FRANKLIN-SIMPSON HIGH SCHOOL
GEOMETRY (PRE-AP)
UNIT 7 PLAN

Purpose of the Unit: **Students will find angles measures in polygons. They will investigate properties of parallelograms and learn what information they can use to conclude that a quadrilateral is a parallelogram. Students will also study special quadrilaterals such as rhombi, rectangles, squares, trapezoids, and kites.**

Prerequisites: Students should have a working knowledge of angle pairs, parallel and perpendicular line properties as well as congruent triangles and methods of proving triangles are congruent. Students should also know how to use slope, distance formula, and midpoint formula in coordinate geometry.

Daily Lesson Guide

Day 1
Lesson Content: Find Angle Measures in Polygons
Quality Core Standards:
1. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
2. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
3. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
4. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
5. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
6. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
7. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
8. **D.2.h.** Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
9. **D.2.i.** Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angles measures, and to solve real-world problems

Common Core Standards:
     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)

Focus Questions:
1. How do you find the sum of the interior angles of a convex polygon?
2. How do you find the number of sides of a regular convex polygon when given degree sum?

Mathematical Practices:
1. Use appropriate tools strategically (Students will use straightedge and/ruler to assist in the Discovery of a Polygon Formula).
2. Look for and make use of structure (Students will use the structure of convex polygons to find relationships in their angle measures)

Engagement:
1. Sense of Audience (Student work of the Discovery Activity will be shared on the document camera).
2. Novelty and Variety (Discovery Activity will be a hands-on activity)

Assessment:
1. Formative – Investigate Angle Sums in Polygons
2. Formative – p504-506 (2-10 even, 28,29, 33, 34)

Day 2
Lesson Content: Find Angles Measures in Polygons
Quality Core Standards:
1. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
2. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
3. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
4. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
5. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
6. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
7. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
8. **D.2.h.** Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
9. **D.2.i.** Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angles measures, and to solve real-world problems

Common Core Standards:
    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)

Focus Questions:
1. How do you find the exterior angle measure of a regular convex polygon?
2. How do you find a missing angle measure in a convex polygon?

Mathematical Practices:
1. Model with mathematics (Students will use polygons and their properties to model real-world plane surfaces).
2. Attend to precision (Students will use mathematical techniques to increase precision of real-world situations).

Engagement:

1. Authenticity (Students will connect knowledge of polygon formulas to solve applications problems).
2. Clear/Modeled Expectations (Students will have model problems to assist them in their problem solving).

Assessment:
1. Formative – ACT Practice Problems
2. Formative – p505(12-26 even)

Day 3
Lesson Content: Use Properties of Parallelograms
Quality Core Standards:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
5. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
6. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
7. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
8. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
9. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
10. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
11. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
12. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
13. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
14. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
15. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
16. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
17. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
18. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms

2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures

Focus Questions:
1. What are the properties of parallelogram?
2. How do you find angle and side measures in a parallelogram?

Mathematical Practices:
1. Construct viable arguments and critique the reasoning of others (Students will obtain properties of parallelograms, share them with a partner, and critique each other's list).
2. Look for and express regularity in repeated reasoning (Students will search for common elements in mathematical problems to create methods for solving them)

Engagement:
1. Personal Response (Student responses during think, pair, share could be different)
2. Learning with Others (Student will share ideas with a partner)

Assessment:
1. Formative – Think, Pair, Share (Properties of Parallelogram)
2. Formative – p512-514 (2-40 even)

Day 4
Lesson Content: Show that a Quadrilateral is a Parallelogram
Quality Core Standards:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
5. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
6. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
7. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
8. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
9. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
10. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
11. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
12. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms

2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures

Focus Questions:

How can you prove that a quadrilateral is a parallelogram?

Mathematical Practices:

1. Construct viable arguments and critique the reasoning of others (Students will use arguments to create flow charts that will be analyze and critiqued by classmates).
2. Look for and make use of structure (Students will use structure to develop connections between the properties of a parallelogram).

Engagement:

1. Personal Response (Flow Chart could be developed differently to assist each student).
2. Sense of Audience (Student Work of Flow Chart is shared with others in the class).

Assessment:

Formative – ACT Practice
Formative – Proving Parallelogram Flow Chart

Day 5
Lesson Content: Show that a Quadrilateral is a Parallelogram
Quality Core Standards:

1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
5. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
6. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
7. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
8. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
9. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
10. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
11. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
12. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
13. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
14. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
15. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)

16. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
17. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
18. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
19. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
20. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
21. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms
2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures

Focus Questions:
> How can you prove that a quadrilateral is a parallelogram?

Mathematical Practices:
1. Make sense of problems and persevere in solving them (Students will be using and developing proofs to assist in their understanding of the properties of parallelograms).
2. Model with mathematics (Students will use coordinate geometry to model a real-world situation).

Engagement:
1. Clear/Modeled Expectations (Students will receive a model of how to use coordinate geometry to understand and solve problems related to parallelograms).
2. Learning with Others (Students will be provided with an opportunity to work with a partner in the proving activity).

Assessment:
> Formative – Parallelogram Proving Activity
> Formative – p520-521(2-30 even)

Day 6
Lesson Content: Properties of Rhombi, Rectangles, and Squares
Quality Core Standards:
Mathematical Procedures:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
3. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
4. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
5. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
6. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)

7. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
8. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
9. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
10. **E.1.a.** Determine points or lines of symmetry and apply the properties of symmetry to figures

Common Core Standards:
> **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures

Focus Questions:
> What are the properties of parallelograms that have all sides or all angles congruent?

Mathematical Practices:
1. Look for and make use of structure (Students will look for patterns in the structure of the special quadrilaterals).
2. Make sense of problems and persevere in solving them (Students will use properties of special quadrilaterals to sort problems and solve them).

Engagement:
1. Clear/Modeled Expectations (Students will see models of special quadrilaterals in order to understand them and solve problems).
2. Sense of Audience (Students will share their graphic organizer on the document camera).

Assessment:
1. Formative – Special Quadrilateral Graphic Organizer
2. Formative – p531 (2-18 even)

Day 7
Lesson Content: Properties of Rhombi, Rectangles, and Squares
Quality Core Standards:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.c.** Represent data, real-world situations, and solutions increasingly complex context (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships.
4. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
5. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
6. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
7. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
8. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
9. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
10. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions

11. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
12. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
13. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
14. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
15. **C.1.i.** Use properties of special quadrilaterals in a proof
16. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
17. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
18. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
19. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems**D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
20. **E.1.a.** Determine points or lines of symmetry and apply the properties of symmetry to figures
21. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
22. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
23. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms
2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures
3. **G.GPE.7.** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles (e.g., using the distance formula)

Focus Questions:
How can you use properties of special quadrilateral to find missing measurements?

Mathematical Practices:
1. Look for and make use of structure (Students will look for patterns in the structure of the special quadrilaterals).
2. Make sense of problems and persevere in solving them (Students will use properties of special quadrilaterals to sort problems and solve them).

Engagement:
Clear/Modeled Expectations (Students will see models of special quadrilaterals in order to understand them and solve problems).

Assessment:
1. Formative – ACT Practice Problems
2. Formative – p531-532 (20-50 even)

Day 8
Lesson Content: Mid-Unit Assessment

Quality Core Standards:

1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
5. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
6. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
7. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
8. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
9. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
10. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
11. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
12. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
13. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
14. **C.1.i.** Use properties of special quadrilaterals in a proof
15. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
16. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
17. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
18. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
19. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
20. **D.2.h.** Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
21. **D.2.i.** Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angles measures, and to solve real-world problems
22. **E.1.a.** Determine points or lines of symmetry and apply the properties of symmetry to figures
23. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
24. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
25. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms
2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures
3. **G.GPE.4.** Use coordinates to prove simple geometric theorems algebraically
4. **G.GPE.7.** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles (e.g., using the distance formula).
5. **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)

Focus Questions:
1. How do you find a missing angle measure in a convex polygon?
2. How do you find angle and side measures in a parallelogram?
3. How can you prove that a quadrilateral is a parallogram?
4. What are the properties of parallelograms that have all sides or all angles congruent?

Mathematical Practices:
1. Make sense of problems and persevere in solving them.
2. Model with mathematics.
3. Attend to precision.
4. Look for and make use of structure.

Engagement:
1. Clear/Modeled Expectations
2. Authenticity

Assessment:
Summative – Unit Seven Mid-Unit Assessment

Day 9
Lesson Content: Use Properties of Trapezoids and Kites
Quality Core Standards:
Mathematical Procedures:
1. **B.1.c.** Represent data, real-world situations, and solutions increasingly complex context (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships.
2. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
3. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
4. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
5. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
6. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties

Common Core Standards:
Congruence:
G.SRT.5. Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures

Focus Questions:
1. What are the main properties of trapezoids and kites?
2. How do you find the missing measurements in trapezoids and kites?

Mathematical Practices:
1. Look for and make sense of structure (Students will make sense of structure noticed in kites and trapezoids).
2. Look for and express regularity in repeated reasoning (Students will related the reasoning of the new special quadrilaterals and the special quadrilaterals that are parallelograms).

Engagement:
1. Personal Response (Students will have multiple possibilities in the brainstorming activity).
2. Sense of Audience. (Students will share work with entire class).

Assessment:
1. Formative – ACT Practice Problems
2. Formative – Brainstorming Activity

Day 10
Lesson Content: Use Properties of Trapezoids and Kites
Quality Core Standards:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems)
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
5. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
6. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
7. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
8. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
9. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
10. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
11. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
12. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
13. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
14. **C.1.i.** Use properties of special quadrilaterals in a proof
15. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
16. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)

17. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
18. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
19. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
20. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
21. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
22. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms
2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures
3. **G.GPE.4.** Use coordinates to prove simple geometric theorems algebraically
4. **G.GPE.7.** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles (e.g., using the distance formula)

Focus Questions:
1. What are the main properties of trapezoids and kites?
2. How do you find the missing measurements in trapezoids and kites?

Mathematical Practices:
1. Reason abstractly and quantitatively. (Students will think through situations abstractly in order to solve problems).
2. Look for and make sense of structure (Students will make sense of structure noticed in kites and trapezoids).
3. Look for and express regularity in repeated reasoning (Students will related the reasoning of the new special quadrilaterals and the special quadrilaterals that are parallelograms).

Engagement:
1. Learning with Others (Students will learn and review coordinate geometry techniques with others).
2. Make Sense of Problems and Persevere in Solving Them (Students will make sense of a variety of complex problems).

Assessment:
1. Formative – Explanation of Coordinate Geometry Tips (Think, Pair, Share)
2. Formative – p540-542 (2-34 even)

Day 11
Lesson Content: Indentify Special Quadrilaterals
Quality Core Standards:
1. **B.1.c.** Represent data, real-world situations, and solutions increasingly complex context (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships
2. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
3. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
4. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences

5. **B.1.g.** Demonstrate the appropriate role of technology (e.g. calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established)
6. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
7. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
8. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
9. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
10. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
11. **D.2.h.** Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
12. **D.2.i.** Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angles measures, and to solve real-world problems

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms

Focus Questions:
How can you identify special quadrilaterals?

Mathematical Practices:
1. Construct viable arguments and critique the reasoning of others (Students will look at the responses of students and make suggestions on their analysis).
2. Use appropriate tools strategically. (Students will use WinGeom to see how special quadrilaterals can be formed by using circles and their radii).

Engagement:
1. Novelty and Variety (Students will use geometry software to see properties of special quadrilaterals)
2. Learning with Others. (Students will critique situations as a whole group discussion)

Assessment:
1. Formative – WinGeom Activity
2. Formative – p546-547 (2-12, 14-24 even, 26, 28, 30)

Days 12 and 13
Lesson Content: Review and Unit Seven Assessment
Quality Core Standards:
1. **B.1.a.** Apply problem-solving skills (e.g. identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
2. **B.1.b.** Use a variety of strategies to set up and solve increasingly complex problems
3. **B.1.d.** Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
4. **B.1.e.** Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems

5. **B.1.f.** Make mathematical connections among concepts, across disciplines, and in everyday experiences
6. **B.1.h.** Apply previously learned algebraic concepts in geometry contexts
7. **C.1.a.** Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
8. **C.1.b.** Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
9. **C.1.c.** Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
10. **C.1.d.** Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
11. **C.1.e.** Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
12. **C.1.f.** Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
13. **C.1.g.** Use the principle that corresponding parts of congruent triangles are congruent to solve problems
14. **C.1.i.** Use properties of special quadrilaterals in a proof
15. **D.1.a.** Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
16. **D.1.b.** Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g, solve equations, use in proofs)
17. **D.1.c.** Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)
18. **D.1.f** Apply properties and theorems of parallel and perpendicular lines to solve problems
19. **D.2.g.** Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
20. **D.2.h.** Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
21. **D.2.i.** Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angles measures, and to solve real-world problems
22. **E.1.a.** Determine points or lines of symmetry and apply the properties of symmetry to figures
23. **G.1.a.** Use slope to distinguish between and write equations for parallel and perpendicular lines
24. **G.1.b.** Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
25. **G.1.c.** Use coordinate geometry to solve problems about geometric figures (e.g., segments triangles, quadrilaterals)

Common Core Standards:
1. **G.CO.11.** Prove theorems about parallelograms
2. **G.SRT.5.** Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures
3. **G.GPE.4.** Use coordinates to prove simple geometric theorems algebraically
4. **G.GPE.7.** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles (e.g., using the distance formula).
5. **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)

Focus Questions:

1. How do you find a missing angle measure in a convex polygon?
2. How do you find angle and side measures in a parallelogram?
3. How can you prove that a quadrilateral is a parallogram?
4. What are the properties of parallelograms that have all sides or all angles congruent?
5. What are the main properties of trapezoids and kites?
6. How can you identify special quadrilateral?

Mathematical Practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Model with mathematics.
4. Attend to precision.
5. Look for and make use of structure.
6. Look for and express regularity in repeated reasoning.

Engagement:

1. Clear/Modeled Expectations
2. Authenticity

Assessment:

Summative – Unit Seven Assessment