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain why the compass and straightedge construction procedures for bisecting segments and angles work, describe the geometric principles and properties (equidistance, perpendicularity, congruent parts) that guarantee the bisector divides the original into two congruent parts, and connect these constructions to theorems about perpendicular bisectors and angle bisectors.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a bisector (divides a segment or angle into two congruent parts).
- I CAN recall the definition of a perpendicular bisector (line that is perpendicular to a segment at its midpoint).
- I CAN recall the definition of an angle bisector (ray that divides an angle into two congruent angles).
- I CAN recognize the tools used for geometric constructions (compass, straightedge).
- I CAN execute the procedure of using a compass to create arcs of equal radius.
- I CAN execute the procedure of constructing a perpendicular bisector (creating arcs from both endpoints, connecting intersection points).
- I CAN execute the procedure of constructing an angle bisector (creating arcs from the vertex, marking equal distances on both rays, connecting to vertex).
- I CAN identify the midpoint of a segment.
- I CAN recognize when a construction creates perpendicular lines or congruent angles.
- I CAN recall that constructions should use only compass and straightedge.

Geometric Reasoning

MA.912.GR.5.3 Construct the inscribed and circumscribed circles of a triangle.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain why the incenter (intersection of angle bisectors) is equidistant from all sides of the triangle and why the circumcenter (intersection of perpendicular bisectors) is equidistant from all vertices, describe the geometric principles that guarantee these special points exist and are unique, and connect these constructions to theorems about points of concurrency.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN construct the inscribed and circumscribed circles of a triangle.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of an inscribed circle (circle inside the triangle tangent to all three sides).
- I CAN recall the definition of a circumscribed circle (circle passing through all three vertices of the triangle).
- I CAN recall that the incenter is the center of the inscribed circle (intersection of angle bisectors).
- I CAN recall that the circumcenter is the center of the circumscribed circle (intersection of perpendicular bisectors).
- I CAN execute the procedure of constructing angle bisectors.
- I CAN execute the procedure of constructing perpendicular bisectors.
- I CAN execute the procedure of finding the point of intersection (incenter or circumcenter).
- I CAN execute the procedure of constructing a perpendicular from a point to a line (to find radius of inscribed circle).
- I CAN execute the procedure of measuring distance with a compass to determine the radius.
- I CAN execute the procedure of drawing a circle with a given center and radius using a compass.
- I CAN recognize the tools used for geometric constructions (compass, straightedge).

Geometric Reasoning

MA.912.GR.6.1 Solve mathematical and real-world problems involving the length of a secant, tangent, segment or chord in a given circle.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for solving circle segment problems (power of a point theorems, Pythagorean theorem, chord properties), determine which theorem or strategy is most efficient for specific problem types and configurations, and justify my strategic choice based on the given information and geometric relationships.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving the length of a secant, tangent, segment or chord in a given circle.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a secant (line that intersects a circle at two points).
- I CAN recall the definition of a tangent (line that intersects a circle at exactly one point).
- I CAN recall the definition of a chord (segment with both endpoints on the circle).
- I CAN recall the theorem: tangent segments from an external point are congruent.
- I CAN recall the power of a point theorem for two secants: $(\text{whole}_1)(\text{external}_1) = (\text{whole}_2)(\text{external}_2)$.
- I CAN recall the power of a point theorem for secant and tangent: $(\text{tangent})^2 = (\text{whole secant})(\text{external part})$.
- I CAN recall that a perpendicular from the center to a chord bisects the chord.
- I CAN recall the Pythagorean Theorem for problems involving radii, chords, and perpendiculars.
- I CAN execute the procedure of setting up and solving equations using circle theorems.
- I CAN identify given information and unknown values in circle diagrams.
- I CAN interpret solutions in the context of real-world problems.

Geometric Reasoning

MA.912.GR.6.2 Solve mathematical and real-world problems involving the measures of arcs and related angles.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for solving arc and angle problems (central angle theorem, inscribed angle theorem, angle formed by chords/secants/tangents), determine which theorem is most efficient for specific angle positions and configurations, and justify my strategic choice based on the given information and geometric relationships.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving the measures of arcs and related angles.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a central angle (vertex at the center of the circle).
- I CAN recall the definition of an inscribed angle (vertex on the circle).
- I CAN recall that the measure of a central angle equals the measure of its intercepted arc.
- I CAN recall that the measure of an inscribed angle is half the measure of its intercepted arc.
- I CAN recall that an inscribed angle that intercepts a semicircle is a right angle.
- I CAN recall the theorem for angles formed by two chords: measure equals half the sum of intercepted arcs.
- I CAN recall the theorem for angles formed by two secants/tangents outside the circle: measure equals half the difference of intercepted arcs.
- I CAN recall that a circle has 360° .
- I CAN identify major arcs, minor arcs, and semicircles.
- I CAN execute the procedure of setting up and solving equations using arc and angle theorems.
- I CAN interpret solutions in the context of real-world problems.

Geometric Reasoning

MA.912.GR.6.3 Solve mathematical problems involving triangles and quadrilaterals inscribed in a circle.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for solving inscribed polygon problems (inscribed angle theorem, cyclic quadrilateral properties, arc relationships, triangle theorems), determine which theorem or combination of theorems is most efficient for specific configurations, and justify my strategic choice based on the given information and geometric relationships.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical problems involving triangles and quadrilaterals inscribed in a circle.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of an inscribed polygon (all vertices lie on the circle).
- I CAN recall that inscribed angles that intercept the same arc are congruent.
- I CAN recall that an inscribed angle that intercepts a semicircle is a right angle (90°).
- I CAN recall that opposite angles of an inscribed quadrilateral (cyclic quadrilateral) are supplementary (sum to 180°).
- I CAN recall the inscribed angle theorem (inscribed angle is half the intercepted arc).
- I CAN recall triangle angle sum theorem (angles sum to 180°).
- I CAN recall properties of special triangles (isosceles, equilateral, right triangles).
- I CAN identify inscribed triangles and quadrilaterals in diagrams.
- I CAN identify intercepted arcs for inscribed angles.
- I CAN execute the procedure of setting up and solving equations using inscribed polygon theorems.
- I CAN recognize when to apply specific theorems based on the given information.

Geometric Reasoning

MA.912.GR.6.4 Solve mathematical and real-world problems involving the arc length and area of a sector in a given circle.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate different scenarios involving circles, arcs, and sectors to determine which measurements (arc length, sector area, or both) are needed to solve specific real-world problems, and justify my strategic approach based on the context and given information (pizza slices, irrigation systems, pendulum motion, etc.).

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving the arc length and area of a sector in a given circle.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the formula for circumference of a circle: $C = 2\pi r$ or $C = \pi d$.
- I CAN recall the formula for area of a circle: $A = \pi r^2$.
- I CAN recall the formula for arc length: $L = (\theta/360^\circ) \cdot 2\pi r$ or $L = (\theta/360^\circ) \cdot C$.
- I CAN recall the formula for area of a sector: $A = (\theta/360^\circ) \cdot \pi r^2$ or $A = (\theta/360^\circ) \cdot (\text{area of circle})$.
- I CAN recall that θ represents the central angle measure in degrees.
- I CAN identify the radius, diameter, and central angle in circle diagrams.
- I CAN execute the procedure of substituting values into arc length and sector area formulas.
- I CAN execute the procedure of calculating with π (exact form or approximation).
- I CAN recognize when to find arc length versus sector area based on the problem context.
- I CAN identify appropriate units (linear units for arc length, square units for sector area).
- I CAN interpret solutions in the context of real-world problems.

Geometric Reasoning

MA.912.GR.7.2 Given a mathematical or real-world context, derive and create the equation of a circle using key features.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Symbolizing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN compare and contrast different methods for deriving circle equations (using center and radius, using center and a point on the circle, using three points, using diameter endpoints), determine which approach is most efficient for specific given information, and explain how the distance formula connects to the circle equation.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension

- I CAN derive and create the equation of a circle using key features given a mathematical or real-world context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the standard form equation of a circle: $(x - h)^2 + (y - k)^2 = r^2$, where (h, k) is the center and r is the radius.
- I CAN recall the distance formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
- I CAN recognize key features of circles (center, radius, diameter).
- I CAN identify the center coordinates (h, k) from given information.
- I CAN execute the procedure of finding the radius from given information (distance from center to a point, half the diameter).
- I CAN execute the procedure of substituting center coordinates and radius into the standard form.
- I CAN execute the procedure of squaring the radius value.
- I CAN execute the procedure of using the midpoint formula to find the center when given diameter endpoints.
- I CAN recognize when a circle equation is in standard form versus general form.
- I CAN interpret circle features from real-world contexts (circular paths, signal ranges, boundaries).

Geometric Reasoning

MA.912.GR.7.3 Graph and solve mathematical and real-world problems that are modeled with an equation of a circle. Determine and interpret key features in terms of the context.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving); Secondary Taxonomy Level: Comprehension Level (Integrating)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization Level (Decision Making)

- I CAN evaluate multiple approaches for solving circle equation problems (graphing, algebraic manipulation, completing the square, systems of equations), determine which strategy is most efficient for specific problem types and contexts, and justify my strategic choice based on the given information and desired outcomes.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization (Problem Solving) with Comprehension (Integrating)

- I CAN graph and solve mathematical and real-world problems that are modeled with an equation of a circle, and determine and interpret key features in terms of the context.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the standard form equation of a circle: $(x - h)^2 + (y - k)^2 = r^2$.
- I CAN recognize key features of circles (center, radius, diameter).
- I CAN execute the procedure of identifying the center (h, k) and radius r from an equation.
- I CAN execute the procedure of graphing a circle on a coordinate plane.
- I CAN execute the procedure of completing the square to convert general form to standard form.
- I CAN execute the procedure of finding points of intersection between a circle and a line.
- I CAN execute the procedure of solving systems of equations involving circles.
- I CAN identify the domain and range of a circle from its equation.
- I CAN recognize when a point lies on, inside, or outside a circle by substituting coordinates.
- I CAN interpret center and radius in real-world contexts (broadcast range, safety zones, circular boundaries).
- I CAN interpret solutions in the context of real-world problems.

Trigonometry

MA.912.T.1.1 Define trigonometric ratios for acute angles in right triangles.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Retrieval Level (Recalling)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Comprehension

- I CAN explain the relationships between the six trigonometric ratios (sine, cosine, tangent, cosecant, secant, cotangent), describe how complementary angles have reciprocal and cofunction relationships, and connect these ratios to similar right triangles to show why the ratios depend only on the angle measure, not the triangle size.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Retrieval

- I CAN define trigonometric ratios for acute angles in right triangles.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the definition of a right triangle (triangle with one 90° angle).
- I CAN recall the definition of acute angles (angles less than 90°).
- I CAN identify the hypotenuse (side opposite the right angle, longest side).
- I CAN identify the opposite side (side across from the reference angle).
- I CAN identify the adjacent side (side next to the reference angle, not the hypotenuse).
- I CAN recall the sine ratio: $\sin \theta = \text{opposite/hypotenuse}$.
- I CAN recall the cosine ratio: $\cos \theta = \text{adjacent/hypotenuse}$.
- I CAN recall the tangent ratio: $\tan \theta = \text{opposite/adjacent}$.
- I CAN recall the reciprocal ratios: $\csc \theta = \text{hypotenuse/opposite}$, $\sec \theta = \text{hypotenuse/adjacent}$, $\cot \theta = \text{adjacent/opposite}$.
- I CAN recognize the reference angle in a right triangle.
- I CAN label the sides of a right triangle relative to a given acute angle.

Trigonometry

MA.912.T.1.2 Solve mathematical and real-world problems involving right triangles using trigonometric ratios and the Pythagorean Theorem.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Knowledge Utilization Level (Problem Solving)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN evaluate multiple approaches for solving right triangle problems (choosing between trigonometric ratios or Pythagorean Theorem, determining which ratio to use), determine which strategy is most efficient based on the given information and unknown values, and justify my strategic choice using mathematical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Knowledge Utilization

- I CAN solve mathematical and real-world problems involving right triangles using trigonometric ratios and the Pythagorean Theorem.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recall the trigonometric ratios: $\sin \theta = \text{opposite/hypotenuse}$, $\cos \theta = \text{adjacent/hypotenuse}$, $\tan \theta = \text{opposite/adjacent}$.
- I CAN recall the Pythagorean Theorem: $a^2 + b^2 = c^2$.
- I CAN recognize right triangles and identify the right angle.
- I CAN identify the hypotenuse, opposite side, and adjacent side relative to a given angle.
- I CAN execute the procedure of setting up trigonometric equations to find unknown sides or angles.
- I CAN execute the procedure of using inverse trigonometric functions ($\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$) to find angle measures.
- I CAN execute the procedure of applying the Pythagorean Theorem to find unknown side lengths.
- I CAN execute the procedure of solving equations involving trigonometric ratios.
- I CAN recognize when to use trigonometry (when an angle and a side are known) versus Pythagorean Theorem (when two sides are known).
- I CAN interpret solutions in the context of real-world problems (angles of elevation/depression, heights, distances).

Logic and Discrete Theory

MA.912.LT.4.3 Identify and accurately interpret “if...then,” “if and only if,” “all” and “not” statements. Find the converse, inverse and contrapositive of a statement.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Comprehension Level (Integrating); Secondary Taxonomy Level: Retrieval Level (Executing)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Analysis

- I CAN evaluate the validity of logical arguments by identifying errors in reasoning, determining which statements (original, converse, inverse, or contrapositive) are logically equivalent, and critique flawed conditional reasoning in mathematical proofs or real-world scenarios.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Comprehension and Retrieval

- I CAN identify and accurately interpret "if...then," "if and only if," "all" and "not" statements and find the converse, inverse and contrapositive of a statement.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval

- I CAN recognize and identify the hypothesis (if part) and conclusion (then part) of a conditional statement.
- I CAN recall and state the definitions of converse, inverse, and contrapositive.
- I CAN identify a statement written in "if...then" form from a list of statements.
- I CAN name and label the parts of a conditional statement using proper notation ($p \rightarrow q$).
- I CAN recognize statements that contain the words "all," "not," "if and only if," and "if...then."
- I CAN recall that "if and only if" represents a biconditional statement ($p \leftrightarrow q$).
- I CAN list the symbolic notation for logical connectives ($\rightarrow$, $\leftrightarrow$, $\sim$).

Logic and Discrete Theory

MA.912.LT.4.10 Judge the validity of arguments and give counterexamples to disprove statements.

MARZANO TAXONOMY LEVEL: Primary Taxonomy Level: Analysis Level (Analyzing Errors)

LEARNING PROGRESSION:

ENRICHMENT: Identified Taxonomy Level: Knowledge Utilization

- I CAN investigate mathematical conjectures by constructing formal arguments to prove statements are true or conducting systematic inquiries to find counterexamples that disprove statements, then debate the validity of complex mathematical claims with supporting evidence and logical reasoning.

STANDARD DECONSTRUCTED: Identified Taxonomy Level: Analysis

- I CAN judge the validity of arguments and give counterexamples to disprove statements.

FOUNDATIONAL SKILLS: Identified Taxonomy Level: Retrieval Comprehension

- I CAN recognize the difference between a valid argument and an invalid argument.
- I CAN recall and define what a counterexample is (a specific example that shows a statement is false).
- I CAN identify the hypothesis and conclusion in a mathematical statement or argument.
- I CAN describe what makes an argument logically valid versus logically invalid.
- I CAN recognize common logical fallacies in mathematical reasoning.
- I CAN recall that only one counterexample is needed to disprove a statement.
- I CAN identify whether a statement is a universal claim (applies to all cases) or a particular claim (applies to some cases).
- I CAN explain the difference between proving a statement true and disproving a statement false.