GCPS Fifth Grade 2021-2022
Curriculum Guide
3rd Quarter at a Glance

43 days - *2 Flex Days to USE AS NEEDED*

Standard	Number of Days	Notes
1st Semester Benchmark	2 days	
5.4/5.5 – Whole Number and Decimal Word Problems Assessment and Answer Key (calculator allowed)	2 days	
5.18 – Patterns	5 days	5.18 & 5.19 tested together
5.19 – Variables	7 days	5.18 & 5.19 tested together
5.9 – Metric Measurement	10 days	
5.14 – Polygons 5.12 – Angles 5.13 – Triangles	4 days 5 days 6 days	5.14, 5.12, 5.13 tested together
Quarter 3 Problem Solving (calculator allowed) - Use Teacher Rubric and Student Rubric to score		
Quarter 3 Daily Reviews DESMOS VA Calculator		

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

*Items measuring these SOLs will be assessed **without** the use of a calculator. All other standards will have **DESMOS VA Calculator** availability. Students should be proficient in using the Desmos Calculator.

SOL Strand: Patterns Functions and Algebra

Focus: Number Patterns

VA SOL: 5.18 The student will identify, describe, create, express, and extend number patterns found in objects, pictures, numbers, and tables.

Anticipated Pacing: 5 days

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

Assessments
Formative and Summative

Inform Instruction:
- SOL 5.18 JIT Quick Check
- SOL 5.18 JIT Virtual Quick Check-Desmos Activity

Assess Learning:
- Post-Assessment (link here)

Vertical Content:
- 4.15 The student will identify, describe, create, and extend patterns found in objects, pictures, numbers, and tables.
- **No matching vertical alignment for sixth grade.**

Resources for bridging the content:
- SOL 4.15 JIT Quick Check
- **Hands-On Standards, Grades 3-4**: page 94 (Extend Patterns)
- **Hands-On Standards, Grades 3-4:** page 96 (Identify the Rule)
- **Hands-On Standards, Grades 3-4**: page 100 (Identify Change)
- **Hands-On Standards, Grades 3-4:** page 112 (Input/Output Tables)
- VDOE Lesson Plan: **How Does the Pattern Grow?**

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources	Instructional Strategies, Manipulatives, and Materials
• Identify, create, describe, and extend patterns using concrete	• **SOL 5.18 Patterns Notes** • **SOL 5.18 Notes Study Guide**	• Free Virtual Manipulatives • Didax Virtual Manipulatives

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	materials, number lines, tables, or pictures. • Describe and express the relationship found in patterns, using words, tables, and symbols.	• **VDOE Lesson Plan:** 5.18 Number Patterns: How Do They Grow? • **Rich Mathematical Tasks:** No VDOE tasks for this SOL • Number Rock Input-Output Tables Video • Numerical Patterns Video • **Hands-On Standards, Grades 5-6:** page 110 (Patterns and Function Tables) • Patterns Practice (Independent Practice)	• Student-created patterns are traded and solved within the class.
	• Solve practical problems that involve identifying, describing, and extending single-operation input and output rules (limited to addition, subtraction and multiplication of whole numbers; addition and subtraction of fractions, with denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths). • Identify the rule in a single-operation numerical pattern found in a list or table	• Function Table and Rule Matching (Group Activity) • Scoot Game Template	• Explore and discuss how using calculators can be used to find rules and extend patterns. Discuss finding the difference between terms in a pattern and how to use that to name the rule and extend patterns. Encourage students to write the difference between terms on the pattern to keep track. • To build understanding of patterns using fractions,

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	(limited to addition, subtraction and multiplication of whole numbers; addition and subtraction of fractions, with denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths).		use fraction manipulatives to build and extend patterns involving fractions and mixed numbers. ● Build understanding of patterns with decimals using base 10 blocks and move to using a calculator. ● Use real-world situations that involve identifying and extending number patterns. ● Student-created patterns can be used to create Scoot for students to identify the rules. Make sure students include patterns that involve whole numbers, fractions, and decimals.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Understanding the Standard
(what teachers should know)

- Mathematical relationships exist in patterns. There are an infinite number of patterns.
- Patterns and functions can be represented in many ways and described using words, tables, and symbols.
- Students need experiences exploring growing patterns using concrete materials and calculators. Calculators are valuable tools for generating and analyzing patterns. The emphasis is not on computation but on identifying and describing patterns.
- Patterns at this level may include: addition, subtraction, or multiplication of whole numbers; addition or subtraction of fractions (with denominators 12 or less); and decimals expressed in tenths or hundredths). Several sample numerical patterns are included below:
    - 1, 2, 4, 7, 11, 16, •;
    - 2, 4, 8, 16, 32, •;
    - 32, 30, 28, 26, 24•;
    - 0.15, 0.35, 0.55, 0.75•; and
    - $\frac{1}{4,}$, $\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{3}{4}$•;

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- Students in grades three and four had experiences working with input/output tables to determine the rule or a missing value. Generalizing patterns to identify rules and applying rules builds the foundation for functional thinking. Sample input/output tables that require determination of the rule or missing terms can be found below:

Rule: ?	
Input	Output
4	8
5	?
6	12
?	20

Rule: ?	
Input	Output
8.9	9.4
6.6	7.1
?	3.5
0.5	1.0

- A numerical expression is a representation of a quantity. It is made up of numbers, variables, and/or computational symbols. It does not have an equal symbol (e.g., 15 × 12).

- A verbal expression involving one operation can be represented by a variable expression that describes the relationship. Numbers are used when they are known; variables are used when the numbers are unknown. The example in the table below defines the relationship between the input number and output number as x + 3.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Students at this level are not expected to write a variable expression to describe patterns. They might describe the pattern below as + 3 or given any number, add three.

x	y
6	9
7	10
11	14
15	18

- An algebraic expression is a variable or a combination of variables, numbers, and/or operation symbols and represents a mathematical relationship.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Key Vocabulary

VDOE Word Wall Cards

• pattern • term • open sentence • mathematical relationship • addition • subtraction • single variable	• sequence • representation • fraction • decimal • input/output • function table • unknown quantity	• multiplication • division • missing number • one operation • variable expression • equal sign = • extend

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- • Use patterns that incorporate fractions and decimals • Students can create patterns for classmates to identify the pattern's rule and extend the pattern. • Explore patterns that involve division.	• How can a pattern be identified, created, described, extended, and represented? • What patterns or relationships do we see in each type of mathematics? • What are the different ways to represent the patterns or relationships? • What predictions can the patterns or relationships support?

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- Work with patterns that include multi-step intervals (e.g. 5, 11, 23, ___ this pattern represents 2x+1).

Below level learners-

- Use simple rules and minimize the number of extensions (the 4th term, instead of the 10th term)
- Remind students to identify the core of the pattern or the pattern's rule before extending the pattern.

SWD Resources-

- Evidence-Based Specially Designed Instruction in Mathematics Resource Guide

- How can pattern identification be used to solve problems?
- How can we use or test our predictions? Are they valid? Are they significant?
- How can we identify, describe and extend single-operation input and output rules?

Common Student Misconceptions:

- Follow directions carefully- students will need to find the 4th term, 2nd term, and so forth
- Students may fail to test the rule through the entire sequence presented.

Teacher Notes and Elaborations:

- The simplest types of patterns are repeating patterns. In such patterns, students need to identify the basic unit of the pattern and repeat it.
- Growing patterns are more difficult for students to understand than repeating patterns because not only must they determine what comes next, they must also begin the process of generalization. Students need experiences with growing patterns.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	
	• Provide students with opportunities to work with a variety of levels of growing and repeating patterns. This should include patterns with multi-step intervals (e.g. 5, 11, 23, ___ this pattern represents 2x+1).	

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

SOL Strand: Patterns Functions and Algebra

Focus: Algebraic Expressions/Variables

VA SOL: 5.19 The student will

a) investigate and describe the concept of variable;

b) write an equation to represent a given mathematical relationship, using a variable;

c) use an expression with a variable to represent a given verbal expression involving one operation; and

d) create a problem situation based on a given equation, using a single variable and one operation.

Anticipated Pacing: 7 days

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

Assessments
Formative and Summative

Inform Instruction:

- SOL 5.19a JIT Quick Check
- SOL 5.19a JIT Virtual Quick Check- Desmos Activity
- SOL 5.19b JIT Quick Check
- SOL 5.19b JIT Virtual Quick Check- Desmos Activity
- SOL 5.19c JIT Quick Check
- SOL 5.19c JIT Virtual Quick Check- Desmos Activity
- SOL 5.19d JIT Quick Check
- SOL 5.19d JIT Virtual Quick Check- Desmos Activity

Assess Learning:

- Post-Assessment (link here)

Vertical Content:

- 4.16 The student will recognize and demonstrate the meaning of equality in an equation.
- 6.13 The student will solve one-step linear equations in one variable, including practical problems that require the solution of a one-step linear equation in one variable.

Resources for bridging the content:

- SOL 4.16 JIT Quick Check
- 4th grade VDOE Lesson Plan: Reasoning About Equations with Equality
- **Hands-On Standards, Grades 3-4**:
  - page 114 (Addition and Subtraction - Missing Component)
  - page 116 (Multiplication and Division - Missing Component)
  - page 118 (Mathematical Reasoning - Finding Equivalents)
- SOL 6.13 JIT Quick Check
- SOL 6.13 VDOE Lesson Plans:
  - **Equation Vocabulary**
  - **Modeling One-Step Linear Equations**
  - **One Step Equations**

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources	Instructional Strategies, Manipulatives, and Materials

• Describe the concept of a variable (presented as boxes, letters, or other symbols) as a representation of an unknown quantity.
• Write an equation with addition, subtraction, multiplication, or division, using a variable to represent an unknown quantity.
• Use an expression with a variable to represent a given verbal expression involving one operation (e.g., "5 more than a number" can be represented by y + 5).
• Create and write a word problem to match a given equation with a single variable and one operation.
	• SOL 5.19 Variables, Equations and Expressions Notes Page
	• SOL 5.19 Notes Study Guide
	• **VDOE Lesson Plan: 5.19 Variables, Operations, Numbers, Oh My!**
	• **Rich Mathematical Tasks:** No VDOE tasks for this SOL
	• Math Antics Video- What is Algebra?
	• Math Antics Video- Solving Basic Equations Part I
	• Variables, Expressions, and Equations Video
	• What is a variable? Video
	• **Hands-On Standards, Grades 5-6:**
	  ○ page 102 (Expressions with a Variable)
	  ○ page 10 (Equations with a Variable)
	• **Hands-On Standards, Grades 5-6:**
		• Free Virtual Manipulatives
		• Didax Virtual Manipulatives
		• Square tiles
		• Cuisenaire Rods
		• Students can work in groups to create word problems or story situations that match a given variable equation.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	○ page 104 **(**Equations with a Variable) ○ page 106 (Addition and Subtraction Equations) ○ page 108 (Multiplication and Division Equations) ● Expressions Four in a Row Bingo (Group Activity) ● Have students match given word problems to variable equations. Equation Match (Group Activity)	

Understanding the Standard
(what teachers should know)

- A variable is a symbol that can stand for an unknown number (e.g., a + 4 = 6) or for a quantity that changes (e.g., the rule or generalization for the pattern for an input/output table such as x + 2 = y).
- An algebraic expression, an expression with a variable, is like a phrase; a phrase does not have a verb, so an expression does not have an equal symbol (=).
- A verbal expression describing a relationship involving one operation can be represented by an expression with a variable that mathematically describes the relationship. Numbers are used when quantities are known; variables are used when the quantities are unknown. For example, when b stands for the number of cookies in one full box, “the number of cookies in a full box and four extra” can be represented by b + 4; “three full boxes of cookies” by 3b; “the number of cookies each person would receive if a full box of cookies were shared among four people” by b/4.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- An equation is a statement that represents the relationship between two expressions of equal value (e.g., 12 × 3 = 72 ÷2).
- A problem situation about two quantities that are equal can be expressed as an equation.
- An equation may contain a variable and an equal symbol (=). For example, the sentence, "A full box of cookies and four extra equal 24 cookies." can be written as b + 4 = 24, where b stands for the number of cookies in one full box. "Three full boxes of cookies contain a total of 60 cookies" can be written as 3b = 60.
- Another example of an equation is b + 3 = 23 and represents the answer to the word problem, "How many cookies are in a box if the box plus three more equals 23 cookies?" where b stands for the number of cookies in the box?
- Teachers should consider varying the letters used (in addition to x) to represent variables. The symbol · is often used to represent multiplication and can be confused with the variable x. In addition to varying the use of letters as variables, this confusion can be minimized by using parentheses [e.g., 4(x) = 20 or 4x = 20] or a small dot raised off the line to represent multiplication [4 • x = 20].
- By using story problems and numerical sentences, students begin to explore forming equations and representing quantities using variables.
- An equation containing a variable is neither true nor false until the variable is replaced with a number and the value of the expressions on both sides are compared.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Key Vocabulary

VDOE Word Wall Cards

• variable • expression • mathematical relationship • one-step linear equation • equation	• addition • subtraction • single variable • symbol • representation • unknown quantity	• multiplication • division • missing number • one operation • variable expression • equal sign =

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- • Students can write a story problem with one unknown value and one operation. A partner can write the expression to match the story problem. **Below level learners-** • Story Problem Templates (created by Allison French)	• How can you use an expression/equation with a variable to represent a given verbal expression? • How can you create a problem situation to represent a given equation or vice versa? • When are algebraic and numeric expressions used? • How is the "equal sign" in an equation like the fulcrum of a balance scale? • Why are variables used?

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	● Use a box for an unknown quantity such as 4 + ☐ = 7, then replace the box with a variable 4 + b = 7. **SWD Resources-** ● Evidence-Based Specially Designed Instruction in Mathematics Resource Guide	● What strategies can be used to solve for unknowns in algebraic equations?

Common Student Misconceptions:

- Students want to solve the equation. (They want to solve for the variable, which is not always what is asked.)
- Students sometimes struggle with matching an equation with a given practical problem.

Teacher Notes and Elaborations:

- Students typically do well with matching equations to word problems, but often have a harder time matching word problems to a given equation. Students should have many opportunities to work both ways with equations and word problems.

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

SOL Strand: Measurement

Focus: Metric Measurement

VA SOL: 5.9 The student will

a) given the equivalent measure of one unit, identify equivalent measurements within the metric system
(calculated allowed)
DESMOS VA Calculator

b) solve practical problems involving length, mass, and liquid volume using metric units.

Anticipated Pacing: 10 Days

Books of Reference:

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

Assessments
Formative and Summative

Inform Instruction:

- SOL 5.9a JIT Quick Check
- SOL 5.9a JIT Virtual Quick Check-Desmos Activity
- SOL 5.9b JIT Quick Check
- SOL 5.9b JIT Virtual Quick Check-Google Slides Activity

Assess Learning:

- Post-Assessment (link here)

Vertical Content:

- 4.8 The student will
  - a) estimate and measure length and describe the result in U.S. Customary and metric units
  - b) estimate and measure weight/mass and describe the result in U.S. Customary and metric units
  - c) given the equivalent measure of one unit, identify equivalent measures of length, weight/mass, and liquid volume between units within the U.S. Customary system
  - d) solve practical problems that involve length, weight/mass, and liquid volume in U.S. Customary units.
- **No matching vertical alignment for sixth grade.**

Resources for bridging the content:

- SOL 4.8a JIT Quick Check
- SOL 4.8b JIT Quick Check
- SOL 4.8c JIT Quick Check
- SOL 4.8d JIT Quick Check
- SOL 4.8 VDOE Lesson Plans:
  - **Body Part Measurement**
  - **Fruit Basket Measurement**
  - **Measuring Weight/Mass**
  - **Liquid Volume: It's My Party**

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	● **Hands-On Standards, Grades 3-4:** ○ page 126 (Estimating and Measuring) ○ page 142 (Measure Weight)

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources	Instructional Strategies, Manipulatives, and Materials
● Given the equivalent measure of one unit, identify equivalent measurements within the metric system for the following: ○ length (millimeters, centimeters, meters, and kilometers); ○ mass (grams and kilograms); and ○ liquid volume (milliliters and liters). ● Estimate and measure to solve practical problems that involve metric units: ○ length (millimeters, centimeters, meters, and kilometers);	● **SOL 5.9 Notes Study Guide** ● **VDOE Lesson Plan: 5.9ab Measurement Mania** ● **Rich Mathematical Tasks:**No VDOE tasks for this SOL ● **Math in Practice; Teaching 5th-Grade Math:** Module 11 Converting Like Measurement Units: p. 215 ● Math Antics Video- Intro to the Metric System ● **Hands-On Standards, Grades 5-6:** page 128 (Standard Units and Precision) ● Metric Measurement Conversion Word Problems (Independent Practice) ● Mass Chart ● Length Chart	● Free Virtual Manipulatives ● Didax Virtual Manipulatives ● Metric weights, meter sticks, centimeter rulers, & metric capacity containers ● Calculators ● Centimeter cubes ● Square tiles ● Have students set up the conversion and write the equivalent measure of one unit underneath. If the equivalent to one unit is on the opposite side of the equal sign from the given measurement, the student knows to multiply. If the equivalent

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	○ mass (grams and kilograms); and ○ liquid volume (milliliters, and liters).	● Liquid Volume Chart	to one unit is on the same side as the equal side, students will divide (like a fraction). Example of when to multiply: 25 km = _____m 1 km = 1000 m Example of when to divide 250 g = _____ kg 1000 g = 1 kg ● Students should explore and work with metric units of length, mass, and volume in order to better understand them. Once students have references for these units, they will be able to make estimates. Students can use the charts below to record their estimates and actual measurements of objects found around the classroom

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Understanding the Standard (what teachers should know)

- Length is the distance between two points along a line.
- Metric units for measurement of length include millimeters, centimeters, meters, and kilometers. Appropriate measuring devices include centimeter ruler, meter stick, and tape measure.
- Weight and mass are different. Mass is the amount of matter in an object. Weight is determined by the pull of gravity on the mass of an object. The mass of an object remains the same regardless of its location. The weight of an object changes depending on the gravitational pull at its location. In everyday life, most people are actually interested in determining an object's mass, although they use the term weight (e.g., "How much does it weigh?" versus "What is its mass?").
- Balances are appropriate measuring devices to measure mass in U.S. Customary units (ounces, pounds) and metric units (grams, kilograms).
- Metric units to measure liquid volume (capacity) include milliliters and liters.
- Practical experience measuring familiar objects helps students establish benchmarks and facilitates students' ability to use the appropriate units of measure to make estimates.
- Students at this level will be given the equivalent measure of one unit when asked to determine equivalencies between units in the metric system. An example can be found below:

  Students will be told 1 kilometer is equivalent to 1,000 meters and then will be asked to apply that relationship to determine:

  - the number of meters in 3.5 kilometers;
  - the number of kilometers equal to 2,100 meters; or
  - Seth ran 2.78 kilometers on Saturday. How many meters are equivalent to 2.78 kilometers?

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Key Vocabulary

[VDOE Word Wall Cards]

• equivalent measurements • metric system • estimate • appropriate unit of measure • length • millimeters • centimeters	• meters • Kilometers • grams • Kilograms • liquid volume • Milliters	• Liters • reasonable(ness) • capacity • weight • mass

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- ● Give students the length and width of a room in meters using decimals. The student can draw to scale the room in centimeters using grid paper. Have them identify how many centimeters the width and length is. **Below level learners-** ● Students need additional practice with measuring tools to identify relationships among the metric system. ● Have students measure the width of the classroom in meters. How many centimeters is the width? How many millimeters? **SWD Resources-** ● Measurement- A Co-Teaching Lesson Plan ● Evidence-Based Specially Designed Instruction in Mathematics Resource Guide	● What two measurement systems currently exist? ● What is the metric system based on? ● What tools are used in linear measurement? …measurement of weight/mass? …measurement of liquid volume? …measurement of temperature? How does one determine which is appropriate to use? ● How do the units within a system relate to each other? ● How do you decide which unit of measurement to use? ● How can I measure length, mass and capacity by using non-standard units?

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	
	Common Student Misconceptions: ● Students need additional practice identifying the measurement that is equivalent to a given metric measurement. ● When converting units students struggle to decide whether to multiply or divide. **Teacher Notes and Elaborations:** ● Students may use a calculator to complete metric conversions. This is especially useful when conversions result in decimal answers. Make sure students have experience using a calculator. ● Students will be given the equivalent measurement to use when converting between units. Students should be comfortable determining whether to multiply or divide to complete the conversion. Use a strategy, such as the ones listed in the “Suggested Strategies, Resources and Tools” column above.	

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Standard	**Essential Knowledge and Skills and Key Instructional Information**	

SOL Strand: Geometry

Focus: Transformations and Polygons

VA SOL: 5.14 The student will

a) recognize and apply transformations, such as translation, reflection, and rotation; and

b) investigate and describe the results of combining and subdividing polygons.

Anticipated Pacing: 4 days

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

Assessments
Formative and Summative

Inform Instruction:

- SOL 5.14a JIT Quick Check
- SOL 5.14a JIT Virtual Quick Check- Desmos Activity
- SOL 5.14b JIT Quick Check
- SOL 5.14b JIT Virtual Quick Check- Desmos Activity

Assess Learning:

- Post-Assessment (link here)

Vertical Content:

- 4.12 The student will classify quadrilaterals as parallelograms, rectangles, squares, rhombi, and/or trapezoids.
- 6.8 The student will
  - a) identify the components of the coordinate plane
  - b) identify the coordinates of a point and graph ordered pairs in a coordinate plane

Resources for bridging the content:

- SOL 4.12 JIT Quick Check
- SOL 4.12 VDOE Lesson Plan: **Classifying Quadrilaterals**
- **Hands-On Standards, Grades 5-6**: page 66 (Identify and Classify Quadrilaterals)
- SOL 6.8a JIT Quick Check
- SOL 6.8b JIT Quick Check
- SOL 6.8 VDOE Lesson Plan: **What's The Point?**

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources and Tools	Instructional Strategies, Manipulatives, and Materials

• Apply transformations to polygons in order to determine congruency.
• Recognize that translations, reflections, and rotations preserve congruency.
• Identify the image of a polygon resulting from a single transformation (translation, reflection, or rotation).
• Investigate and describe the results of combining and subdividing polygons.
• Compare and contrast the characteristics of a given polygon that has been subdivided with the characteristics of the resulting parts.
	• **SOL 5.14 Notes Study Guide**
	• **VDOE Lesson Plans: 5.14a Slides, Flips and Turns**
	• **5.14b Combining and Subdividing Shapes**
	• **Rich Mathematical Tasks: No task for this SOL**
	• **Math in Practice; Teaching 5th-Grade Math:** Module 11 Converting Like Measurement Units: p. 215
	• Number Rock Transformations Video
	• **Hands-On Standards, Grades 3-4:** page 84 (Tangram Puzzles)
	• **Hands-On Standards, Grades 3-4:**
	  ○ page 90 (Putting Shapes Together)
	  ○ page 84 (Tangram Puzzles)
	• **Hands-On Standards, Grades 5-6:**
		• Free Virtual Manipulatives
		• Didax Virtual Manipulatives
		• Pattern blocks
		• Tangrams
		• AngLegs or Geostix
		• GeoReflector mirrors
		• Geo-boards
		• Use tangram puzzle pieces to explore composing and decomposing shapes.
		• Explore the properties of the shapes that result from cutting a square to make the tangram pieces.

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

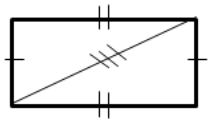
	○ page 74 (Slides and Flips) ○ page 76 (Rotational Symmetry) ○ page 82 (Congruent Figures and Transformations) ● Combine and Subdivide Task Cards-Pattern Blocks (Group Activity) ● Combine and Subdivide Polygons (Teacher Directed)	

Understanding the Standard
(what teachers should know)

- A transformation of a figure (preimage) changes the size, shape, or position of the figure to a new figure (image). Transformations can be explored using mirrors, paper folding, and tracing.
- Congruent figures have the same size and shape.
- A translation is a transformation in which an image is formed by moving every point on the preimage the same distance in the same direction.
- A reflection is a transformation in which an image is formed by reflecting the preimage over a line called the line of reflection. All corresponding points in the image and preimage are equidistant from the line of reflection.
- A rotation is a transformation in which an image is formed by rotating the preimage about a point called the center of rotation. The center of rotation may or may not be on the preimage.
- The resulting figure of a translation, reflection, or rotation is congruent to the original figure.

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- The orientation of figures does not affect congruency or non congruency.
- A polygon is a closed plane figure composed of at least three line segments that do not cross.
- Two or more polygons can be combined to form a new polygon. Students should be able to identify the figures that have been combined.
- A polygon that can be divided into more than one basic figure is said to be a composite figure (or shape). Students should understand how to divide a polygon into familiar figures using concrete materials (e.g., pattern blocks, tangrams, geoboards, grid paper, paper (folding), etc.).



This diagonal of the rectangle above subdivides the rectangle in half and creates two right triangles. The figure can also be formed by combining two right triangles that are congruent. The resulting figure shows that the legs of the right triangles are congruent to the sides of the rectangle. The representation illustrates that the area of each right triangle is half the area of the rectangle. Exploring decomposition of shapes helps students develop algorithms for determining area of various shapes (e.g., area of a triangle is ½ × base × height).

- Congruent sides are denoted with the same number of hatch (or hash) marks on each congruent side. For example, a side on a polygon with two hatch marks is congruent to the side with two hatch marks on a congruent polygon or within the same polygon.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Key Vocabulary

VDOE Word Wall Cards

• plane figures • square • rectangle • triangle • parallelogram • rhombus • trapezoid • Investigate • diagonal • quadrilateral • line • plane • geometric figures	• congruent halves • rectangle • square • rhombus • bases • legs • divide • congruent triangles • opposite sides • opposite angles • bisect • line segment • results • combining	• subdividing • complicated figures • simple plane figure • polygon • parallel • vertex • vertices • translation • reflection • rotation

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- ● Use tangram pieces to create polygons by combining pieces. For instance, use three pieces to make a trapezoid or use three triangles to create a square. This activity can be found in fifth grade resources on google drive: Tangram Puzzle Challenge. ● **Hands-On Standards, Grades 5-6**: page 78 (Multiple Transformations) **Below level learners-** ● Students can use pattern blocks to experiment with combining and dividing blocks to create new polygons. Identify polygons created. **SWD Resources-** ● Evidence-Based Specially Designed Instruction in Mathematics Resource Guide	● How can transformations help us understand congruency? ● How can we recognize and apply transformations (translation, reflection, and rotation)? ● How can we predict and explain the results of combining and subdividing polygons into other polygons? ● How can objects be represented and compared using geometric attributes? ● How can I put shapes together and take them apart to form other shapes?

Common Student Misconceptions:

- Students need additional practice identifying characteristics of plane figures.

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	● Students need additional practice determining the figures that result when a polygon is subdivided. ● Students struggle to identify all names associated with polygons ex. square is also a quadrilateral, rhombus, parallelogram, etc. ● Students may confuse the words translation, rotation, and reflection. **Teacher Notes and Elaborations:** ● **Prior Knowledge for Understanding the Standard:** ○ A triangle is a polygon with three sides. Triangles may be classified according to the measure of their angles, i.e., right, acute, or obtuse. Triangles may also be classified according to the measure of their sides, i.e., scalene (no sides congruent), isosceles (at least two sides congruent) and equilateral (all sides congruent). ○ A quadrilateral is a polygon with four sides. ○ A parallelogram is a quadrilateral in which both pairs of opposite sides are parallel. ○ A rectangle is a quadrilateral with four right angles and opposite sides that are parallel and congruent. ○ A square is a rectangle with four congruent sides and four right angles. ○ A rhombus is a quadrilateral with four congruent sides. Properties of a rhombus include: opposite sides are congruent, opposite sides are parallel and opposite angles are congruent. ○ A trapezoid is a quadrilateral with exactly one pair of parallel sides. ● Read The Greedy Triangle by Marilyn Burns to review polygons and build student's prior knowledge. Have a discussion of all of the polygons your students saw in the book and the name based on how many sides and angles each shape has.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

SOL Strand: Geometry

Focus: Angle Measurement

VA SOL: 5.12 The student will classify and measure right, acute, obtuse, and straight angles.

Anticipated Pacing: 5 days

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

Assessments
Formative and Summative

Inform Instruction:

- SOL 5.12 JIT Quick Check
- SOL 5.12 JIT Virtual Quick Check-Google Slides Activity

Assess Learning:

- Post-Assessment (link here)

Vertical Content:

- 4.10 The student will
  - a) identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices
  - b) identify and describe intersecting, parallel, and perpendicular lines.
- 6.9 The student will determine congruence of segments, angles, and polygons.

Resources for bridging the content:

- SOL 4.10a JIT Quick Check
- SOL 4.10b JIT Quick Check
- VDOE Lesson: Geometry in Real Life Situations
- **Hands-On Standards, Grades 5-6:** page 70 (Parallel and Perpendicular Lines)
- SOL 6.9 JIT Quick Check
- SOL 6.9 VDOE Lesson Plan: Side to Side

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources	Instructional Strategies, Manipulatives, and Materials
• Classify angles as right, acute, obtuse, or straight. • Identify the appropriate tools (e.g., protractor and straightedge or angle ruler as well as available software) used to measure and draw angles. • Measure right, acute, obtuse, and straight angles, using appropriate tools, and identify their measures in degrees.	• **SOL 5.12 Notes Study Guide** • **VDOE Lesson Plans: 5.12 Exploring Angles** • **Rich Mathematical Tasks: 5.12 Angle Design Task** • Math Antics Video- Angle Basics • Math Antics Video- Angles & Degrees • **Hands-On Standards, Grades 5-6:** page 60 (Measure and Classify Angles) • TEI Angle Sort • Angle Benchmarks Sort • Angles Memory (Group Activity) • Math Clock Angles (Independent Practice) • Sir Cumference and the Great Knight of Angleland by Cindy Neuschwander: This book is an introduction to the topic of angles, including the difference between right, acute and	• Use protractors to measure angles or angles contained in shapes. • Angle Rulers • Angle Sort • AngLegs/GeoSticks • Geo-boards (App or Library of Virtual Manipulatives versions) • Protractors • Free Virtual Manipulatives • Didax Virtual Manipulatives

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	obtuse, as well as measuring angles.	
• Solve addition and subtraction problems to determine unknown angle measures on a diagram in practical problems.	• Angle Decomposing- Farm Activity; Google Slides • Angle Decomposing- Window Activity; Google Slides • Angle Decomposing- Cake Activity; Google Slides • Angle Decomposing- Train Activity; Google Slides • Decomposing Angles in a Circle Activity; Google Slides	• Use angle legs to explore complementary and supplementary angles and how to use addition and subtraction to find missing angles. • Angle legs • Calculators (use to find missing angle in additive situations)

Understanding the Standard
(what teachers should know)

- Angles can be classified as right, acute, obtuse, or straight according to their measures.
- Angles are measured in degrees. A degree is 1/360 of a complete rotation of a full circle. There are 360 degrees in a circle.
- To measure the number of degrees in an angle, use a protractor or an angle ruler.
- A right angle measures exactly 90 degrees.
- An acute angle measures greater than zero degrees but less than 90 degrees.
- An obtuse angle measures greater than 90 degrees but less than 180 degrees.

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- A straight angle measures exactly 180 degrees.
- Before measuring an angle, students should first compare it to a right angle to determine whether the measure of the angle is less than or greater than 90 degrees.
- Students should recognize angle measure as additive. When an angle is decomposed into non overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts.
- Students should understand how to work with a protractor or angle ruler as well as available computer software to measure and draw angles and triangles.

Key Vocabulary

VDOE Word Wall Cards

• measure • right • acute • obtuse • straight angle • appropriate tools	• protractor • straightedge • angle ruler • triangles • degrees • 360 °	• right angle • 90 ° • 180 ° • less than • greater than

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- ● Use AngLegs to create an angle. Have classmates identify the type of angle and measure. **Below level learners-** ● Cover one set of numbers on the protractor to minimize confusion. ● First day of measuring angles, only measure acute angles. Then add obtuse angles when ready. Make sure angles open to the left and to the right so students are using both sides of the protractor. **SWD Resources-** ● Evidence-Based Specially Designed Instruction in Mathematics Resource Guide	● How are angles measured? ● How are angles classified? ● How does angle measurement differ from linear measurement? ● How can we use benchmark angle measurements (e.g., 90°, 180°) to determine the measurement of other angles?

Common Student Misconceptions:

- Students will use the wrong set of numbers when using the protractor when measuring angles.
- Students may not line up the protractor correctly when measuring angles.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

	Teacher Notes and Elaborations: ● Students need practice using both physical and digital/online protractors. ● Students may use calculators for this unit, particularly for finding the measure of a missing angle. ● Encourage students to classify angles are acute, right, or obtuse before measuring with a protractor. This will allow students to think about which set of numbers to read on a protractor.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

SOL Strand: Geometry

Focus: Triangles

VA SOL: 5.13 The student will

a) classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles; and
b) investigate the sum of the interior angles in a triangle and determine an unknown angle measure.

Anticipated Pacing: 6 days

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

Assessments
Formative and Summative

Inform Instruction:

- SOL 5.13a JIT Quick Check
- SOL 5.13a JIT Virtual Quick Check- Desmos Activity
- SOL 5.13b JIT Quick Check
- SOL 5.13b JIT Virtual Quick Check- Desmos Activity

Assess Learning:

- Post-Assessment (link here)

Vertical Content:

- 4.11 The student will identify, describe, compare, and contrast plane and solid figures according to their characteristics (number of angles, vertices, edges, and the number and shape of faces) using concrete models and pictorial representations.
- 6.9 The student will determine congruence of segments, angles, and polygons.

Resources for bridging the content:

- SOL 4.11 JIT Quick Check
- SOL 4.11 VDOE Lesson Plan: Solids
- **Hands-On Standards, Grades 3-4:**
  - page 66 (Plane Shapes)
  - page 68 (Attributes of Geometric Shapes)
  - page 72 (Classify Three-Dimensional Shapes)
- **Hands-On Standards, Grades 5-6:** page 90 (Three-Dimensional Shapes)
- SOL 6.9 JIT Quick Check
- SOL 6.9 VDOE Lesson Plan: Side to Side

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Content and Instruction

Essential Knowledge and Skills (what students should know and do)	Instructional Resources	Instructional Strategies, Manipulatives, and Materials
• Classify triangles as right, acute, or obtuse. • Classify triangles as equilateral, scalene, or isosceles. • Compare and contrast the properties of triangles. • Identify congruent sides and right angles using geometric markings to denote properties of triangles.	• **SOL 5.13 Notes Study Guide** • **VDOE Lesson Plans: 5.13a Triangle Sort** • **Rich Mathematical Tasks: see below** • Math Antics Video- Triangles • Number Rock Video- Types of Triangles • Classifying Triangles by Angles Video • Classifying Triangles by Sides Video • Missing Angles in Triangles Video • **Hands-On Standards, Grades 5-6:** page 62 (Identify and Classify Triangles) • Triangles with Geostix Video • Classifying Triangles Song • Numberock Triangles Song • Triangle Splat Online Game • Triangle Task Cards • Triangle sort	• Have students build triangles using AngLegs/ Geostix using 3 same color pieces, 2 same color and 1 different piece, and 3 different color pieces. Have students compare and contrast the triangles to determine the combinations of side and angle classifications. • Complete a "Partner Match" where one student has a triangle and must match to another student with the right words to describe the triangle. • Demonstrate how to mark congruent sides using hash/hatch marks. Make sure to show that sides that are congruent have the same number of

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

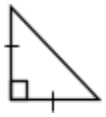
		• Triangle Sort 2 • TEI Triangle Sorts (3) in Resources Folder	marks. • Demonstrate how to mark right angles, with a square in the corner of the angle. • Tangram pieces & pattern blocks • Protractors • AngLegs or GeoSticks • Free Virtual Manipulatives • Didax Virtual Manipulatives
• Use models to prove that the sum of the interior angles of a triangle is 180 degrees, and use that relationship to determine an unknown angle measure in a triangle.		• **VDOE Lesson Plans:** 5.13b Exploring the Sum of a Triangle's Angles • **Rich Mathematical Tasks:** 5.13: Designing Windows - Task template - Student version of task - Anchor papers - Scoring rationales • Triangles Culminating Activity	• Use paper cutouts of different types of triangles to illustrate that the angles always add up to 180 degrees. Tear off the three angles/vertices of a triangle and out the angles together. They will always create a straight angle (180°). • Use protractors to measure the angles in different types of triangles (on paper or created with geostix) and

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

		add them up to find the pattern. ● Protractors

Understanding the Standard
(what teachers should know)

- Angles can be classified as right, acute, obtuse, or straight according to their measures.
- A triangle can be classified as right, acute, or obtuse according to the measure of its largest angle.
- Triangles may also be classified according to the measure of their sides, e.g., scalene (no sides congruent), isosceles (at least two sides congruent) and equilateral (all sides congruent).
- An equilateral triangle (with three congruent sides) is a special case of an isosceles triangle (which has at least two congruent sides).
- Triangles can be classified by the measure of their largest angle and by the measure of their sides (i.e., an isosceles right triangle).

  Isosceles Right Triangle 

- Congruent sides are denoted with the same number of hatch (or hash) marks on each congruent side.
- A right angle measures exactly 90 degrees.
- An acute angle measures greater than zero degrees but less than 90 degrees.
- An obtuse angle measures greater than 90 degrees but less than 180 degrees.
- A straight angle measures exactly 180 degrees.
- A right triangle has one right angle.

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

- An obtuse triangle has one obtuse angle.
- An acute triangle has three acute angles.
- A scalene triangle has no congruent sides.
- An isosceles triangle has at least two congruent sides.

- An equilateral triangle has three congruent sides. All angles of an equilateral triangle are congruent and measure 60 degrees.

Key Vocabulary

VDOE Word Wall Cards

• angles • right • acute • obtuse • triangles • hatch/hash marks	• right angle • 90° • acute angle • greater than 0° • greater than 90° • isosceles	• exactly 180° • congruent sides • classify angles • classify triangles • equilateral • scalene

Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	

Instructional Support For ALL Learners

Differentiation	Essential Questions
Above level learners- ● Students can create triangles with two angles given and classmates must determine the degrees in the remaining angle. **Below level learners-** ● Students need practice identifying each angle in a given triangle. Then identify the triangle based on the angles. ● Students can use AngLegs, Geostix or pipe cleaners to make types of triangles. **SWD Resources-** ● Evidence-Based Specially Designed Instruction in Mathematics Resource Guide	● How are triangles classified? ● How are side lengths used to classify triangles? ● How does the sum of the interior angles of a triangle help you determine an unknown angle measure? ● How are geometric markings used to identify congruent sides and right angles of triangles? ● Can a triangle have more than one right angle? Why or why not?

Common Student Misconceptions:

- All triangles contain at least two acute angles but all triangles are not acute triangles.
- Students may mix up the names to classify triangles by the number of congruent sides.

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Quarter 3	SOL 5.18, 5.19, 5.9, 5.14, 5.12, 5.13	43 days
Standard	**Essential Knowledge and Skills and Key Instructional Information**	
	Teacher Notes and Elaborations: ● Be sure students understand why triangles can only have one right or obtuse angle. ● Students should understand that equilateral triangles can only be acute. However, isosceles and scalene triangles can be acute, right, or obtuse.	