

CONCEPT MAP

GEOMETRY

August 2011

Suggested Sequence:

1. Tools of Geometry
2. Reasoning and Proof
3. Parallel and Perpendicular Lines
4. Congruent Triangles
5. Relationships Within Triangles
6. Polygons and Quadrilaterals
7. Similarity
8. Right Triangles and Trigonometry
9. Transformations
10. Area
11. Surface Area and Volume
12. Circles

GEOMETRY

Prioritized Curriculum

CSOs	Essential	Important	Need to Know
M.O.G.3.1	X		
M.O.G.3.2	X		
M.O.G.3.3	X		
M.O.G.3.4		X	
M.O.G.3.5	X		
M.O.G.3.6	X		
M.O.G.3.7	X		
M.O.G.3.8	X		
M.O.G.3.9		X	
M.O.G.3.10	X		
M.O.G.3.11	X		
M.O.G.3.12	X		
M.O.G.3.13	X		
M.O.G.3.14	X		
M.O.G.3.15	X		
M.O.G.3.16	X		
M.O.G.3.17	X		
M.O.G.3.18	X		
M.O.G.3.19	X		
M.O.G.3.20		X	
M.O.G.3.21	X		

Tools of Geometry

Key Concepts:

- Nets and Drawings for Visualizing Geometry
- Points, Lines, and Planes
- Measuring Segments
- Measuring Angles
- Exploring Angle Pairs
- Basic Constructions
- Midpoint and Distance in the Coordinate Plane
- Perimeter, Circumference, and Area

CSOs: G.3.1, G.3.8, G.3.17, G.3.21

Estimated days to complete: 8

Enduring Understanding:

Students will be introduced to various topics in the study of geometry.

Essential Question(s):

- How can you represent a three-dimensional figure with a two-dimensional drawing?
- What are the building blocks of geometry?
- How can you describe the attributes of a segment or angle?

Key Vocabulary:

- Acute, right, obtuse, straight angles
- Adjacent angles
- Angle bisector
- Collinear points, coplanar points
- Complementary and supplementary angles
- Congruent angles
- Congruent segments
- Constructions
- Linear pair
- Measure of an angle
- Net
- Perpendicular bisector
- Perpendicular lines
- Point, line, plane
- Postulate, axiom
- Ray, opposite rays
- Segment
- Segment bisector
- Vertex of an angle
- Vertical angles

Reasoning and Proof

Key Concepts:

- Patterns and Inductive Reasoning
- Conditional Statements
- Biconditionals and Definitions
- Deductive Reasoning
- Reasoning in Algebra and Geometry
- Proving Angles Congruent

CSOs: G.3.2, G.3.3, G.3.4, G.3.5, G.3.7

Estimated days to complete: 5

Enduring Understanding:

Students will be introduced to topics related to reasoning including deductive and inductive reasoning.

Essential Question(s):

- How can you make a conjecture and prove that it is true?

Key Vocabulary:

- Biconditional
- Conclusion
- Conditional
- Conjecture
- Contrapositive
- Converse
- Counterexample
- Deductive reasoning
- Equivalent statements
- Hypothesis
- Inductive reasoning
- Inverse
- Law of detachment
- Law of syllogism
- Negation
- Paragraph proof
- Proof
- Theorem
- Truth value
- Two-column proof

Parallel and Perpendicular

Lines

Key Concepts:

- Lines and Angles
- Properties of Parallel Lines
- Proving Lines Parallel
- Parallel and Perpendicular Lines
- Parallel Lines and Triangles
- Constructing Parallel and Perpendicular Lines
- Equations of Lines in the Coordinate Plane
- Slopes of Parallel and Perpendicular

CSOs: G.3.1, G.3.4, G.3.5, G.3.6, G.3.14, G.3.19, G.3.20

Estimated days to complete: 8

Enduring Understanding:

Students will expand upon their understanding of skills related to parallel and perpendicular lines.

Essential Question(s):

- How do you prove that two lines are parallel or perpendicular?
- What is the sum of the measures of the angles of a triangle?
- How do you write an equation of a line in the coordinate plane?

Key Vocabulary:

- Alternate exterior angles
- Alternate interior angles
- Auxiliary line
- Corresponding angles
- Exterior angle of a polygon
- Flow proof
- Parallel lines
- Parallel planes
- Point-slope form
- Remote interior angles
- Same-side interior angles
- Skew lines
- Slope
- Slope-intercept form
- Transversal

Congruent Triangles

Key Concepts:

- Congruent Figures
- Triangle Congruence by SSS and SAS
- Triangle Congruence by ASA and AAS
- Using Corresponding Parts of Congruent Triangles
- Isosceles and Equilateral Triangles
- Congruence in Right Triangles
- Congruence in Overlapping Triangles

CSOs: G.3.5, G.3.7

Estimated days to complete: 7

Enduring Understanding:

Students will build upon their understanding and skills related to angles and triangles.

Essential Question(s):

- How do you identify corresponding parts of congruent triangles?
- How do you show that two triangles are congruent?
- How can you tell whether a triangle is isosceles or equilateral?

Key Vocabulary:

- Base angles of an isosceles triangle
- Base of an isosceles triangle
- Congruent polygons
- Corollary
- Hypotenuse
- Legs of an isosceles triangle
- Legs of a right triangle
- Vertex angles of an isosceles triangle

Relationships Within Triangles

Key Concepts:

- Midsegments of Triangles
- Perpendicular and Angle Bisectors
- Bisectors in Triangles
- Medians and Altitudes
- Indirect Proof
- Inequalities in One Triangle
- Inequalities in Two Triangles

CSOs: G.3.5, G.3.10, G.3.18

Estimated days to complete: 6

Enduring Understanding:

Students will identify the unique properties of triangles.

Essential Question(s):

- How do you use coordinate geometry to find relationships within triangles?
- How do you solve problems that involve measurements of triangles?
- How do you write indirect proofs?

Key Vocabulary:

- Altitude of a triangle
- Centroid of a triangle
- Circumcenter of a triangle
- Circumscribed about
- Concurrent
- Distance from a point to a line
- Equidistant
- Incenter of a triangle
- Indirect proof
- Indirect reasoning
- Inscribed
- Median of a triangle
- Midsegment of a triangle
- Orthocenter of a triangle
- Point of concurrency

Polygons and Quadrilaterals

Key Concepts:

- The Polygon Angle-Sum Theorem
- Properties of Parallelogram
- Proving that a Quadrilateral is a Parallelogram
- Properties of Rhombuses, Rectangles, and Squares
- Conditions for Rhombuses, Rectangles, and Squares
- Trapezoids and Kites
- Polygons in the Coordinate Plane
- Applying Coordinate Geometry
- Proofs Using Coordinate Geometry

CSOs: G.3.4, G.3.5, G.3.8, G.3.14, G.3.17

Estimated days to complete: 8

Enduring Understanding:

Students will identify the unique properties of triangles.

Essential Question(s):

- How do you use coordinate geometry to find relationships within triangles?
- How do you solve problems that involve measurements of triangles?
- How do you write indirect proofs?

Key Vocabulary:

- Base, base angle, and leg of a trapezoid
- Consecutive angles
- Coordinate proof
- Equiangular, equilateral polygon
- Isosceles trapezoid
- Kites
- Midsegment of a trapezoid
- Opposite angles
- Opposite sides
- Parallelogram
- Rectangle
- Regular polygon
- Rhombus
- Square
- trapezoid

Similarity

Key Concepts:

- Ratios and Proportions
- Similar Polygons
- Proving Triangles Similar
- Similarity in Right Triangles
- Proportions in Triangles

**CSOs: G.3.4, G.3.5, G.3.9,
G.3.11, G.3.19**

Estimated days to complete: 5

Enduring Understanding:

Students will expand upon their understanding and skills related to similarity.

Essential Question(s):

- How do you use proportions to find side lengths in similar polygons?
- How do you show two triangles are similar?
- How do you identify corresponding parts of similar triangles?

Key Vocabulary:

- Extended proportion
- Extended ratio
- Extremes
- Geometric mean
- Indirect measurement
- Means
- Proportion
- Ratio
- Scale drawings
- Scale factor
- Similar figures
- Similar polygons

Right Triangles and Trigonometry

Key Concepts:

- The Pythagorean Theorem and its Converse
- Special Right Triangles
- Trigonometry
- Angles of Elevation and Depression
- Vectors

CSOs: G.3.11, G.3.12

Estimated days to complete: 6

Enduring Understanding:

Students will explore concepts related to right triangles, including trigonometry.

Essential Question(s):

- How do you find a side length or angle measure in a right triangle?
- How do trigonometric ratios relate to similar right triangles?
- What is a vector?

Key Vocabulary:

- Angle of depression
- Angle of elevation
- Cosine
- Initial point
- Magnitude
- Pythagorean triple
- Resultant
- Sine
- Tangent
- Terminal point
- Trigonometric ratios
- Vector

Transformations

Key Concepts:

- Translations
- Reflections
- Rotations
- Symmetry
- Dilations
- Compositions of Reflections
- Tessellations

CSOs: G.3.15, G.3.19

Estimated days to complete: 6

Enduring Understanding:

Students will explore the concepts related to transformations.

Essential Question(s):

- How can you change a figure's position without changing its size and shape?
- How can you change a figure's size without changing its shape?
- How can you represent a transformation in the coordinate plane?
- How do you recognize symmetry in a figure?

Key Vocabulary:

- Center of a regular polygon
- Composition of transformations
- Dilation
- Glide reflection
- Glide reflectional symmetry
- Image
- Isometry
- Line symmetry
- Preimage
- Reflection
- Rotation
- Rotational symmetry
- Tessellation
- Transformation
- Translation
- Translational symmetry

Area

Key Concepts:

- Areas of Parallelograms and Triangles
- Areas of Trapezoids, Rhombuses, and Kites
- Areas of Regular Polygons
- Perimeters and Areas of Similar Figures
- Trigonometry and Area
- Circles and Arcs
- Areas of Circles and Sectors
- Geometric Probability

CSOs: G.3.8, G.3.9, G.3.11, G.3.13

Estimated days to complete: 7

Enduring Understanding:

Students will identify the unique properties of triangles.

Essential Question(s):

- How do you find the area of a polygon or find the circumference and area of a circle?
- How do perimeters and areas of similar polygons compare?

Key Vocabulary:

- Adjacent arcs
- Altitude
- Apothem
- Arc length
- Base
- Central angle
- Circle
- Circumference
- Concentric circles
- Congruent arcs
- Congruent circles
- Diameter
- Geometric probability
- Height
- Major arc
- Minor arc
- Radius
- Sector of a circle
- Segment of a circle
- semicircle

Surface Area and Volume

Key Concepts:

- Space Figures and Cross Sections
- Surface Areas of Prisms and Cylinders
- Surface Areas of Pyramids and Cones
- Volumes of Prisms and Cylinders
- Volumes of Pyramids and Cones
- Surface Areas and Volumes of Spheres
- Areas and Volumes of Similar Solids

CSOs: G.3.9, G.3.16

Estimated days to complete: 8

Enduring Understanding:

Students will find surface areas and volumes of solid figures.

Essential Question(s):

- How can you determine the intersection of a solid and a plane?
- How do you find the surface area and volume of a solid?
- How do the surface areas and volumes of similar solids compare?

Key Vocabulary:

- Altitude
- Center of a sphere
- Cone
- Cross section
- Cylinder
- Edge
- Face great circle
- Hemisphere
- Lateral area
- Lateral face
- Polyhedron
- Prism
- Pyramid
- Right cone
- Right cylinder
- Right prism
- Slant height
- Sphere
- Surface area
- volume

Circles

Key Concepts:

- Tangent Lines
- Chords and Arcs
- Inscribed Angles
- Angle Measures and Segment Lengths
- Circles in the Coordinate Plane
- Locus: A Set of Points

CSOs: G.3.13

Estimated days to complete: 5

Enduring Understanding:

Students will explore concepts related to circles.

Essential Question(s):

- How can you prove relationships between angles and arcs in a circle?
- When lines intersect a circle, or within a circle, how do you find the measures of resulting angles, arcs, and segments?
- How do you find the equation of a circle in the coordinate plane?

Key Vocabulary:

- Chord
- Inscribed angle
- Intercepted arc
- Locus
- Point of tangency
- Secant
- Standard form of an equation of a circle
- Tangent to a circle