

Richmond Public Schools
Curriculum Framework
7th Grade Math

Strand: Measurement and Geometry	
<p>7.6 The student will</p> <ul style="list-style-type: none"> a) compare and contrast quadrilaterals based on their properties; and b) determine unknown side lengths or angle measures of quadrilaterals. 	
Suggested Pacing	
Second Nine Weeks- 5 Instructional Days	
Spiraling Standards	
<p>Spiraling Down:</p> <p>6.9 The student will determine congruence of segments, angles, and polygons.</p> <p>5.13b The student will</p> <ul style="list-style-type: none"> b) investigate the sum of the interior angles in a triangle and determine an unknown angle measure. 	<p>Spiraling Up:</p> <p>8.10 The student will solve area and perimeter problems, including practical problems, involving composite plane figures.</p>
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> ● Why can some quadrilaterals be classified in more than one category? <p>Every quadrilateral in a subset has all of the defining attributes of the subset. For example, if a quadrilateral is a rhombus, it has all the attributes of a rhombus. However, if that rhombus also has the additional property of 4 right angles, then that rhombus is also a square.</p>	<ul style="list-style-type: none"> ● Rectangles are often seen as quadrilaterals with 4 congruent sides which is false. ● Composite figures involving triangles and quadrilaterals often involve parallelograms where unlabeled sides are to be found due to the characteristic of having congruent opposite sides.
Understanding the Standard	Essential Knowledge and Skills

Richmond Public Schools

Curriculum Framework

7th Grade Math

- A polygon is a closed plane figure composed of at least three line segments that do not cross.
- A quadrilateral is a polygon with four sides.
- Properties of quadrilaterals include: number of parallel sides, angle measures, number of congruent sides, lines of symmetry, and the relationship between the diagonals.
- A diagonal is a segment in a polygon that connects two vertices but is not a side.
- To bisect means to divide into two equal parts.
- A line of symmetry divides a figure into two congruent parts each of which is the mirror image of the other. Lines of symmetry are not limited to horizontal and vertical lines.
- A parallelogram is a quadrilateral with both pairs of opposite sides parallel. Properties of a parallelogram include the following:
 - o opposite sides are parallel and congruent;
 - o opposite angles are congruent; and
 - o diagonals bisect each other and one diagonal divides the figure into two congruent triangles.
- Parallelograms, with the exception of rectangles and rhombi, have no lines of symmetry. A rectangle and a rhombus have two lines of symmetry, with the exception of a square which has four lines of symmetry.
- A rectangle is a quadrilateral with four right angles. Properties of a rectangle include the following:
 - o opposite sides are parallel and congruent;

The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to

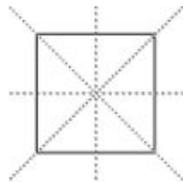
- Compare and contrast properties of the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid. (a)
- Sort and classify quadrilaterals, as parallelograms, rectangles, trapezoids, rhombi, and/or squares based on their properties. (a)
- Given a diagram, determine an unknown angle measure in a quadrilateral, using properties of quadrilaterals. (b)
- Given a diagram determine an unknown side length in a quadrilateral using properties of quadrilaterals. (b)

Richmond Public Schools

Curriculum Framework

7th Grade Math

- o all four angles are congruent and each angle measures 90° ; and
 - o diagonals are congruent and bisect each other.
- A square is a quadrilateral that is a regular polygon with four congruent sides and four right angles. Properties of a square include the following:
 - o opposite sides are congruent and parallel;
 - o all four angles are congruent and each angle measures 90° ; and
 - o diagonals are congruent and bisect each other at right angles.
- A rhombus is a quadrilateral with four congruent sides. Properties of a rhombus include the following:
 - o all sides are congruent;
 - o opposite sides are parallel;
 - o opposite angles are congruent; and
 - o diagonals bisect each other at right angles.
- A square has four lines of symmetry. The diagonals of a square coincide with two of the lines of symmetry that can be drawn. Example: Square with lines of symmetry shown:

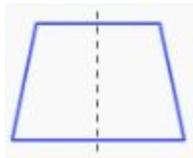


Richmond Public Schools

Curriculum Framework

7th Grade Math

- A trapezoid is a quadrilateral with exactly one pair of parallel sides. The parallel sides of a trapezoid are called bases. The nonparallel sides of a trapezoid are called legs.
- An isosceles trapezoid has legs of equal length and congruent base angles. An isosceles trapezoid has one line of symmetry. Example: Isosceles trapezoid with line of symmetry shown:



- A chart, graphic organizer, or Venn diagram can be made to organize quadrilaterals according to properties such as sides and/or angles.
- Quadrilaterals can be classified by the number of parallel sides: parallelogram, rectangle, rhombus, and square each have two pairs of parallel sides; a trapezoid has one pair of parallel sides; other quadrilaterals have no parallel sides.
- Quadrilaterals can be classified by the measures of their angles: a rectangle and a square have four 90° angles; a trapezoid may have zero or two 90° angles.
- Quadrilaterals can be classified by the number of congruent sides: a rhombus and a square have four congruent sides; a parallelogram and a rectangle each have two pairs of congruent sides, and an isosceles trapezoid has one pair of congruent sides.

Richmond Public Schools

Curriculum Framework

7th Grade Math

<ul style="list-style-type: none"> - A square is a special type of both a rectangle and a rhombus, which are special types of parallelograms, which are special types of quadrilaterals. - Any figure that has the properties of more than one subset of quadrilaterals can belong to more than one subset. - The sum of the measures of the interior angles of a quadrilateral is 360°. Properties of quadrilaterals can be used to find unknown angle measures in a quadrilateral. 	
Vocabulary	Instructional Activities Organized by Learning Objective
<p>Corresponding Parallel Similar Congruent Opposite Parallelogram Rectangle Rhombus Square Trapezoid Isosceles Trapezoid Quadrilateral Venn Diagram Subset Right Angle Diagonal Bisect Polygon Line of Symmetry Symmetrical Interior Angles</p>	<p>Virginia Department of Education <u>Classifying Quadrilaterals</u></p> <p>Textbook Virginia Math Connects, Course 2, ©2012, Glencoe/McGraw-Hill page(s)303, 609, 687-692, 829-830;</p> <p>Notes <u>Interactive Reading and Notetaking- Quadrilaterals</u></p> <p>Resources</p> <ul style="list-style-type: none"> ● Print Virginia Coach New SOL Edition Mathematics Grade 7; page(s) 96 - 104 ● Technology-based <p>Station Activities <u>Always Sometimes Never- Quadrilaterals</u></p>

Richmond Public Schools

Curriculum Framework

7th Grade Math

Line Segments	<u>Cut and Glue Table Activity</u> (missing diagonal properties)
Assessment	
Cross-Curricular Connections	Tiered Differentiations
A very popular game “Minecraft” is a game that uses square blocks to build structures. It allows for creativity, design, and architecture. It can be used to discuss volume and surface area since each block represents 1 square meter. It can also be used to discuss the volume and surface area of cylinders and further discussion for the necessity of pi.	(Tier 1) Students are given quadrilaterals with missing angles. They are to find the missing angles with an understanding that the total must be 360 degrees. Students are to write about how the angle measurements relate to the type of quadrilaterals the polygons are. (Tier 3) Students are given quadrilaterals rotated unconventionally and students are to make conjectures on which ones are similar based on line segments and angle measurements while identifying the type of quadrilateral as well.