Curriculum Map: Geometry 2019

Course: GEOMETRY Sub-topic: Geometry

Grade(s): 7-12

Unit: Unit 1: Essentials of Geometry

Timeline: August to September

Month: August- September

Skills:

Identify, sketch and use properties of geometric figures

Use segment postulates to identify congruent segments

Find lengths of segments in the coordinate plane

Find the midpoint

Use midpoint and segment bisector to solve and analyze problems

Name, measure and classify angles

Identify congruent angles

Use special angle relationships (Vertical angles and Linear Pair) to find angle measures

Classify polygons- identify convex or concave and equilateral, equiangular, or regular

Use Formulas to solve problems and find dimensions: Area, Perimeter, Circumference

Essential Questions: How do you describe and measure geometric figures and use equality and congruence to solve problems?

Content:

1. Describe geometric figures
2. Measure geometric figures
3. Understand equality and congruence

Vocabulary:

undefined terms: point, line, plane

postulate

axiom

line segment

line

ray, opposite rays

congruent segments/angles

midpoint

segment addition

acute, right, obtuse, and straignt angles

angle bisector

linear pair

vertical angles

polygon

convex, concave

equilateral, equiangular, regular polygons

Resources: Text: McDougall Littell Geometry

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M4.C.1.2.1 (Advanced)	Identify points, lines, line segments or rays.
M6.C.1.1 (Advanced)	Define and/or use basic properties of triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons, nonagons, decagons and circles.
M6.C.1.1.1 (Advanced)	Identify, classify and/or compare polygons (up to ten sides.)
M6.C.1.2 (Advanced)	Represent and/or use concepts and relationships of lines and line segments.
M6.C.1.2.2 (Advanced)	Identify, draw and/or label points, planes, lines, line segments, rays, angles and vertices.
M11.C.1.2.2 (Advanced)	Identify and/or use properties of quadrilaterals (e.g., parallel sides, diagonals, bisectors, congruent sides/angles and supplementary angles).
M11.C.1.2.3 (Advanced)	Identify and/or use properties of isosceles and equilateral triangles
M11.C.3 (Advanced)	Locate points or describe relationships using the coordinate plane.
M11.C.3.1.1 (Advanced)	Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane (formula provided on the reference sheet).

Topic: Lesson 1: Identify Points, Lines, and Planes?
Minutes for Topic: 40

Core Lesson Description: Points, Lines and Planes

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Identify and name points, lines and planes?
2. **(E)** Define, name, and identify lines, line segments, rays, and opposite rays
3. **(E)** Define and identify collinear and coplanar points

Topic: Lesson 2: Segments and Congruence
Minutes for Topic: 80

Core Lesson Description: Use segment postulates to identify congruent segments

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** use segment postulates to identify congruent segments
2. **(E)** use segment postulates to solve problems

Topic: Lesson 3: Use Midpoint and Distance Formula
Minutes for Topic: 80

Core Lesson Description: Use Midpoint and Distance formulas to solve problems.

Core Lesson Student Learning Objectives: The student will be able to:

1. **(E)** Find the midpoint of segments in the coordinate plane
2. **(E)** Find the length of segments in the coordinate plane
3. **(E)** Understand and use segment bisectors to solve problems

Topic: lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Show mastery of :

1. Identify and name points, lines and planes.
2. Define, name, and identify lines, line segments, rays, and opposite rays
3. Define and identify collinear and coplanar points
4. Use segment postulates to identify congruent segments
5. Use segment postulates to solve problems

Topic: Lesson 6: Measure and Classify Angles
Minutes for Topic: 40

Core Lesson Description: Name, measure and classify angles.

Core Lesson Student Learning Objectives: The student will be able to:

1. **(E)** Identify the vertex and sides of an angle
2. **(E)** Name and classify (acute, right, obtuse, straight) an angle
3. **(C)** Use a protractor to measure angles

Topic: Lesson 7: Describe Angle Pair Relationships
Minutes for Topic: 80

Topic: Lesson 8: Classify Polygons
Minutes for Topic: 40

Core Lesson Description: Classify polygons by number of sides and as convex or concave.

Core Lesson Student Learning Objectives: Students will be able to:

1. (E) Classify a polygon by the number of sides
2. (I) Classify a polygon as concave or convex
3. (E) Determine if a polygon is equiangular, equilateral, or regular and use the classification to solve problems.

Topic: Lesson 9: Find Perimeter, Circumference and Area
Minutes for Topic: 40

Core Lesson Description: Find dimensions of polygons using Area, Circumference, and Perimeter

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Find the perimeter and area of squares, rectangles and triangles.
2. **(I)** Find the radius, diameter, circumference and area of circles.

Topic: Lesson 10 and 11 (optional)
Minutes for Topic: 80

Core Lesson Student Learning Objectives: Show Mastery of:

1. Classify and name angles
2. Describe angle pair relationships
3. Classify Polygons
4. Find Area, Perimeter, and Circumference

Topic: Lesson 12 and 13: Review and Chapter 1 Test
Minutes for Topic: 80

Core Lesson Description:

1. Identify and name points, lines and planes.
2. Define, name, and identify lines, line segments, rays, and opposite rays
3. Define and identify collinear and coplanar points
4. Use segment postulates to identify congruent segments
5. Use segment postulates to solve problems
6. Classify and name angles
7. Describe angle pair relationships
8. Classify Polygons
9. Find Area, Perimeter, and Circumference

Unit: Unit 2: Reasoning and Proof
Timeline: September to October

Month: September- October

Skills:

Describe patterns and use inductive reasoning.

Write definitions as conditional statements.

Use deductive reasoning to form a logical argument.

Use postulates involving points, lines, and planes.

Use algebra properties in logical arguments.

Write proofs using geometric theorems.

Essential Questions: How do you use Reasoning and logic to write proofs through knowledge of definitions, postulates and theorems?

Content:

1. Inductive and Deductive Reasoning
2. Analyzing Conditional Statements
3. Use Postulates and Diagrams
4. Reason using properties from Algebra
5. Prove statements about Segments and Angles
6. Prove angle pair relationships

Vocabulary:

inductive reasoning

deductive reasoning

conjecture

counter example

conditional statement (converse, inverse, contrapositive)

if-then form

negation

perpendicular and parallel lines

biconditional statements

theorem

proof

Resources: McDougal Littell Geometry

Topic: Lesson 1: Use Inductive Reasoning
Minutes for Topic: 40

Core Lesson Description: Patterns and Inductive reasoning

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** describe patterns
2. **(I)** use inductive reasoning

Topic: Lesson 2: Write definitions as conditional statements
Minutes for Topic: 80

Core Lesson Description: Write conditional statements (if-then) as well as converse, inverse, and contrapositive and identify the hypothesis and conclusion.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Write conditional statements (if-then)
2. (**I)** Identify the hypothesis and conclusion of conditional statements
3. **(I)** Write converse, inverse, and contrapositive statements
4. **(I)** Understand definition of perpendicular lines
5. **(I)** Write definitions as biconditional statements

Topic: Lesson 3: Use deductive reasoning to form a logical argument
Minutes for Topic: 80

Core Lesson Description: Use deductive reasoning (laws of detachment and syllogism) to form logical arguments and conclusions.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Use the law of detachment to form logical arguments.

2. **(I)** Use the law of syllogism to form logical arguments.

3. **(I)** Use deductive reasoning to draw conclusions.

Topic: Lesson 4: Use postulates involving points lines an planes
Minutes for Topic: 40

Core Lesson Description: Use postulates involving points, lines and planes to interpret diagrams and write conditional statements.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Utilize and indentify postulates involving points, lines and planes.

2. **(I)** Interpret diagrams using postulates involving points, lines and planes.

Topic: Lesson 5 and 6: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Show mastery of:

Inductive Reasoning

Deductive Reasoning (laws of detachment and syllogism)

Postulates involving points, lines and planes

Topic: Lesson 7: Reason Using Properties from Algebra
Minutes for Topic: 40

Core Lesson Description: Use Algebraic properties to make logical arguments and to explain your work.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Use the Algebraic properties of equality to show logical argument for each step of a problem.

2. **(I)** Use the distributive property and the reflexive, symmetric and transitive properties of equality to show a logical argument for each step of a problem.

Topic: Lesson 8: Prove statements about segments and angles
Minutes for Topic: 40

Core Lesson Description: Write proofs using geometric theorems.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** analyze and interpret 2 column proofs
2. **(I)** write 2 column proofs

Topic: Lesson 9: Prove angle pair relationships
Minutes for Topic: 80

Core Lesson Description: Use angle pair relationships to analyze and write proofs.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Use right angle congruence theorem to analyze and write proofs.
2. **(I)** Use congruent supplements theorem to analyze and write proofs.
3. **(I)** Use congruent complements theorem to analyze and write proofs.

Topic: Lesson 10 and 11: Review and Quiz (optional)
Minutes for Topic: 80

Topic: Lesson 12 and 13: Review and Chapter 2 Test
Minutes for Topic: 80

Core Lesson Description: Show mastery of:

1. Inductive and Deductive Reasoning
2. Analyzing Conditional Statements
3. Use Postulates and Diagrams
4. Reason using properties from Algebra
5. Prove statements about Segments and Angles
6. Prove angle pair relationships

Unit: Unit 3: Parallel and Perpendicular Lines
Timeline: October to November

Month: October-November

Skills:

Identify and use angle pairs formed by parallel lines and transversals to solve problems and do proofs.

Use the converse statements of angle pairs to prove lines parallel

Find slopes of lines to write linear equations that are parallel and perpendicular to given lines

Prove lines parallel perpendicular

Essential Questions:

How do you use properties of parallel and perpendicular line?

How do you prove relationships using angle measures?

How do you use linear equations and Algebra to make connections?

Content:

1. Identify relationships in space- lines and planes- parallel, perpendicular, skew
2. Identify angle pairs formed by intersecting lines
3. Parallel and perpendicular lines
4. Identify congruent and supplementary angles fromed by parallel lines and transversals
5. Prove lines parallel
6. Find and use slopes of lines
7. Write and graph equations of lines
8. Prove theorems about perpendicular lines

Vocabulary:

parallel lines

skew lines

perpendicular lines

transversal

corresponding angles

alternate interior angles

alternate exterior angles

consecutive interior angles

slope

slope intercept form

standard form

x and y intercepts

distance between parallel lines

Resources: Text: McDougall Littell Geometry

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M11.C.3.1.1 (Advanced)	Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane (formula provided on the reference sheet).
M11.C.3.1.2 (Advanced)	Relate slope to perpendicularity and/or parallelism (limit to linear algebraic expressions; slope formula provided on the reference sheet).
M11.D.3.2 (Advanced)	Compute and/or use the slope of a line.
M11.D.3.2.1 (Advanced)	Apply the formula for the slope of a line to solve problems (formula given on reference sheet).
M11.D.3.2.2 (Advanced)	Given the graph of the line, 2 points on the line, or the slope and a point on a line, write or identify the linear equation in point-slope, standard and/or slope-intercept form.
M11.D.3.2.3 (Advanced)	Compute the slope and/or yintercept represented by a linear equation or graph.

Topic: Lesson 1: Identify Pairs of Lines and Angles
Minutes for Topic: 40

Core Lesson Description: Identify pairs of lines and angles

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Identify parallel, perpendicular, and skew lines and planes.
2. **(E)** Identify angle pair relationships formed by intersecting lines.

Topic: Lesson 2: Use parallel lines and transversals
Minutes for Topic: 80

Core Lesson Description: Identify and use angle pairs formed by parallel lines and transversals

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Identify and name the angle pair relationship formed by parallel lines and transversals.
2. **(E)** Use angle pair relationships to solve problems.
3. **(I)** Use angle pair relationships to complete proofs.

Topic: Lesson 3: Prove lines parallel
Minutes for Topic: 40

Core Lesson Description: Use angle relationships to prove that lines are parallel.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Prove lines parallel using the converse of angle pair relationships.
2. **(E)** Use the transitive property of parallel lines.

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description:

1. Identify relationships in space- lines and planes- parallel, perpendicular, skew
2. Identify angle pairs formed by intersecting lines
3. Parallel and perpendicular lines
4. Identify congruent and supplementary angles fromed by parallel lines and transversals
5. Prove lines parallel

Topic: Lesson 6: Find and use slopes of lines
Minutes for Topic: 40

Core Lesson Description: Find and compare slopes of lines.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Find the slope of line given 2 points or a graph.
2. **(E)** Compare and use slopes of parallel and perpendicular lines.
3. **(E)** Use slopes to compare steepness of lines.

Topic: Lesson 7: Write and graph equations of lines
Minutes for Topic: 40

Core Lesson Description: Write equations of lines

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Write an equation of a line in slope intercept form and standard form.
2. **(I)** Find x and y intercepts.

Topic: Lesson 8: Prove theorems about perpendicular lines
Minutes for Topic: 40

Core Lesson Description: You will find the distance between parallel lines and between a point and a line.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Justify why lines are parallel and perpendicular

Topic: Lesson 9 and 10 (Review and Quiz) (optional)
Minutes for Topic: 80

Core Lesson Description: Show mastery of :

Writing equations of lines

Finding slopes of lines

Finding intercepts of lines

Comparing slopes of parallel and perpendicular lines

Comparing steepness of lines

Finding the distance between parallel lines

Topic: Lesson 11 and 12: Review and ch 3 Test
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of:

1. Identify relationships in space- lines and planes- parallel, perpendicular, skew
2. Identify angle pairs formed by intersecting lines
3. Parallel and perpendicular lines
4. Identify congruent and supplementary angles fromed by parallel lines and transversals
5. Prove lines parallel
6. Writing equations of lines
7. Finding slopes of lines
8. Finding intercepts of lines
9. Comparing slopes of parallel and perpendicular lines
10. Comparing steepness of lines
11. Finding the distance between parallel lines

Unit: Unit 4: Congruent Triangles

Timeline: November to December

Month: November-December

Skills: Classify triangles and find measures of their angles.

Identify congruent figures.

Prove triangles congruent by side lengths (SSS)

Prove triangles congruent by sides and angles (SAS, AAS, ASA, HL)

Use congruent triangles to prove corresponding parts congruent.

Use properties of isosceles and equilateral triangles.

Essential Questions: How do you classify triangles by sides and angles and prove them congruent?

Content:

Triangle Sum

Triangle congruence

Prove Triangles congruent

Use congruent triangles

Use isosocles and equilateral triangles

Congruence transformations

Vocabulary:

triangles- equilateral, isosceles, scalene, acute right, obtuse, equiangular

interior angles

exterior angles

corollary

congruent figures

corresponding parts

Isosceles triangle parts- leg, base, vertex angles, base angles

transformations- translations, reflection, rotation

Resources: McDougall Littell Geometry text

STANDARDS:

STANDARDS

STATE: Pennsylvania State Anchors (2010)

M11.C.1.2.3 (Advanced)	Identify and/or use properties of isosceles and equilateral triangles
M11.C.1.3 (Advanced)	Use properties of congruence, correspondence and similarity in problem-solving settings involving two- and three- dimensional figures.
M11.C.1.3.1 (Advanced)	Identify and/or use properties of congruent and similar polygons or solids.
M11.C.2 (Advanced)	Identify and/or apply concepts of transformations or symmetry.

Topic: Lesson 1: Apply Triangle Sum Properties
Minutes for Topic: 40

Core Lesson Description: Classify triangles and find measures of their angles

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E**) Classify triangles by their sides and angles
2. **(E)** Use the triangle sum theorem to find the measure of angles in a triangle
3. **(E)** Use the exterior angle theorem to find measures of angles in a triangle

Topic: Lesson 2: Apply Congruence and Triangles
Minutes for Topic: 40

Core Lesson Description: Identify congruent figures

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Identify congruent figures.
2. **(E)** Use the third angle theorem to show congruent triangles
3. **(E)** Prove triangles are congruent using sides and angles.

Topic: Lesson 3: Prove triangles congruent by SSS
Minutes for Topic: 40

Core Lesson Description: Use side lengths to prove triangles are congruent

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Use SSS (side-side-side) Congruence postulate to determine if triangles are congruent
2. **(E)** Use SSS Congruence postulate to prove triangles congruent.

Topic: Lesson 4: Prove triangles congruent by SAS and HL
Minutes for Topic: 80

Core Lesson Description: Use sides and angles to prove congruence

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use SAS (side-angle-side) congruence postulate to prove triangles congruent.
2. **(E)** Use the HL (hypotenuse-leg) congruence theorem to prove triangles congruent.

Topic: Lesson 5: Prove Triangles Congruent by ASA and AAS
Minutes for Topic: 80

Core Lesson Description: Use ASA and AAS to prove triangles congruent

Core Lesson Student Learning Objectives: The student will be able to:

1. **(E)** Use and identify the ASA (Angle-side-angle) congruence postulate.
2. **(E)** Use and identify the AAS (Angle-angle-side) congruence theorem.

Topic: Lesson 6: Prove triangle congruence
Minutes for Topic: 80

Core Lesson Description: Use multiple methods to prove triangles congruent

Core Lesson Student Learning Objectives: Students will be able to:

1. **(C)** choose/identify the best method for proving given triangles congruent

Topic: Lesson 7 and 8: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of proving triangles congruent using SSS, SAS, AAS, ASA, and HL.

Topic: Lesson 9: Use Congruent Triangles
Minutes for Topic: 80

Core Lesson Description: Use congruent triangles to prove corresponding parts congruent.

Core Lesson Student Learning Objectives: The students will be able to:

1. use congruent triangles to prove corresponding parts congruent.

Topic: Lesson 10: Use Isosceles and Equilateral Triangles
Minutes for Topic: 80

Core Lesson Description: Use theorems about isosceles and equilateral triangles

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use the base angles theorem to solve problems
2. **(E)** Use the converse of the base angles theorem to solve problems
3. **(E)** Use the corrollary to the base angles theorem to solve problems
4. **(E)** Write proofs using theorems about equilateral and isosceles triangles

Topic: Lesson 11: Perform Congruence Transformations
Minutes for Topic: 40

Core Lesson Description: Perform and identify congruence transformations

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Name the transformation demonstrated in a picture.
2. **(I)** Understand and use coordinate notation for a translation
3. **(I)** Perform a congruence transformation

Topic: Lesson 12 and 13: Review and Ch 4 Test
Minutes for Topic: 80

Core Lesson Description: Show mastery of Ch 4:

Classify triangles and find measures of their angles.

Identify congruent figures.

Prove triangles congruent by side lengths (SSS)

Prove triangles congruent by sides and angles (SAS, AAS, ASA, HL)

Use congruent triangles to prove corresponding parts congruent.

Use properties of isosceles and equilateral triangles.

Unit: Unit 5: Relationships within Triangles (Optional for Academic level)

Timeline: December to January

Month: December- Janurary

Skills:

1. Find and use midsegment of a triangle
2. Write a coordinate proof
3. Use properties of perpendicular bisectors
4. Identify, find and name points of concurrency
5. Use properties of Angle bisectors
6. Use properties of medians and altitudes
7. Use inequalities in a triangle

Essential Questions: How do you use properties of special segments in triangles?

How do you use triangle inequalities to determine what triangles are possible?

Content: Midsegment theorem

Perpendicular Bisectors

Angle Bisectors of Triangles

Use Medians and Altitudes

Inequalities in a triangle and in two triangles

Indirect proof

Vocabulary:

midsegment of a triangle

coordinate proof

perpendicular bisector

equidistant

point of concurrency

circumcenter

incenter

median of a triangle

centroid

altitude of a triangle

orthocenter

indirect proof

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M11.C.1.2 (Advanced)	Recognize and/or apply properties of angles, triangles and quadrilaterals.
M11.C.1.2.1 (Advanced)	Identify and/or use properties of triangles (e.g., medians, altitudes, angle bisectors, side/angle relationships, Triangle Inequality Theorem).

Topic: Lesson 1: Properties of midsegments and coordinate proofs
Minutes for Topic: 80

Core Lesson Description: Use properties of midsegments and write coordinate proofs

Core Lesson Student Learning Students will be able to:

1. **(E)** Use midsegment theorem to solve problems

Objectives:

2. **(C)** Place a figure in a coordinate plane in a convenient way and assign coordinates to each vertex

3. **(C)** Write a coordinate proof

Topic: Lesson 2: Use Perpendicular Bisectors
Minutes for Topic: 40

Core Lesson Description: Use perpendcular bisectors to solve problems

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Use perpendicular bisectors to find sides of triangles

2. **(E)** Determine where the circumcenter will be in acute, right, and obtuse triangles

3. **(E)** Define a cicumcenter

Topic: Lesson 3: Use Angle Bisectors of Triangles
Minutes for Topic: 40

Core Lesson Description: Use angle bisectors to find distance relationships

Core Lesson Student Learning Objectives: The students will be able to:

1. **(C)** Use the angle bisector theorem to solve problems

2. **(C)** Use the converse of the angle bisector theorem to solve problems

3. **(C)** Define and identify location of an incenter in a triangle

Topic: Lesson 4 and 5: Review and Quiz 5.1-5.3
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of:

Midsegments, Perpendicular Bisectors, and Angle Bisectors

Topic: Lesson 6: Use Medians and Altitudes
Minutes for Topic: 40

Core Lesson Description: Use medians and altitudes of triangles to solve problems

Core Lesson Student Learning Objectives: The students will be able to:

1. **(C)** Identify and define median, centroid, atltitude, and orthocenter
2. **(C)** Use the properties of medians and centroid to solve problems
3. **(C)** Use the properties of altitudes and orthocenter to solve problems

Topic: Lesson 7: Use Inequalities in a Triangle
Minutes for Topic: 40

Core Lesson Description: Find the combinations of angles that are possible in a triangle.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use and understand the Triangle Inequality Theorem

Topic: Lesson 8: Inequalities in two triangles and indirect proof
Minutes for Topic: 40

Core Lesson Description: Use inequalities to make comparisons in two triangles. Write an indirect proof.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(C)** Use indirect reasoning to write an indirect proof.
2. **(E)** Use the hinge theorem and its converse to solve problems about triangles

Topic: Lesson 10 and 11: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of relationships within triangles (Medians, altitudes, hinge theorem, indirect reasoning)

Topic: Lesson 12 and 13: Review and Chapter 5 Test
Minutes for Topic: 80

Core Lesson Practice and show mastery of Unit 5: Relationships within triangles

Description: (Midsegments, Perpendicular and angle bisectors, medians, altitudes, hinge thm, indirect proof)

Unit: Unit 6: Similarity

Timeline: January to March

Month: January- February

Skills:

Simplify ratios

Find and use scale factor

Solve proportions- identlfy means and extremes

Find Geometric mean

Prove triangles similar using AA, SSS, SAS

Understand and identify translation, reflection, rotation, dilation, reduction and enlargement

Essential Questions:

How do you write and solve ratios and proportions?

How do you find a geometric mean?

How do you use ratios, proportions and geometric mean to solve problems?

How do you prove triangles similar using AA, SSS, SAS?

How do you perform similarity transformations?

Content:

Ratio

Proportion

Geometric mean

Similar polygons

Similar triangles

Proportionality Theorems

SimilarityTransformations

Vocabulary:

ratio

proportion

mean and extremes

geometric mean

scale and scale drawing

similar polygons

similar triangles

translation

reflection

dialtion and center of dialtion

reduction

enlargement

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M7.C.1.2 (Advanced)	Identify congruence and/or similarity in polygons.
M7.C.1.2.1 (Advanced)	Identify and/or use polygons that are similar and/or congruent, given either measurements or tic and angle marks.
M7.C.1.2.2 (Advanced)	Identify corresponding sides and/or angles of congruent or similar polygons.
M11.C.1.3 (Advanced)	Use properties of congruence, correspondence and similarity in problem-solving settings involving two- and three- dimensional figures.
M11.C.1.3.1 (Advanced)	Identify and/or use properties of congruent and similar polygons or solids.

Topic:

Topic: Lesson 1: Ratios, proportions and geometric mean
Minutes for Topic: 60

Core Lesson Description: Solve problems using ratios, proportions, and geometric mean

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Simplify ratios
2. **(E)** Use the cross products property to solve proportions
3. **(E)** Use proportions to find the geometric mean

Topic: Lesson 2: Use Proportions to Solve Geometry problems
Minutes for Topic: 40

Core Lesson Description: Use proportions to solve problems.

Calculate a scale for drawings and models

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use properties of proportions to write and solve problems
2. **(E)** Find and use scales to find acutal distances from models

Topic: Lesson 3: Use proportions to identify similar polygons
Minutes for Topic: 40

Core Lesson Description: Identify similar polygons, write similarity statements, and finding sides of similar polygons.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Write similarity statements and identify corresponding parts
2. **(E)** Use proportions to find parts of similar figures
2. **(E)** Use similar figures and proprotions to find the scale factor

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of ratios, proportions, and similar figures

Topic: Lesson 5: Prove triangles similar by AA
Minutes for Topic: 40

Core Lesson Description: Prove triangles similar using the AA (angle-angle) Similarity Theorem

Core Lesson Student Learning Objectives: The students will be able:

1. **(E)** Prove triangles similar using the AA Theorem

Topic: Lesson 6: Prove Triangles Similar by SSS and SAS
Minutes for Topic: 40

Core Lesson Description: Use SSS (side-side-side) and SAS (side-angle-side) Similarity Theorems to prove triangles congruent.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** prove triangles congruent using SSS and SAS.

Topic: Lesson 7: Use Proportionality Theorems
Minutes for Topic: 40

Core Lesson Description: Use proportionality theorems with triangles and parallel lines to solve problems

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Use proportionality to solve problems involving triangles
2. **(I)** Use proportionality to solve problems involving parallel lines

Topic: Lesson 8: Perform Similarity Transformations
Minutes for Topic: 40

Core Lesson Description: Identify a dialtion as a reduction or enlargement

Find the scale factor of a dilation and use to solve prolems

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Identify a dialtion as a reduction or enlargement

2. **(I)** Find the scale factor of a dilation and use to solve prolems

Topic: Lesson 9 and 10 (Review and Quiz)
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of similar triangles and proportionality

Topic: Lesson 11 and 12: Review and unit 6 Test
Minutes for Topic: 80

Core Lesson Description: Pracitice and show mastery of similarity

Unit: Unit 7: Right Triangles and Trigonometry

Timeline: January

Month: Feb

Skills:

Apply the pythagorean theorem to find side lengths of triangles?

Use the converse of the pythagorean theorem to determine the type of triangle?

Use similar triangles and altitudes to solve problems?

Use the relationships among the sides in special right triangles to solve problems?

Use sine, cosine and tangent ratios to find side lengths and angle measures of triangles?

Use inverse trig functions to solve right triangle

Use the law of sines and cosines to solve non right triangles (extension)?

Essential Questions: How do you solve right triangles?

Content:

Right Triangles

Pythagorean Theorem

Trigonometric Functions

Inverse Trigonometric Functions

Vocabulary:

Pythagorean theorem

Pythagorean triple

trigonometric ratio

tangent

sine

cosine

angle of elevation

angle of depression

inverse tangent

inverse sine

inverse cosine

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M8.C.1.2 (Advanced)	Compute measures of sides of right triangles using the Pythagorean Theorem.
M8.C.1.2.1 (Advanced)	Use the Pythagorean Theorem to find the measure of a missing side of a right triangle (formula provided on the reference sheet – whole numbers only).
M11.C.1.4 (Advanced)	Solve problems involving right triangles using the Pythagorean Theorem.
M11.C.1.4.1 (Advanced)	Find the measure of a side of a right triangle using the Pythagorean Theorem (Pythagorean Theorem included on the reference sheet).

Topic: Lesson 1: Apply Pythagorean Theorem
Minutes for Topic: 40

Core Lesson Description: Use pythagorean theorem to find side lengths of right triangles

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use pythagorean theorem to find sides of right triangles.
2. **(C)** Understand and utilize pythagorean triples to find sides of right triangles

Topic: Lesson 2: Converse of Pythagorean Theorem
Minutes for Topic: 40

Core Lesson Description: Use the converse of Pythagorean Theorem to determine if a triangle is right.

Determine if a triangle is acute or obtuse.

Core Lesson Student Learning Objectives: The students will be able to

1. Determine if a triangle is right, acute or obtuse.

Topic: Lesson 3: Use Similar Right Triangles
Minutes for Topic: 80

Core Lesson Description: Use properties of altitudes and the geometric mean to find sides of similar triangles.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Use proportions and properties of altitudes to find sides of similar triangles
2. **(I)** Use geometric means to find sides of triangles

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Practice and show mastery of solving right trianges using pythagorean theorem and proportions.

Topic: Lesson 6: Use the relationships of special right triangles
Minutes for Topic: 40

Core Lesson Description: Use the relationships of 30-60-90 triangles and 45-45-90 triangles to find side lengths

Core Lesson Student Learning Objectives: The students will be able to:

use the relationships among the sides in special right triangles

Topic: Lesson 7: Apply the tangent ratio

Minutes for Topic: 40

Core Lesson Description: Use the tangent ratio for indirect measurement.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Use the tangent ratio to find side lengths of right triangles

Topic: Lesson 8: Apply sine and cosine ratio
Minutes for Topic: 80

Core Lesson Description: Use sine and cosine ratios to find side lengths of right triangles. Apply trig ratios to solve real world scenarios.

Core Lesson Student Learning Objectives: The student will be able to:

1. **(E)** Apply the sine and cosine ratio to solve right triangles.
2. **(E)** Use sine, cosine, and tangent ratios to solve word problems involving angles of elevation and angles of depression

Topic: Lesson 9: Solve right triangles using inverse trig functions
Minutes for Topic: 40

Core Lesson Description: Find all parts of right triangles using trig functions and inverse trig functions

Core Lesson Student Learning Objectives: Students will be able to:

1. Use inverse trig functions to solve right triangles
2. Use trig functions and inverse trig functions to solve real world problems

Topic: Lesson 10: Solving Right triangle word problems
Minutes for Topic: 80

Topic: Lesson 10 and 11: Review and Quiz
Minutes for Topic: 80

Topic: Lesson 12 and 13: Review and Unit 7 Test
Minutes for Topic: 80

Unit: Unit 8: Quadrilaterals

Timeline: March

Month: March

Skills:

Find angle measures of polygons.

Find angle and side measures in parallelograms

Use properties to identify if a shape is parallelogram

Use properties to identify rhombus, rectangle, square

Use properties of trapezoids and kites

Find the midsegment of a trapezoid and use it to solve problems

Essential Questions:

How do you use angle relationships in polygons?

How do you use properties of parallelograms?

How do you classify quadrilterals by their properties?

Content:

Polygon Interior Angles Theorem

Polygon Exterior Angles Theorem

Properties of Parallelograms

Properties of Phombuses, Rectangles, Squares,Trapezoids and Kites

Vocabulary:

diagonal

parallelogram

rhombus

rectangle

square

trapezoid- base angles, bases and legs

isosceles trapezoid

midsegment

trapezoid

kite

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M3.C.1 (Advanced)	Analyze characteristics and properties of two- and three-dimensional geometric shapes and demonstrate understanding of geometric relationships.
M3.C.1.1.1 (Advanced)	Name/identify/describe geometric shapes in two dimensions (circle, square, rectangle, triangle, pentagon, hexagon, octagon).
M4.C.1 (Advanced)	Analyze characteristics and properties of two- and three-dimensional geometric shapes and demonstrate understanding of geometric relationships.
M4.C.1.1 (Advanced)	Identify/describe the basic properties of geometric figures in two or three dimensions.
M4.C.1.1.1 (Advanced)	Identify, classify and/or compare twodimensional figures (circle, triangle, square, parallelogram, trapezoid, rhombus, rectangle, pentagon, hexagon, octagon).

Topic: Lesson 1: Find Angle Measures in Polygons
Minutes for Topic: 40

Core Lesson Description: Use interior and exterior angle theorems to find angle measures in polygons

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Find the sum of the measures of the interior angles of a polygon.
2. **(E)** Find the measures of the exterior angles of a regular polygon.

Topic: Lesson 2: Find Angle and Side Measures in Parallelograms
Minutes for Topic: 80

Core Lesson Description: Find angle and side measures in parallelograms.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Use properties of parallelograms to find missing side lengths and angles.

Topic: Lesson 3: Use properties to identify parallelograms
Minutes for Topic: 80

Core Lesson Description: Use propeties to determine if a shape is a parallelogram.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Use properties and theorems to identify parallelograms.
2. **(E)** Use properties and theorems to find missing sides of parallelograms

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Review and Quiz 8.1-8.3

Topic: Lesson 6: Properties of Rhombuses, Rectangles, and Squares
Minutes for Topic: 80

Core Lesson Description: Use properties of rhombuses, rectangles and squares.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Use properties to identify rhombuses, squares, and rectangles.

Topic: Lesson 7: Use Properties of Trapezoids and Kites
Minutes for Topic: 60

Core Lesson Description: Use properties of kites and trapezoids to solve problems.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(I)** Use properties of trapezoids and kites to solve problems.

Topic: Lesson 8 and 9: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: 8.4-8.6 Review and Quiz

Topic: Lesson 10 and 11: Review and Chapter 8 Test
Minutes for Topic: 80

Unit: Unit 10: Properties of Circles

Timeline: April

Month: April

Skills:

Use properties of tangents to circles

Use angle measures to find arc measures

Use inscribed angles of circles to solve problems

Use tangents and chords to find measures of angles inside or outside a circle

Find segment lengths in circles

Write equations of circles in coordinate plane

Essential Questions:

How do you use properties of segments that intersect circles?

How do you apply angle relationships in circles?

How do you use circles in the coordinate plane?

Content:

Circle- center, radius, diameter

chord, secant, tangent

central angle

semicircle, minor arc, major arc

inscribed angle

cngruent arcs and intercepted arc

standard equation of a circle

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M7.C.1.1.1 (Advanced)	Identify, describe and/or define diameter, radius, chord and/or circumference in circles.

Topic: Lesson 1: Use Properties of a Tangent to a Circle
Minutes for Topic: 40

Core Lesson Description: Use properties of tangents.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Identify a radius, chord, diameter, secant or tangent.
2. **(E)** Determine if a line is tangent to a circle.
3. **(E)** Identify common tangents
4. **(E)** Solve problems using tangents

Topic: Lesson 2: Use angle measures to find arc measures
Minutes for Topic: 40

Core Lesson Description: Use angle measures in circles to find arc measures

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Find the measures of major and minor arcs.
2. **(E)** Use the arc addition postulate to solve problems.

Topic: Lesson 3: Apply properties of arcs and chords
Minutes for Topic: 80

Core Lesson Description: Use relationships of arc and chords in a circle.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** find the measures of arcs and chords.

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Review and Quiz 10.1-10.3

Topic: Lesson 6: Apply angle relationships in circles
Minutes for Topic: 40

Core Lesson Description: Find measures of angles inside or outside a circle.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(C)** Use theorems of tangents and chords to solve problems involving circles.

Topic: Lesson 7: Find segment lengths in circles
Minutes for Topic: 40

Core Lesson Description: Find segment lengths in circles.

Core Lesson Student Learning Objectives: Students will be able to:

1. **(C)** Find segment lengths of chords.
2. **(C)** Use the segments of secants theorem to solve problems.

Topic: Lesson 8: Write and Graph Equations of Circles
Minutes for Topic: 80

Core Lesson Description: Write equations of circles in the coordinate plane.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(E)** Write an equation of a circle in standard form.

Topic: Lesson 9 and 10 (Review and Quiz)
Minutes for Topic: 80

Core Lesson Description: Review and Quiz 10.4-10.7

Unit: Unit 11: Measuring Length and Area

Month: May

Skills: Area of parallelogram, triangle, rectangle.

Area congruence postulate

Area addition postulate

Essential Questions: How do you find area, perimeter, circumference,and arc lengths of polygons?

Content: Use Area formula for polygons

Relate length, perimeter, and area ratios in similar polygons

Compare measures for parts of circles and the whole circle

Vocabulary: base and height of parallelogram

height of trapezoid

circumference

arc length

sector of circle

center and radius of polygon

apothem of polygon

central angle of a regular polygon

STANDARDS: **STANDARDS**

STATE: Pennsylvania State Anchors (2010)

M11.C.1 (Advanced)	Analyze characteristics and properties of two- and three-dimensional geometric shapes and demonstrate understanding of geometric relationships.
M11.C.1.1 (Advanced)	Identify and/or use parts of circles and segments associated with circles.

Topic: Lesson 1: Areas of Triangles and Parallelograms
Minutes for Topic: 40

Core Lesson Description: Areas of Triangles and parallelograms

Core Lesson Student Learning Objectives: Students will be able to:

1. **(E)** Find the perrimeters and areas of triangles and parallelograms.

Topic: Lesson 2: Areas of Trapezoids, Rhombuses and Kites
Minutes for Topic: 80

Core Lesson Description: Find areas of other quadrilaterals such as Trapezoids, rhombuses and kites.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Find the area of rhombuses, trapezoids, and kites.

Topic: Lesson 3: Perimeter of Similar Figures
Minutes for Topic: 40

Core Lesson Description: Use ratios to find areas of similar figures.

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Use ratios to find perimeters and areas of similar figures.

Topic: Lesson 4 and 5: Review and Quiz
Minutes for Topic: 80

Core Lesson Description: Review and Quiz 11.1-11.3

Topic: Lesson 6: Finding Circumference and Arc Length
Minutes for Topic: 80

Core Lesson Description: Find circumference and arc lengths of circles.

Core Lesson Student Learning Objectives: The student will be able to:

1. **(E)** Find circumference and arc length of circles.

Topic: Lesson 7: Areas of Circles and Sectors
Minutes for Topic: 40

Core Lesson Description: Areas of Sectors of Circles

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Find areas of sectors
2. **(I)** Use areas of sectors to solve problems.

Topic: Lesson 8: Areas of Regular Polygons
Minutes for Topic: 40

Core Lesson Description: Find areas of regular polygons inscribed in circles

Core Lesson Student Learning Objectives: The students will be able to:

1. **(I)** Find the area of a regular polygon.
2. **(I)** Find the perimeter of a regular polygon.

Topic: Lesson 9 and 10 (Review and Quiz)
Minutes for Topic: 80

Core Lesson Description: Review and Quiz 11.4-11.7

Topic: Lesson 11 and 12: Review and Ch 11 Test
Minutes for Topic: 80

Core Lesson Description: Review and Test ch 11