

Richmond Public Schools
Curriculum Framework
Geometry

Strand: Polygons and Circles	
<p>G.10 The student will solve problems, including practical problems, involving angles of convex polygons. This will include determining the</p> <ul style="list-style-type: none"> a) sum of the interior and/or exterior angles; b) measure of an interior and/or exterior angle; and c) number of sides of a regular polygon. 	
Suggested Pacing	Cognitive Demand
Second Nine Weeks 3 instructional days (including assessment)	G.10
	Analyze
Spiraling Down Standards	Spiraling Up Standards
<p>A.4 The student will solve</p> <ul style="list-style-type: none"> a) Multistep linear equations in one variable algebraically b) Quadratic equations in one variable algebraically c) Literal equations for a specified variable <p>6.9 The student will determine congruence of segments, angles, and polygons.</p>	N/A
Essential Questions	Common Misconceptions
<p>What are the distinguishing characteristics of a polygon? <i>A polygon is a plane figure formed by coplanar segments (sides) such that each segment intersects exactly two other segments, one at each endpoint; and no two points with a common endpoint are collinear.</i> <i>Polygons are named by their number of sides.</i> <i>Common polygons</i></p>	<ul style="list-style-type: none"> • Students are introduced to n (number of sides). This can be confusing because it is a new variable. Having students write down the formulas and writing out n as the number of sides will help students to remember. • Students may recognize the names of some polygons. Including the name of polygons instead of stating the number of sides will help students get used to the names of the different polygons.

Richmond Public Schools
Curriculum Framework
Geometry

3 sides: triangles
4 sides: quadrilateral
5 sides: pentagon
6 sides: hexagon
7 sides: heptagon
8 sides: octagon
9 sides: nonagon
10 sides: decagon
12 sides: dodecagon
n sides: n-gon

How do we verify that polygons can tile a plane?

Tessellations are repeated copies of a figure that completely fill a plane without overlapping. A polygon will tessellate the plane if the interior angles at a vertex add to 360° . Equilateral triangles, squares, and regular hexagons create pure tessellations (can tessellate with one shape).

What are the relationships between sides of a polygon and the angles of a polygon?

The sides create angles. The number of sides indicates the number of angles in a polygon.

Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> • In convex polygons, each interior angle has a measure less than 180°. • In concave polygons, one or more interior angles have a measure greater than 180°. • Two intersecting lines form angles with specific relationships. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> • Solve problems, including practical problems, involving angles of convex polygons. (a, b, c)

Richmond Public Schools
Curriculum Framework
Geometry

<ul style="list-style-type: none"> • An exterior angle is formed by extending a side of a polygon. • The exterior angle and the corresponding interior angle form a linear pair. • The sum of the measures of the interior angles of a convex polygon may be found by dividing the interior of the polygon into non-overlapping triangles. • Both regular and non-regular polygons can tessellate the plane. • A regular polygon will tessellate the plane if the measure of an interior angle is a factor of the 360. • The sum of the measures of the angles around a point in a tessellation is 360°. • Tessellations can be found in art, construction, and nature. 			<ul style="list-style-type: none"> • Determine the sum of the measures of the interior and exterior angles of a convex polygon. (a) • Determine the measure of each interior and exterior angle of a regular polygon. (b) • Determine the angles measures of a regular polygon in a tessellation. (b) • Determine the number of sides of a regular polygon, given the measures of interior or exterior angles of the polygon. (c)
Vocabulary			Instructional Activities Organized by Learning Objective
Concave	Convex	Polygon	<p>Virginia Department of Education</p> <ul style="list-style-type: none"> • Angles in Polygons <p>Textbook</p> <ul style="list-style-type: none"> • <i>Geometry</i>, ©2012, Price, et al, McGraw-Hill School Education Group page(s) 389-397 <p>Notes and Homework</p> <ul style="list-style-type: none"> • G.10 Notes and Keys • G.10 Homework and Keys <p>Resources</p>
Triangle	Quadrilateral	Pentagon	
Hexagon	Heptagon	Octagon	
Nonagon	Decagon	Dodecagon	
Regular Polygon	Irregular Polygon	Tessellation	
Tiling	Linear Pair	n-gon	
Interior Angle	Exterior Angle		
Assessment			

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<p>1. Powerschool Assessments G.10a (E:2VR1KT) G.10b (E:2PDMTP) G.10c (E:21RWHE)</p> <p>2. Mulligan Checkpoint G.10 Checkpoint G.10</p> <p>3. Formative Assessments (Paper) G.10a,b,c FA</p> <p>4. Cumulative Assessment #8 (SOLs G.1, G.2, G.3, G.4, G.5, G.6, G.7, G.8, G.9, G.10, G.12) Cumulative Assessment #8</p>	<ul style="list-style-type: none"> ● Print <ul style="list-style-type: none"> ○ Coach book, Virginia edition Lessons 21 & 22 page(s) 174-185 ● Technology-Based <ul style="list-style-type: none"> ○ Geogebra <ul style="list-style-type: none"> ■ Polygon Investigations ■ Tessellations ○ Youtube Videos <ul style="list-style-type: none"> ■ Polygons-Basic definition (Math Antics) ■ Interior and Exterior angles of Polygons ■ CyberChase Cartoon (Intro on Tessellations) ■ Video to accompany Tessellation Project ■ Basic Math Explanation/Examples of Tessellations ○ Quizizz Practice <ul style="list-style-type: none"> ■ G.10a Practice ■ G.10b Practice ■ G.10c Practice <p>Instructional Activities Polygon Activity Students are create a poster with the headings: Sum of Interior, Sum of Exterior, Each Exterior, Each Interior. Students are to sort the problems by which formula they use to solve the problems. Then students may solve and discuss their solutions and explanations.</p>
Cross-Curricular Connections	Tiered Interventions
<p>Any form of tiling involves polygons. The tiles need to tessellate to cover an area without leaving any gaps. This is directly connected to the angle properties of polygons. Architects include polygons with every plan of a house - rooms usually have 90° corners, but not</p>	<p>Tier 3: Recall and Reproduction Vocabulary Have students study flashcards, create their own flashcards, play a matching game or test themselves on Quizlet. Polygons Flashcards on Quizlet</p>

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Curriculum Framework
Geometry

always. Rooms on a plan are polygons. The cost of building any structure depends on the lengths of the walls and the size of the angles - all properties of polygons.

[Tessellation Project](#)

Tier 2: Basic Skills and Concepts

Practice and Drill

[Polygon Drills](#)

[SOL G.10 Practice problems](#)

Tier 1: Strategic Thinking and Reasoning

Application

Have students create a review game, booklet, poster, Powerpoint, etc. explaining how and when to find the sum of the interior and exterior angles of a polygon, each interior and exterior angle of a regular polygon, and the rules of tessellations.