Geometry Modules

Unit 1 - Foundations and Tools (Chapter 1, Sections 1.1-4)

Unit 2 - Formulas, Coordinates, and Transformational Tools (Ch 1, Sections 1.5-1.6 and Ch9 sections 9.1 - 9.4)

Unit 3 - Logic, Proof, & Geometric Reasoning (Chapter 2)

Unit 4 - Parallel & Perpendicular Lines (Chapter 3)

Unit 5 - Triangle congruence (Chapter 4)

Unit 6 - Properties of Triangles (Chapter 5)

Unit 7 - Polygons & quadrilaterals (Chapter 6)

Unit 8 - Similarity (Chapter 7)

Unit 9 - Right triangles & Trigonometry (Chapter 8)

Unit 10 - Perimeter, Circumference & Area (Chapter 10)

Unit 11 - 3D figures: volume and surface area (Chapter 11)

Unit 12 - Circle (Chapter 12)

Course Description:

Geometry is the second of third course in a traditional mathematics sequence that builds mathematical reasoning through mathematical proof, and improves algebraic thinking by embedding algebra in geometry problems.

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 1 – FOUNDATIONS AND TOOLS

Desired Results

Priority Standards

G.CO.1. Demonstrates understanding of key geometrical definitions, including angle, circle, perpendicular line, parallel line, line segment, and transformations in Euclidean Geometry. Understand undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Transfer

Students will be able to independently use their learning to…
Use the correct terminology for basic geometric figures.
Apply basic formulas in and out of the coordinate plane.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Geometry is omnipresent in the physical world; it can be used to solve problems in real life.
- Geometry uses standard vocabulary and symbols to communicate facts and relationships about geometric figures.

ESSENTIAL QUESTIONS

Students will keep considering…

- What are ways geometric properties are used in real-life situations?
- What symbols, formulas, and vocabulary are conventional for communicating within the context of Geometry?

Acquisition

Students will know…

- Key geometrical definitions.
- The length of a segment can be given as an expression.
- Angle postulates.
- There are different types of angles (adjacent, vertical complementary, and supplementary).
- There are varieties of tools that help us make formal geometric constructions.

Students will be skilled at…

- I can apply and draw facts about points, lines, segments, rays, and planes.
- I can use length and midpoint of a segment to calculate measures and construct midpoints and congruent segments.
- I can measure/construct angles, angle bisectors, and using angle classifications and postulates to calculate the measure of pairs of angles.
- I can differentiate between pairs of angles and use this differentiation to calculate angle measures.

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 1 – FOUNDATIONS AND TOOLS

Evidence	
Evaluative Criteria	**Assessment Evidence**
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 1 test (will be attached later) Construction performance task should include: • copy/bisect a segment • copy/bisect an angle • measure length to the nearest 16th of inch and millimeter • measure an angle with a protractor OTHER EVIDENCE: Formative assessments, construction labs

Learning Plan

Flexible Content – To be determined

Ch 1: Sections 1.1 - 1.4

- compass constructions: pg 14, 22, 23 and bisect a midpoint (supplement)
- ruler lab - knowing how to measure to the 16th of an inch
- protractor lab - knowing how to measure an angle
- drawing lab - planes, intersecting planes, lines, rays, segments relationships

Mathematical practices: (reference pg 4 of teachers edition)

- Section 1.1
  - reason abstractly and quantitatively #28-34
  - construct viable arguments and critique the reasoning of others #31-34, 38
  - Model with mathematics #22
  - look for and express regularity in repeated reasoning #45
- Section 1.2
  - construct viable arguments and critique the reasoning of others #24-27
  - use appropriate tools strategically #5, 13, 35

- Look for and make use of structure #44
- Section 1.3
  - reason abstractly and quantitatively #19-22, 32
  - model with mathematics #3, 11
  - use appropriate tools strategically #4-6, 12-14, 23-26, 40
- Section 1.4
  - construct viable arguments and critique the reasoning of others #34-37
  - model with mathematics #12
  - look for and make use of structure #32

Additional resources/assignments/activities:

- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary

Acute angle	Endpoint	Pi
Adjacent angles	Exterior of an angle	Plane
Angle	Height	Point
Angle bisector	Hypotenuse	Postulate
Between	Interior of an angle	Ray
Bisect	Leg	Right angle
Collinear	Length	Segment
Complementary angles	Line	Segment bisector
Congruent angles	Linear pair	Straight angle
Congruent segments	Midpoint	Supplementary angles
Construction	Measure	Undefined term
Coplanar	Obtuse angle	Vertex
Degree	Opposite rays	Vertical angles
Diameter	Perimeter	

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 2 – FORMULAS, COORDINATES, AND TRANSFORMATIONAL TOOLS

Desired Results

Priority Standards

G.CO.5. Given a geometric figure and a rotation, reflections, or translation, draw the transformed figure using, e.d., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Supporting Standards

G.GPE.7. Use coordinates to compute perimeters and areas of polygons using the distance formula.

G.CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g.; translation versus horizontal stretch).

G.CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and the line segments.

Transfer

Students will be able to independently use their learning to…
Find distances between points in the real world (between cities).
Determine materials needed to make triangular or rectangular objects.
Design patterns to create products (e.g. clothing, furniture, art).

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Formulas help us measure the perimeter, area, and circumference of basic geometric shapes.
- Mathematical situations can be analyzed by applying transformations and using symmetry.
- Geometry allows measurement of things that can't be measured easily using traditional methods.

ESSENTIAL QUESTIONS

Students will keep considering…

- How is the perimeter, area, and circumference of basic geometric shape calculated?
- How to determine the midpoint and length of segment?
- How to determine the image of figure after a transformation?

Acquisition

Students will know…

- The formulas for area, midpoint, distance, and the Pythagorean theorem.
- The types of congruent transformations (rotation, reflection, rotation).
- Midpoint and distance in a coordinate plane.
- Transformations in the coordinate plane.

Students will be skilled at…

- I can apply formulas for perimeter, area, circumference, midpoint, distance, and the Pythagorean Theorem.
- I can use the distance formula and Pythagorean Theorem to find the distance between two points.
- I can identify and write transformations in transformation notation.
- I can predict the coordinates of the image, given the preimage and transformation notations.

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 2 – FORMULAS, COORDINATES, AND TRANSFORMATIONAL TOOLS

Evidence	
Evaluative Criteria	**Assessment Evidence**
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 2 assessment (to be attached later) OTHER EVIDENCE: Formative assessments, labs, quizzes

Learning Plan

Students should, but may not have understanding of:

- Perimeter and area of triangles and rectangles
- Pythagorean Theorem
- Midpoint Formula

Consider reviewing 1.5

Chapter 1: section 1.6 - Focus on problems in the coordinate plane → supplement with other problems

Chapter 9: sections 9.1 - 9.4

Mathematical practices:

- Section 1.5
  - reason abstractly and quantitatively #55
  - Construct viable arguments and critique the reasoning of others #54
  - model with mathematics #6, 13, 26, 30
  - Look for and make use of structure #27, 31
- Section 1.6
  - model with mathematics #11, 21, 26, 27, 33, 37
  - look for and make use of structure #25
- Section 9.1
  - construct viable arguments and critique the reasoning of others: #52
  - model with mathematics #8, 19, 27, 37
  - use appropriate tools strategically #43, 45
  - look for and make use of structure #53-57

- Section 9.2
  - model with mathematics #44
  - use appropriate tools strategically # 36-38
  - look for and make use of structure #45-49
- Section 9.3
  - construct viable arguments and critique the reasoning of others #37, 46
  - model with mathematics #11, 22, 31, 45
  - use appropriate tools strategically #36, 41
  - look for and make use of structure #47-51
- Section 9.4
  - reason abstractly and quantitatively #16-20
  - construct viable arguments and critique the reasoning of others #14

Additional resources/assignments/activities:

- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary		
Area	Preimage	Coordinate plane
Perimeter	Radius	Distance
Circumference	Reflection	Midpoint
Coordinate	Rotation	Translation

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 3 – LOGIC, PROOF, AND GEOMETRIC REASONING

Desired Results

Priority Standards

G.CO.9. Using methods of proof including direct, indirect, and counter examples to prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Supporting Standards

A.REI.1. Apply properties of mathematics to justify steps in solving equations in one variable.

Transfer

Students will be able to independently use their learning to…
Use inductive and deductive reasoning to make valid arguments.
Plan and write geometric proofs.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- A proof is a formal argument supported by postulates, theorems, and definitions.
- Logical reasoning helps us come to a conclusion.
- A proof is a formal argument supported by postulates, theorems, and definitions.

ESSENTIAL QUESTIONS

Students will keep considering…

- How and why is deductive reasoning used in geometric proof?
- How can traditional constructions deepen understanding and illustrate geometric relationships?

Acquisition

Students will know…

- The difference between inductive and deductive reasoning.
- The Law of Detachment and The Law of Syllogism in logical reasoning.
- The properties of equality and congruence.

Students will be skilled at…

- I can analyze & write conditional & biconditional statements.
- I can use symbolic notation for conditional statements.
- I can form conclusions by using laws of logic.
- I can prove geometric theorems by using deductive reasoning.
- I can write the inverse, converse, and contrapositive of a conditional statement.
- I can apply the Law of detachment and the law of syllogism in logical reasoning.
- I can write and analyze biconditional statements.
- I can recognize algebraic properties of equality/properties of congruence.

		• I can write reasons for steps in a proof. • I can write two-column proofs. • I can use deductive reasoning to prove statements about segments and angles. • I can perform constructions: copy a segment, copy an angle.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): KPBSD common unit exam OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 2: Sections 2.1 - 2.7
Mathematical practices:

- Section 2.1
  - reason abstractly and quantitatively #5-7, 14-16, 23, 28, 30, 33, 35
  - construct viable arguments and critique the reasoning of others: #8-10, 17-19, 24-27
  - Use appropriate tools strategically #43
  - look for the make use of structure: #40
  - look for and express regularity in repeated reasoning: #2-4, 11-13, 20-22, 31
- Section 2.2
  - reason abstractly and quantitatively #4, 5, 9, 10, 18, 20, 30-32, 39 41, 51, 52, 57
  - construct viable arguments and critique the reasoning of others: #9-11, 19-21, 38-41, 56
  - Look for and make use of structure: #3-7, 12-18, 22, 23, 30-37, 48, 54, 55
- Section 2.3
  - reason abstractly and quantitatively #8, 13, 15-18, 22, 24, 26-28
  - construct viable arguments and critique the reasoning of others #4, 5, 11, 12, 19-21, 24, 26

- look for and make use of structure #4-8, 11-13, 15-18
- Section 2.4
  - reasons abstractly and quantitatively #6, 7, 16, 17, 20-23, 33, 34, 37, 38, 41, 43, 45
  - construct viable arguments and critique the reasoning of others #6, 7, 16, 17, 20-23, 41
  - look for and make use of structure #2-5, 8-15, 18, 19, 24-35, 37, 42-44
- Section 2.5
  - reason abstractly and quantitatively #29, 36, 39, 44
  - construct viable arguments and critique the reasoning of others #2-9, 16-21, 36, 37
  - look for and make sure of structure #2-9, 12-21, 23-28, 30-32, 37, 41
- Section 2.6
  - reason abstractly and quantitatively #4-10, 14, 16-19, 28
  - attend to precision #23
  - look for and make use of structure: #3-10, 14, 24, 28
- Section 2.7
  - reason abstractly and quantitatively #11-13, 19, 21, 23, 24-26
  - construct viable arguments and critique the reasoning of others #17-19, 24-26
  - look for and make use of structure #3-10, 18

Additional resources/assignments/activities:

- 20 beginning proof worksheet: https://drive.google.com/file/d/1f7bQJSNqHKe_MNNcj_M-T1G7K1KG9FO3/view?usp=sharing
- helpful hints for writing proofs: https://drive.google.com/file/d/1AGCa5zgXbKO3n8HJ-FtOGI0YV2Zz3JDM/view?usp=sharing
- assumptions & justifications: https://drive.google.com/file/d/1jWadkISU73UpdNj3wj6nF4hqVJu5chXq/view?usp=sharing
- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary

Biconditional statement	Definition	Polygon
Conclusion	Hypothesis	Proof
Conditional statement	Inductive reasoning	Quadrilateral
Conjecture	Inverse	Theorem
Contrapositive	Logically equivalent statements	Triangle
Converse	Negation	Truth value
Counter example	Deductive reasoning	Two-column proof

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 4 – PARALLEL AND PERPENDICULAR LINES

Desired Results

Priority Standards

G.CO.1. Demonstrates understanding of key geometrical definitions, including angle, circle, perpendicular line, parallel line, line segment, and transformations in Euclidean Geometry. Understand undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.9. Using methods of proof including direct, indirect, and counter examples to prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Supporting Standards

G.GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Transfer

Students will be able to independently use their learning to…

Use and prove properties of parallel lines and the angles formed by parallel lines and transversals.

Represent lines in a coordinate plane.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Lines and angles.
- Angles formed by parallel lines and transversal.
- Properties/relationships of parallel and perpendicular lines.
- Slopes of lines.
- Lines in a coordinate plane.

ESSENTIAL QUESTIONS

Students will keep considering…

- What algebraic and geometric conditions are sufficient and necessary to prove lines parallel or perpendicular?
- What are the angle relationships when parallel lines are cut by a transversal?
- What are the conventional forms of proof?

Acquisition

Students will know…

- Parallel, perpendicular, and skew lines.
- The types of angles formed by two lines and a transversal.
- Slopes of parallel and perpendicular lines.

Students will be skilled at…

- I can prove and use theorems about angles formed by parallel lines and a transversal.
- I can use the angles forme.
- I can use slopes of lines to determine if two lines are parallel or perpendicular.

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 4 – PARALLEL AND PERPENDICULAR LINES

Evidence	
Evaluative Criteria	**Assessment Evidence**
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 4 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 3: Sections: 3.1 - 3.6
Mathematical practices:

- Section 3.1
  - reason abstractly and quantitatively #42, 54
  - construct viable arguments and critique the reasoning of others #34
  - model with mathematics #26, 30-33, 41, 43
- Section 3.2
  - reason abstractly and quantitatively #27, 28, 32, 33, 35
  - construct viable arguments and critique the reasoning of others #13-19, 25, 26, 31, 32, 39
- Section 3.3
  - reason abstractly and quantitatively #1-42, 44
  - construct viable arguments and critique the reasoning of others #1-39, 41-46
- Section 3.4
  - reason abstractly and quantitatively #3, 7, 10-21, 34, 36, 27, 31-16
  - construct viable arguments and critique the reasoning of others #4, 5, 8, 22, 23, 28, 37, 38
  - model with mathematics: #5, 9, 24
  - use appropriate tools strategically #29, 30
  - attend to precision #25
  - look for and make use of structure #4, 8
- Section 3.5
  - reason abstractly and quantitatively #26, 29, 30, 32, 33

- model with mathematics #6, 14, 18, 24, 28
- look for and make use of structure #2-5, 7-9, 10-13, 15-18, 23

- Section 3.6
  - reason abstractly and quantitatively #8-11, 19-22, 33-44, 51, 52, 65, 66
  - construct viable arguments and critique the reasoning of others #32, 54, 56
  - model with mathematics #12, 23, 45, 53, 55
  - attend to precision #46
  - look for and make use of structure #2-4, 8-11, 13-15, 19-22, 24-31, 33-44, 47-52, 62-64, 66

Additional resources/assignments/activities:

- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary

Alternate exterior angles	Parallel planes	Same-side interior angles
Alternate interior angles	Perpendicular bisector	Skew lines
Corresponding angles	Perpendicular lines	Slope
Distance from a point to a line	Point-slope form	Slope-intercept form
Parallel lines	Rise	Transversa
Run		

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 5 – TRIANGLE CONGRUENCE

Desired Results

Priority Standards

G.CO.9. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G.CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G.CO.8. Explain how the criteria for triangle congruence (ASA, SAS, SSS, AAS, and HL) follow from the definition of congruence in terms of rigid motions.

G.CO.10. Using methods of proof including direct, indirect, and counter examples to prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

G.SRT.5. Apply congruence and similarity properties and prove relationships involving triangles and other geometric figures.

G.GPE.4. Perform simple coordinate proofs. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*

G.GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or

Transfer

Students will be able to independently use their learning to…
Proof and use the triangle sum theorem.
Understand congruence and prove and apply congruence relationships for triangles.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- In congruent triangles, each pair of corresponding parts is congruent.
- Triangles can be proven congruent using SSS, SAS, ASA, AAS and HL postulates, and theorem.
- Base angles of an isosceles triangle are congruent, and conversely, if two angles of a triangle are congruent, then the triangle is isosceles.
- A triangle is equiangular if and only if it is equilateral.
- In an isosceles triangle, the median to the base, the altitude to the base and the bisector of the vertex angle are the same segment.

ESSENTIAL QUESTIONS

Students will keep considering…

- What are the different classifications for triangles?
- How can triangles be proven congruent?
- How can congruent triangles be used to solve problems?

Acquisition

Students will know…

- Triangles are classified by sides and angles.
- There are relationships between triangles and other geometric figures.
- The properties of isosceles and equilateral triangles.

Students will be skilled at…

- I can solve problems based on interior and exterior angle relationships.
- I can identify congruent figures and corresponding parts.
- I can understand and apply postulates and theorems proving triangles congruent.

perpendicular to a given line that passes through a given point)		• I can prove triangles congruent with given information. • I can copy a triangle by construction. • I can use congruent triangles to prove segment or angle relationships. • I can use congruent triangles to solve problems.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 5 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 4: Sections 4.1-4.9
Mathematical practices:

- Section 4.1
  - construct viable arguments and critique the reasoning of others #9. 10. 22-24 33
  - model with mathematics #11, 25, 28, 32, 38
  - attend to precision #34, 35
  - look for and make use of structure #3-6, 13-18, 26, 27, 29, 30, 37
- Section 4.2
  - reason abstractly and quantitatively #9, 10, 18, 19, 21, 22, 32, 34-37, 44, 47, 48
  - construct viable arguments and critique the reasoning of others #46
  - model with mathematics #11, 33
  - use appropriate tools strategically #20-39
  - look for and make use of structure #38
- Section 4.3

- construct viable arguments and critique the reasoning of others #324, 25, 27, 28, 38, 47
- model with mathematics #4, 5, 15, 36
- use appropriate tools strategically #37, 39
- attend to precision #37, 39
- look for and make use of structure #6-14, 16-22, 29-32, 35

- Section 4.4
  - reason abstractly and quantitatively #9 10, 17, 18, 23-25, 32-36
  - construct viable arguments and critique the reasoning of others #11, 12, 19, 20, 26, 27, 29, 30
  - look for and make use of structure #3-8, 13-18, 21, 22, 31, 37
- Section 4.5
  - reason abstractly and quantitatively #2, 3, 8, 9, 18, 23, 29-31
  - construct viable arguments and critique the reasoning of others #5-7, 11-17, 19-21, 32-34
  - model with mathematics #4, 10, 22, 25
  - use appropriate tools strategically #27
- Section 4.6
  - reason abstractly and quantitatively #4, 5, 7, 8, 11, 12, 14, 15, 18, 26, 29
  - construct viable arguments and critique the reasoning of others #6, 13, 20-24, 30, 32-34
  - model with mathematics #2, 3, 9, 10, 19, 31
  - use appropriate tools strategically #25
- Section 4.7
  - reason abstractly and quantitatively #17, 18, 22, 24, 26, 27, 32
  - construct viable arguments and critique the reasoning of others #3, 4, 8-11, 14, 15, 19-21, 29-31
- Section 4.8
  - reason abstractly and quantitatively #16, 17, 20, 21, 28, 29, 33
  - construct viable arguments and critique the reasoning of others #4, 7, 10 13, 22-24, 34
  - model with mathematics #15
  - look for and make use of structure #2, 3, 5, 6, 8, 9, 11, 12, 14, 27, 31, 32
- Section 4.9
  - reason abstractly and quantitatively #3-10, 13-20, 22-25, 26, 28, 29, 32, 34-43, 44
  - construct viable arguments and critique the reasoning of others #11, 21, 30, 35-37, 39, 41, 45
  - model with mathematics #2, 12, 38
  - use appropriate tools strategically #31

Additional resources/worksheets/labs:

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 5 – TRIANGLE CONGRUENCE

- review of right triangle congruency worksheet https://drive.google.com/file/d/16RcR4KvdN4UA4YIaQb4iKFa0_EcGZSYC/view?usp=sharing
- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary		
Acute triangle	Dilation	Isometry
Equiangular triangle	Equiangular triangle	Legs of an isosceles triangle
Right triangle	Equilateral triangle	Obtuse triangle
Auxiliary line	Exterior	Remote interior angle
Base	Exterior angle	Right triangle
Base angle	Included angle	Rigid transformation
Congruent polygons	Interior	Scalene triangle
Coordinate proof	Interior angle	Triangle rigidity
Corollary	Isosceles triangle	Vertex angle
Corresponding angles	Corresponding sides	CPCTC

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 6 – PROPERTIES OF TRIANGLES

Desired Results

Priority Standards

G.CO.10. Using methods of proof including direct, indirect, and counter examples to prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180, base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

Supporting Standards

G.CO.9. Using methods of proof including direct, indirect, and counter examples to prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

G.C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Transfer

Students will be able to independently use their learning to…
Apply the properties of special triangle segments to solve real-world problems.
Justify and apply inequality relationships in triangles.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Segments can be created in triangles using perpendicular and angle bisectors, medians and altitudes, special points in triangles, and a triangle mid-segment to solve equations and inequalities about the triangle.

ESSENTIAL QUESTIONS

Students will keep considering…

- What segments have special purposes in understanding triangles and solving problems?
- What are some traditional constructions involving special segments in triangles?
- What is indirect proof and how is it different from direct proof?

Acquisition

Students will know…

- Triangles are classified by sides and angles.
- There are relationships between triangles and other geometric figures.
- The properties of isosceles and equilateral triangles.

Students will be skilled at…

- I can use properties of perpendicular bisectors & angle bisectors to solve problems.
- I can construct circle circumscribing a triangle.
- I can construct centroid of a triangle.
- I can solve problems using properties of a centroid.
- I can solve problems using properties of medians & altitudes of a triangle.
- I can solve problems using properties using the mid-segments of a triangle.
- I can write and solve inequalities using properties of sides and angles of one triangle.
- I can write and solve inequalities comparing

		sides/angles of two triangles.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): ● KPBSD common unit exam ● compass constructions of: centroid, circumcenter, incenter, orthocenter, midsegment OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 5: Sections 5.1 - 5.8
Mathematical practices:

- Section 5.1
  - reason abstractly and quantitatively #2-7, 12-17, 23-29, 34-36
  - construct viable arguments and critique the reasoning of others #30, 31, 38, 40, 41
  - model with mathematics #8, 18, 33, 37
  - attend to precision #32
- Section 5.2
  - reason abstractly and quantitatively #3-6, 9, 10, 12-15, 18, 19, 21, 28-32
  - construct viable arguments and critique the reasoning of others #35, 36, 43
  - model with mathematics #11, 20, 37
  - attend to precision #38
  - use appropriate tools strategically #39
- Section 5.3
  - reason abstractly and quantitatively #3-6, 9, 10, 12-15, 18, 19, 21, 28-32
  - construct viable arguments and critique the reasoning of others #35, 36, 43
  - model with mathematics #11, 20, 37
  - attend to precision #38
  - use appropriate tools strategically #39

- Section 5.4
  - reason abstractly and quantitatively #3-8, 11-16, 18-26, 30-36, 40, 41, 44, 45
  - construct viable arguments and critique the reasoning of others #2, 10, 27, 38
  - model with mathematics #9, 17, 37
  - attend to precision #29
  - look for and make use of structure #42, 43
- Section 5.5
  - reason abstractly and quantitatively #12-14, 26-31, 33, 42-53, 60-65, 69, 71
  - construct viable arguments and critique the reasoning of others #2, 3, 16, 17, 66-68, 74, 75
  - model with mathematics #15, 32, 59
  - look for and make use of structure #4-11, 18-25, 34, 35, 54-57, 72
- Section 5.6
  - reason abstractly and quantitatively #1-6, 9-14, 17-27, 31, 34
  - construct viable arguments and critique the reasoning of others #8, 16, 35
  - model with mathematics #7, 15, 30 ,33
  - attend to precision #29
- Section 5.7
  - reason abstractly and quantitatively #53, 55
  - construct viable arguments and critique the reasoning of others #29, 45, 46
  - model with mathematics #5, 18, 36, 47
  - attend to precision #44
  - look for and make use of structure #9-14, 22-27, 52-54
  - look for and express regularity in repeated reasoning #51

Additional resources/assignments/activities:

- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary		
Altitude of a triangle	Equidistant	Mediant of a triangle
Centroid of a triangle	Incenter of a triangle	Midsegment of a triangle
Circumcenter of a triangle	Indirect proof	Orthocenter of a triangle
Circumscribed	Inscribed	Point of concurrency
Concurrent	Locus	Pythagorean triple

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 7 – POLYGONS AND QUADRILATERALS

Desired Results

Priority Standards

G.CO.11. Using methods of proof including direct, indirect, and counter examples to prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

G.SRT.5. Apply congruence and similarity properties and prove relationships involving triangles and other geometric figures.

Supporting Standards

G.CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Transfer

Students will be able to independently use their learning to…

Apply the properties of regular polygons to solve real-world problems.

Justify and apply the properties of special parallelograms.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Polygons have properties depending on their sides and angle relationships.
- Parallelograms and other special quadrilaterals help define our physical world.
- Diagonals are an important part to prove that shapes are special parallelograms.

ESSENTIAL QUESTIONS

Students will keep considering…

- By what characteristics can I classify quadrilaterals?
- What are necessary and sufficient conditions for proving a quadrilateral is a parallelogram?
- How can algebra be used to classify quadrilaterals?

Acquisition

Students will know…

- The properties of polygons.
- Polygons can be classified based on their sides and angles.
- Properties of parallelograms, rectangles, rhombi, squares, trapezoids, and kites.

Students will be skilled at…

- I can find and use the measures of interior and exterior angles of polygons.
- I can use properties of parallelograms to solve problems.
- I can prove that a given quadrilateral is a parallelogram.
- I can prove and apply properties of parallelograms, rectangles, rhombi, squares, trapezoids, and kites.
- I can use properties of rectangles, rhombuses, and squares to solve problems.
- I can use coordinate geometry in conjunction with quadrilaterals to solve problems

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 7 – POLYGONS AND QUADRILATERALS

Evidence	
Evaluative Criteria	**Assessment Evidence**
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 7 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 6: sections 6.1-6.6
Mathematical properties:

- Section 6.1
  - reason abstractly and quantitatively #9-13, 22-26, 32-34, 39-42, 56, 57, 58
  - construct viable arguments and critique the reasoning of others #43, 59
  - use appropriate tools strategically #44
- Section 6.2
  - reason abstractly and quantitatively #32-43, 46, 47, 49, 53
  - construct viable arguments and critique the reasoning of others #14, 26, 44, 45, 56, 57
  - attend to precision #50
- Section 6.3
  - reason abstractly and quantitatively #20-24, 35
  - construct viable arguments and critique the reasoning of others #1-15, 17-19, 26-31, 37, 40
  - model with mathematics #16, 38
  - use appropriate tools strategically #33
- Section 6.4
  - reason abstractly and quantitatively #6, 7, 14, 15, 24-31, 43, 45, 47, 48
  - construct viable arguments and critique the reasoning of others #8, 9, 16, 17, 34, 35, 37-39, 49, 50
  - model with mathematics #36
  - attend to precision #32, 51
- Section 6.5

- reason abstractly and quantitatively #2, 3, 7, 8, 18, 19, 39, 41
- construct viable arguments and critique the reasoning of others #17, 28, 30-32, 34, 42
- model with mathematics #1, 6, 44
- attend to precision #43
- look for and make use of structure #20-26, 33
- use appropriate tools strategically #36-38

- Section 6.6
  - reason abstractly and quantitatively #23-25, 48
  - construct viable arguments and critique the reasoning of others #38, 39, 46, 50
  - model with mathematics #3, 13, 26, 37
  - attend to precision #245
  - look for and make use of structure #9, 10, 19, 20, 34-36

Additional resources/assignments/activities:

- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary		
Base of a trapezoid	Isosceles trapezoid	Regular polygon
Base of a trapezoid	Kite	Rhombus
Base angle of a trapezoid	Leg of a trapezoid	Side of a polygon
Concave	Midsegment of a trapezoid	Square
Convex	Parallelogram	Trapezoid
Diagonal	Rectangle	Vertex of a polygon

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 8 – SIMILARITY

Desired Results

Priority Standards

G-SRT.2. Given two figures, use the definition of similarity in terms of transformations to explain whether or not they are similar.

G-SRT.5. Apply congruence and similarity properties and prove relationships involving triangles and other geometric figures.

Supporting Standards

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G-SRT.4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely.

G-C.1. Prove that all circles are similar.

G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G-GPE.6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Transfer

Students will be able to independently use their learning to…

Express geometric figures by known relationships of measures, often expressed as theorems and/or algebraic formulas.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Similar polygons have:
  - Corresponding angles that are congruent.
  - Corresponding sides that are in proportion.
- Certain lengths in triangles are in proportion.

ESSENTIAL QUESTIONS

Students will keep considering…

- How are ratio and proportion related to geometric figures?
- What information is needed to prove triangles similar?
- How is knowledge of similar figures applicable to real-world problems?

Acquisition

Students will know…

- Properties of similar polygons.
- Dilation is the resizing of an object.
- With dilation, the angles remain the same, but the distance between points increases or decreases by a common scale factor.
- A similarity transformation is a dilation or a composition of rigid motions and dilations.

Students will be skilled at…

- I can compute the ratio of two numbers.
- I can use proportions to solve problems.
- I can use properties of proportions.
- I can identify and define similar polygons and find their scale factor.
- I can use similar polygons to solve problems.
- I can identify similar triangles.
- I can draw and describe similarity transformation in a coordinate plane.
- I can use the AA, SSS, and SAS similarity theorems to prove two triangles are similar.
- I can use similar triangles to solve real-life problems.

		• I can use proportionality theorems to solve problems. • I can identify a dilation and write the scale factor of a dilation. • I can use dilations to solve problems.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 8 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 7: Sections 7.1 - 7.6
Mathematical practices:

- Section 7.1
  - reason abstractly and quantitatively #13-17, 19, 20, 27
  - construct viable arguments and critique the reasoning of others #29, 31, 32
  - attend to precision #24
- Section 7.2
  - reason abstractly and quantitatively #25
  - construct viable arguments and critique the reasoning of others #11, 12, 21, 22
  - model with mathematics #13, 23
  - look for and make use of structure #24, 27, 28
- Section 7.3
  - reason abstractly and quantitatively #20-22, 35, 37, 40
  - construct viable arguments and critique the reasoning of others #7, 8, 17, 18, 26, 28, 30, 32, 33, 38, 39
  - model with mathematics #10, 19, 31

- attend to precision #10, 19

- Section 7.4
  - reason abstractly and quantitatively #21, 32, 33, 35
  - construct viable arguments and critique the reasoning of others #23, 24, 31, 37, 38
  - model with mathematics #5, 12, 22, 28, 34
  - attend to precision #5, 12, 28
  - use appropriate tools strategically #29, 39
- Section 7.5
  - reason abstractly and quantitatively #3-9. 13-17, 27, 30, 33, 35, 38, 41-43, 46
  - construct viable arguments and critique the reasoning of others #38, 44, 45
  - model with mathematics # 2, 12, 27, 30-33, 43
  - look for and make use of structure #46
- Section 7.6
  - reason abstractly and quantitatively #17, 19, 22, 24, 25
  - construct viable arguments and critique the reasoning of others #5, 6, 13, 14, 18, 26
  - model with mathematics #20
  - look for and make use of structure #28

Additional resources/assignments/activities:
EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary

Dilation	Scale drawing	Similar polygons
Directed line segment	Scale factor	Similarity ratios
Indirect measurement	Similar	Similarity transformation
Scale		

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 9 – RIGHT TRIANGLES AND TRIGONOMETRY

Desired Results

Priority Standards

G.SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Supporting Standards

G.SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.SRT.7. Explain and use the relationship between the sine and cosine of complementary angles.

Transfer

Students will be able to independently use their learning to…

Solve problems using the similarity relationships of right triangles.

Apply trigonometric ratios to real-world situations.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Trigonometric ratios exist across similar triangles.
- The unknown sides or angles of a triangle can be solved, given certain triangle information (SSS, ASA, etc.).

ESSENTIAL QUESTIONS

Students will keep considering…

- What theorems and other rules apply specifically to right triangles?
- What information is needed in order to apply these rules and theorems?
- How is trigonometry used to solve real--world problems?

Acquisition

Students will know…

- The basic trigonometric ratios.
- The inverse of basic trigonometric ratio.
- How similar triangles are formed from an altitude within a right triangle.
- The relationship between sine and cosine.

Students will be skilled at…

- I can use geometric mean to find segment lengths in right triangles.
- I can apply similarity relationships in right triangles to solve problems.
- I can find the sine, cosine, and tangent of an acute angle.
- I can use trigonometric ratios to find side lengths in right triangles and to solve real-world problems.
- I can use the relationship between the sine and consine.
- I can find the cosine of complementary angles.
- I can apply properties of inverses to trigonometric functions.

		• I can use trigonometric ratios to find angle measures in right triangles and to solve real-world problems. • I can solve problems involving angles of elevation and angles of depression.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 9 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) clinometer activity - measure trees, building height OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 8: Sections 8.1 - 8.4
Mathematical practices:

- Section 8.1
  - reason abstractly and quantitatively #46, 50
  - construct viable arguments and critique the reasoning of others #41, 43, 45, 52
  - attend to precision #14, 27, 40, 42, 44, 47, 53
  - look for and make use of structure # 49
- Section 8.2
  - construct viable arguments and critique the reasoning of others #57, 61, 73
  - attend to precision #21, 43, 48, 52, 55
  - look for and make use of structure #66
  - use appropriate tools strategically #56
- Section 8.3
  - reason abstractly and quantitatively #51, 58
  - construct viable arguments and critique the reasoning of others #45, 62, 63
  - look for and make use of structure #46, 51

- model with mathematics #38, 47
- Use appropriate tools strategically #46

- Section 8.4
  - reason abstractly and quantitatively #17-20
  - construct viable arguments and critique the reasoning of others #26
  - model with mathematics #8, 9, 14-16, 23-25, 27-34
  - attend to precision #31-34

Additional resources/worksheets/videos

- Getting Triggy With It Rap video https://youtu.be/t2uPYYLH4Zo
- Solving right triangle worksheet https://drive.google.com/file/d/1vACAwnIqA2u0BXkSsfq_p28sUDnsgxM6/view?usp=sharing
- Multi-step trig problems https://drive.google.com/file/d/1-ktVYjJ5Rc8MdqRRPox2QYGP6S9wiFvD/view?usp=sharing
- EngageNY: https://www.engageny.org/sites/default/files/resource/attachments/geometry-m1-teacher-materials.pdf

Vocabulary

Angle of depression Angle of elevation Trigonometric ratio	Cosine Geometric mean	Sine Tangent

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 10 – PERIMETER, CIRCUMFERENCE, AND AREA

Desired Results

Priority Standards

G.MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid system based on ratios).
G.GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Supporting Standards

A.SSE.1. Interpret expressions that represent a quantity in terms of its context.
G.GMD.1. Explain how to find the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
N.Q.2. Define appropriate quantities for the purpose of descriptive modeling.
N.Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Transfer

Students will be able to independently use their learning to…
Develop and apply area formulas for circles, polygons, and composite figures.
Use area to solve geometric probability problems.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Area and perimeter of polygons and area and circumference of circles can be determined using formulas for the figure and dimensions given.
- Surface area and volume of three-dimensional solids can be determined using formulas for the figure and dimensions given.

ESSENTIAL QUESTIONS

Students will keep considering…

- How are area formulas for plane figures derived?
- How are area and perimeter used in real-world applications?
- How are surface area formulas for three-dimensional figures derived?
- How are surface area and volume formulas used in real-world applications?

Acquisition

Students will know…

- The coordinate plane is used to determine coordinates and the perimeter or area of a figure.
- The formulas for perimeter, area, volume, and circumference to determine these measurements.

Students will be skilled at…

- I can solve the perimeter of a polygon.
- I can determine the area of a square, a rectangle, a parallelogram, a triangle, and a trapezoid.
- I can determine the area of an unclassified quadrilateral whose diagonals are perpendicular.
- I can find the area of a regular polygon.
- I can use areas to solve problems.
- I can find the measures of and the sum of the interior and exterior angles of a polygon.
- I can solve the area and circumference of a circle.
- I can solve the length of an arc of a circle.
- I can find the area of a sector of a circle (regions

		of a circle). • I can find the surface area of a prism, cylinder, pyramid, cone, and sphere. • I can find the volume of a prism, cylinder, pyramid, cone, and sphere. • I can use volume and surface areas to solve real-life problems.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 10 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 10: Sections 10.1 - 10.6
Mathematical Practices:

- Section 10.1
  - reason abstractly and quantitatively #52, 53
  - construct viable arguments and critique the reasoning of others #43-46, 51, 60
  - look for and make use of structure #61
  - model with mathematics #29, 48, 49, 54, 56
  - Attend to precision #47, 50, 55
- Section 10.2
  - reason abstractly and quantitatively #42, 45
  - construct viable arguments and critique the reasoning of others #33
  - look for and make use of structure #48
  - model with mathematics #5, 13, 32, 38-41
- Section 10.3

- reason abstractly and quantitatively #35, 36
- construct viable arguments and critique the reasoning of others #22
- model with mathematics #6, 13, 21, 23
- Use appropriate tools strategically #24-26
- Attend to precision #32

- Section 10.4
  - reason abstractly and quantitatively #18
  - construct viable arguments and critique the reasoning of others #21
- Section 10.5
  - reason abstractly and quantitatively #1-6, 8-13, 15-22, 24-31
  - model with mathematics #7, 14, 23, 32
- Section 10.6
  - reason abstractly and quantitatively #39-44, 48, 50, 51
  - construct viable arguments and critique the reasoning of others #31
  - model with mathematics #6, 7, 20-22, 38

Vocabulary

Apothem Center of circle Center of a regular polygon	Central angle of a regular polygon Circle	Composite figure Geometric probability

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 11 – THREE-DIMENSIONAL FIGURES: VOLUME AND SURFACE AREA

Desired Results

Priority Standards

G.GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. *For example, Solve problems requiring determination of a dimension not given.*

Supporting Standards

G.GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional
N.Q.2. Define appropriate quantities for the purpose of descriptive modeling. objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
N.Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
G.MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
G.MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

Transfer

Students will be able to independently use their learning to…
Geometric figures are ruled by known relationships of measures, often expressed as theorems and/or algebraic formulas.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- Formulas help us solve problems.
- Geometric shapes, their measures, and their properties help us describe objects.

ESSENTIAL QUESTIONS

Students will keep considering…

- How are surface area formulas for three-dimensional figures derived?
- How are volume formulas for three-dimensional figures derived?
- How are surface area and volume formulas used in real-world applications?

Acquisition

Students will know…

- Three-dimensional figures are classified based on their properties.
- Volume formulas.
- Surface areas formulas.

Students will be skilled at…

- I can use nets and cross sections to analyze three-dimensional figures.
- I can apply volume/surface area formulas.

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 11 – THREE-DIMENSIONAL FIGURES: VOLUME AND SURFACE AREA

Evidence	
Evaluative Criteria	**Assessment Evidence**
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 11 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) drawing 3D figure lab - spheres, prisms, pyramids, cones and cylinders OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 11: Sections 11.1 - 11.4
Mathematical practices:

- Section 11.1
  - construct viable arguments and critique the reasoning of others #38
  - model with mathematics #11, 12, 22, 23, 37, 48-50
- Section 11.2
  - reason abstractly and quantitatively #9, 10, 20, 21, 35, 36, 39
  - construct viable arguments and critique the reasoning of others #44
  - model with mathematics #5, 16, 25, 26, 32-34
- Section 11.3
  - reason abstractly and quantitatively #9, 10, 29, 21, 39, 50
  - construct viable arguments and critique the reasoning of others #38
  - model with mathematics #41
- Section 11.4
  - reason abstractly and quantitatively #5, 9, 10, 16, 20, 21, 28, 35-38, 40, 42, 45, 47, 48
  - construct viable arguments and critique the reasoning of others #39
  - look for and make use of structure #46
  - model with mathematics #33, 41, 45

MUST SUPPLEMENT SURFACE AREA FOR: PYRAMIDS, CONES, CYLINDERS, and PRISMS.
Additional resources/worksheets/projects:

- polyhedron project
  - list of polyhedron https://drive.google.com/file/d/1Fxv_JEnbQ6LiLNY4bjD-VJVaSkPqjvTe/view?usp=sharing
  - project explanation https://drive.google.com/file/d/1_a2OUm_3_7i6CKlGMpFwxzNrTKEsK6zG/view?usp=sharing

rubric https://drive.google.com/file/d/1VMfX95SIinU45cUwK3jlwzhHsvMXX6NI/view?usp=sharing

Vocabulary		
Center of a sphere	Face	Radius of a sphere
Cone	Great circle	Sphere
Cross section	Hemisphere	Vertex
Cube	Net	Volume
Cylinder	Prism	
Edge	Pyramid	

KPBSD MATH CURRICULUM
GEOMETRY
UNIT 12 – CIRCLE

Desired Results

Priority Standards

G.C.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G.C.5. Use and apply the concepts of arc length and areas of sectors of circles. Determine or derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

G.GPE.1. Determine or derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Transfer

Students will be able to independently use their learning to…

Develop and apply the properties of lines and angles that intersect circles.

Analyze the properties of circles in the coordinate plane and use them to solve real-world problems.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…

- All circles are similar.
- There are relationships among inscribed angles, radii, and chords.
- The radius of a circle is perpendicular to the tangent where the radius intersects the circle.

ESSENTIAL QUESTIONS

Students will keep considering…

- What vocabulary is used to describe circles as they relate to lines and angles?
- How can circles give me information about angle measures and segment lengths?
- How are the equation of a circle and its graph on the Cartesian Plane related?

Acquisition

Students will know…

- Properties of circles in problems.
- Properties of tangents to solve problems in geometry.
- Properties of chords and arcs to solve problems.
- Properties of the inscribed angles of a quadrilateral to solve problems.

Students will be skilled at…

- I can use all vocabulary associated with circles.
- I can name minor and major arcs of a circle.
- I can determine measures of central angles and arcs of circles.
- I can use the measures of central angles and their arcs to solve problems.
- I can use properties of chords and arcs to solve problems.
- I can identify the lengths of segments and chords in a circle.
- I can use the properties of inscribed angles to solve problems.
- I can use properties of the inscribed angles of a quadrilateral to solve problems.
- I can calculate angles formed by tangents,

		chords, and secants. • I can use angle measures to solve real-life problems. • I can write the equation of a circle and use it to solve real-life problems.

Evidence

Evaluative Criteria	Assessment Evidence
Rubrics Course Assignments Performance Tasks Teacher made assessments Observation Journals and Self-Reflection Technology-Based Assessments Other…	PERFORMANCE TASK(S): Unit 12 assessment (to be attached later) (Find three mathematical practice problems and have students complete two.) OTHER EVIDENCE: Formative assessments, construction labs, quizzes

Learning Plan

Chapter 12: Sections 12.1 - 12.7
Mathematical practices:

- Section 12.1
  - reason abstractly and quantitatively #18-22, 40
  - construct viable arguments and critique the reasoning of others #28-30, 36, 37, 41
  - model with mathematics #8, 15, 43
- Section 12.2
  - reason abstractly and quantitatively #33-35, 37
  - construct viable arguments and critique the reasoning of others #40-43, 45
  - look for and make use of structure #52
  - Use appropriate tools strategically #36
- Section 12.3
  - reason abstractly and quantitatively #23-25, 28
  - model with mathematics #5-29
- Section 12.4

- reason abstractly and quantitatively #23-25, 41
- construct viable arguments and critique the reasoning of others #28, 30-32, 34, 35, 37, 43, 44
- Use appropriate tools strategically #36, 38, 47

- Section 12.5
  - construct viable arguments and critique the reasoning of others #34-37, 45, 46
  - model with mathematics #11
- Section 12.6
  - reason abstractly and quantitatively #31
  - construct viable arguments and critique the reasoning of others #27-30, 38
  - model with mathematics #15, 26
- Section 12.7
  - reason abstractly and quantitatively #22-27
  - look for and make use of structure #9, 18, 21, 30-32
  - model with mathematics #37

Vocabulary

Adjacent arcs	Exterior of a circle	Secant segment
Arc	External secant segment	Sector of a circle
Arc length	Inscribed angle	Segment of a circle
Central angle	Intercepted arc	Semicircle
Chord	Interior of a circle	Subtend
Common tangent	Major arc	Tangent of a circle
Concentric circles	Minor arc	Tangent circles
Congruent arcs	Point of tangency	Tangent segment
Congruent circles	Secant	