

Geometry Curriculum Frameworks

First Nine Weeks

1. Enduring Understanding - Points, lines, and planes are the foundations of geometry.

1a. Essential Question - Why are *point*, *line*, and *plane* the undefined terms of geometry?

[LG.1.G.2](#)

Represent *points*, *lines*, and *planes* pictorially with proper identification, as well as basic concepts derived from these undefined terms, such as segments, rays, and *angles*

2. Enduring Understanding - Valid inductive and deductive reasoning are used to develop and prove conjectures.

2a. Essential Question - How are the foundations of logical reasoning used to develop and prove conjectures which can be applied to real-world situations?

[LG.1.G.1a](#)

Define inductive and deductive reasoning

[LG.1.G.1b](#)

Make predictions based on real world situations using inductive reasoning

[LG.1.G.3](#)

Describe relationships derived from geometric figures or figural patterns

[LG.1.G.1c](#)

Make predictions based on real world situations using deductive reasoning and appropriate strategies such as but not limited to:

- Venn diagrams
- Matrix logic
- Conditional statements (statement, converse, inverse, contrapositive)

3. Enduring Understanding - Linear relationships can be defined on the coordinate plane.

3a. Essential Question - How can coordinate geometry be used to write equations of lines?

[CGT.5.G.1](#)

Use *coordinate geometry* to find the distance between two points, the *midpoint of a segment*, and the *slopes* of parallel, perpendicular, horizontal, and vertical lines

[CGT.5.G.2](#)

Write the equation of a line parallel to a line through a given point not on the line.

[CGT.5.G.3](#)

Write the equation of a line perpendicular to a line through a given point.

[CGT.5.G.4](#)

Write the equation of the perpendicular bisector of a line segment.

4. Enduring Understanding - Points, lines, and planes form the foundational properties of geometry.

4a. Essential Question - How can geometric properties be used to prove relationships between lines and angles?

[LG.1.G.4](#)

Apply, with and without appropriate technology, definitions, *theorems*, properties, and *postulates* related to such topics as *complementary*, *supplementary*, *vertical angles*, *linear pairs*, and angles formed by *perpendicular* lines

[LG.1.G.5](#)

Explore, with and without appropriate technology, the relationship between angles formed by two lines cut by a *transversal* to justify when lines are *parallel*

[M.3.G.5](#)

Identify and apply properties of and theorems about parallel and perpendicular lines to prove other theorems and perform basic Euclidean constructions

Second Nine Weeks

1. Enduring Understanding - Relationships that exist between the angles and segments of triangles can be proven.

1a. Essential Question - How can the measure of the segments of triangles be applied to real world situations?

T.2.G.2	Investigate the measures of segments to determine the existence of triangles (<i>triangle inequality theorem</i>)
T.2.G.3	Identify and use the special segments of triangles (<i>altitude</i> , <i>median</i> , <i>angle bisector</i> , <i>perpendicular bisector</i> , and <i>midsegment</i>) to solve problems

2. Enduring Understanding - Similar and congruent geometric figures have proportional attributes.

2a. Essential Question - How are triangle similarity and congruency applied and verified?

T.2.G.1	Apply <i>congruence</i> (SSS ...) and <i>similarity</i> (AA ...) correspondences and properties of figures to find missing parts of geometric figures and provide logical justification
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2b. Essential Question - How is similarity of geometric figures applied and verified?

M.3.G.4	Use (given similar geometric objects) proportional reasoning to solve practical problems (including scale drawings)
LG.1.G.6	Give justification for conclusions reached by deductive reasoning

3. Enduring Understanding - The special properties of right triangles can be used to solve real world problems.

3a. Essential Question - How are right triangles used to measure indirectly?

T.2.G.4	Apply the <i>Pythagorean Theorem</i> and its converse in solving practical problems
T.2.G.5	Use the <i>special right triangle</i> relationships (30° - 60° - 90° and 45° - 45° - 90°) to solve problems
T.2.G.6a	Use trigonometric ratios (sine, cosine, tangent) to determine the lengths of sides in right triangles.
T.2.G.6b	Use trigonometric ratios (sine, cosine, tangent) to determine the measures of angles in right triangles.
T.2.G.7	Use similarity of right triangles to express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths.
T.2.G.6c	Use trigonometric ratios (sine, cosine, tangent) in right triangle problems involving angles of elevation and depression.

Third Nine Weeks

1. Enduring Understanding - Properties of geometric figures can be verified.

1a. Essential Question - How can the properties of geometric figures be verified?

R.4.G.2	Solve problems using properties of polygons: sum of the measures of the interior angles of a polygon, interior and exterior angle measure of a regular polygon or irregular polygon, number of sides or angles of a polygon
R.4.G.1	Explore and verify the properties of <i>quadrilaterals</i>
CGT.5.G.5	Determine, given a set of points, the type of figure based on its properties (parallelogram, isosceles triangle, trapezoid)

2. Enduring Understanding - Relationships exist among the radius, secant, tangent, and chords of a circle.

2a. Essential Question - How can angles and intercepted arcs be applied to verify the properties of circles?

R.4.G.5	Investigate and use the properties of angles (<i>central</i> and <i>inscribed</i>) <i>arcs</i> , <i>chords</i> , <i>tangents</i> , and <i>secants</i> to solve problems involving <i>circles</i>
R.4.G.6	Solve problems using inscribed and <i>circumscribed</i> figures
CGT.5.G.6	Write, in standard form, the equation of a circle given a graph on a coordinate plane or the center and radius of a circle

3. Enduring Understanding - When the linear dimensions of an object change, the volume and surface area change in a predictable way.

3a. Essential Question - How are the areas of polygons and circles related and applied?

M.3.G.2a	Solve application problems involving circumference, and perimeter of polygons and composite figures using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.2b	Solve application problems involving area of circles, polygons and composite figures using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.3a	Relate change in perimeter of a polygon or circumference of a circle to change in a linear dimension.
M.3.G.1	Calculate probabilities arising in geometric contexts (Ex. Find the probability of hitting a particular ring on a dartboard.)

1b. Essential Question - How are the surface areas and volumes of solids related and applied?

M.3.G.2c	Solve application problems involving surface area of prisms, cylinders, pyramids, and cones using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.2d	Solve application problems involving area of surface areas of composite figures using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.2e	Solve application problems involving volume of prisms, cylinders, pyramids, and cones using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.2f	Solve application problems involving volume of composite figures using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.2g	Solve application problems involving surface area and volume of spheres using appropriate units and formulas and expressing solutions in both approximate and exact forms.
M.3.G.3b	Relate change in area of a polygon or surface area of a solid to change in a linear dimension.
M.3.G.3c	Relate change in volume of a solid to change in a linear dimension.

Fourth Nine Weeks

1. Enduring Understanding - Geometric transformations are functional relationships.

1a. Essential Question - How are geometric transformations represented as functional relationships?

CGT.5.G.7	Draw and interpret the results of transformations and successive transformations on figures in the coordinate plane: translations, reflections, rotations (90 and 180 degrees, clockwise and counterclockwise about the origin), dilations (scale factor)
R.4.G.3	Identify and explain why figures <i>tessellate</i>

2. Enduring Understanding - The properties of three-dimensional objects are related to those of two-dimensional objects.

2a. Essential Question - How are two dimensional relationships connected to the properties of two dimensional objects?

R.4.G.4	Identify the attributes of the five <i>Platonic Solids</i>
R.4.G.7a	Use <i>orthographic drawings</i> (top, front, side) to represent three-dimensional objects
R.4.G.8	Draw, examine, and classify <i>cross-sections</i> of three-dimensional objects
R.4.G.7b	Use <i>isometric drawings</i> (corner) to represent three-dimensional objects
R.4.G.9	Explore non-Euclidean geometries, such as spherical geometry and identify its unique properties which result from a change in the parallel postulate.