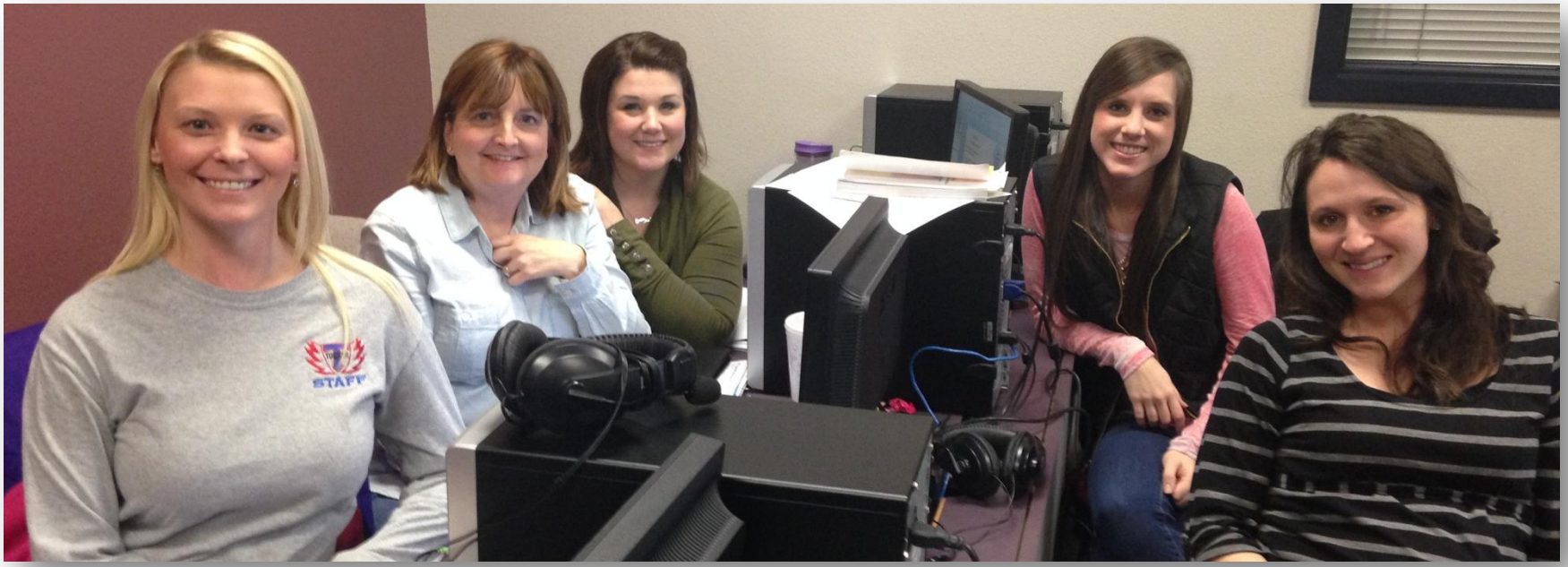
5th Grade Unit 5

Geometry and the Coordinate Plane

3 weeks



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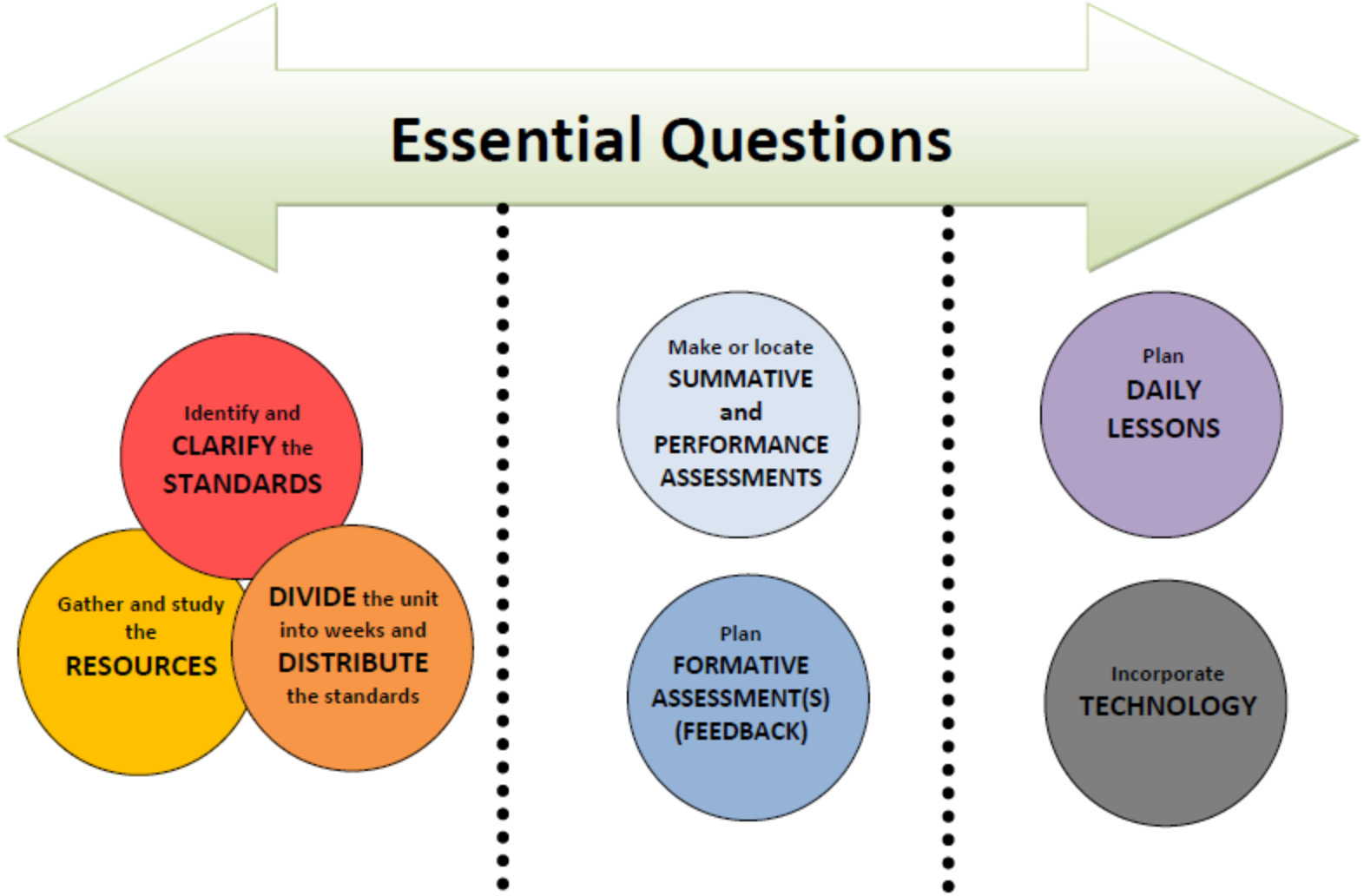
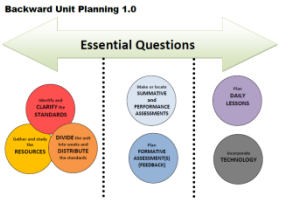
Backward Unit Planning 1.0



Essential Questions



R.P.S. Common Core Math Curriculum — 5th Grade

Unit 5 – Geometry & Coordinate Plane — 3 Weeks

Students will graph points on the coordinate grid and use them to solve real-world and mathematical problems. They will evaluate numerical patterns based on given rules and graph the ordered pairs on the coordinate plane. Students will interpret coordinate values in the context of the situation. They will understand the attributes of two-dimensional shapes and categories of shapes and will classify two-dimensional figures based on hierarchies of shapes. Students demonstrate fluency with multi-digit multiplication and will continue building their strategies for multi-digit division.

Essential Questions:

How can I use the coordinate plane to solve real-world and mathematical problems?

How can attributes of shapes help me classify 2-dimensional figures?

Geometry	
Graph points on the coordinate plane to solve real-world and mathematical problems.	
5.G.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
5.G.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Classify two-dimensional figures into categories based on their properties.	
5.G.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
5.G.4	Classify two-dimensional figures in a hierarchy based on properties.
Operations and Algebraic Thinking	
Analyze patterns and relationships.	
5.OA.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*
Number and Operations in Base Ten	
Perform operations with multi-digit whole numbers and with decimals to hundredths.	
5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
	Minimum expectation: Standard algorithm is not expected to be applied until 4th quarter.
5.NBT.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Operations and Algebraic Thinking	
Write and interpret numerical expressions.	
These standards will not be taught in isolated lessons, but will be addressed during Number Talks and Problem Solving discussion and notation.	
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

How can I use the coordinate plane to solve real-world and mathematical problems?

5.G.1, 5.G.2, & 5.OA.3

How can attributes of shapes help me classify 2-dimensional figures?

5.G.3 & 5.G.4

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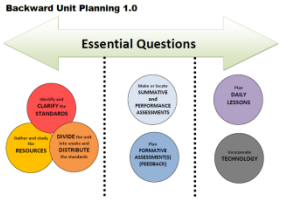
5.G.1 Graphing on the coordinate grid in the first quadrant. Students need to be able to understand that you plot the x coordinate first and then the y coordinate.

5.G.2 Using the coordinate grid in the first quadrant in real world problems. Make sense of the points in context.

5.G.3 & 4 Using a hierarchy based on properties. Students will need some review on the vocabulary of the shapes and what are their defining properties. Graphic Organizers will be helpful to help students organize their ideas about the properties of each shape. This includes quadrilaterals and triangles.

5.OA.3 This standard asks student to generate a rule for a numeric pattern (such as x 2 or +3) and then plot the resulting numbers on a coordinate grid. For example, if the rule is times 2, If x is 1 then y is 2. If x is 3, then y would be 6. Students would then plot the coordinates (1, 2) and (3, 6) on the coordinate plane.



Identify and CLARIFY the STANDARDS

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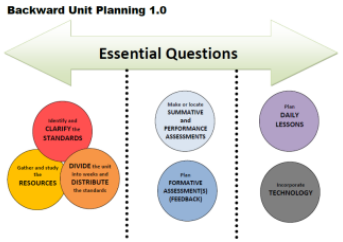
5.NBT.5- Continue with multiplying whole numbers.

5.NBT.6 Divide whole numbers up to four-digits divided by two-digits. Strategies need to be based on place value, properties of operations, and the inverse property.

5.OA.1 & 5.OA.2 Bring these out in discussion and notation.



Identify and CLARIFY the STANDARDS

Big Ideas for Unit 5:

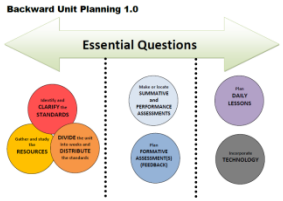
•5.G.1, 5.G.2 & 5.OA.3 – These standards go well together and all deal with the coordinate graph. Students will learn how to coordinate graph works, use it in real world problems and graph points generated by a pattern rule.

•5.G.2 & 5.G.3- Properties of shapes help us to classify the shapes. A hierarchy results and the shapes in one category also belong to all the subcategories of that category.

•5.NBT.5 & 5.NBT.6- Continue working with multiplication and division problems. Looking for more sophistication in student thinking.

•5.OA.1 & 5.OA.2- Notation! Work on notating student thinking in their work.

Identify and CLARIFY the STANDARDS



5th Grade: 5.G.1, 5.G.2, & 5.OA.3

Coordinate Grid

6th Grade:

6.G.3 Draw polygons on the Coordinate Grid

5th Grade: 5.NBT.6

Divide using a variety of strategies

6th Grade:

6.NS.2 Fluently Divide

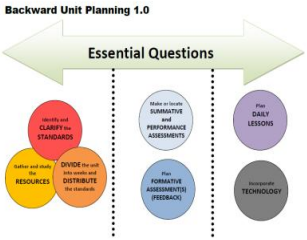
Vertical Exploration

Where are they going?

How does the work in your grade level extend into the grade level above?

What do you need to emphasize this quarter to ensure they are ready for the next grade level?

Week	Standards	Structure/Resources
1- 1 ½	**5.G.1 Coordinate Grid** **5.G.2 Coordinate Grid –real world problems** **5.OA.3 Generate number patterns, determine rule, and plot points.** **5.NBT.5 (x) and 5.NBT.6 (÷)** **5.OA.1 Use parentheses in expression and evaluate expressions** **5.OA.2 interpret expressions**	Coordinate Grid SMART Notebook **Graph Points on Coordinate Plane with Real-world Problems** (5.G.1-2) Air Traffic Controller Earth Day Project (includes 5.OA.3, 5.OA.5) First to Arrive (includes 5.OA.3) Shoo Fly Tell Me a Story What's the Better Buy (includes 5.OA.3) http://www.k-5mathteachingresources.com/support-files/the-fly-on-the-ceiling.pdf
1 ½ -3	**5.G.3 Understand that attributes belonging to a category of 2D figures also belong to all subcategories.** **5.G.4 Classify 2D figures in a hierarchy based on properties** **5.NBT.5 (x) and 5.NBT.6 (÷)** **5.OA.1 Use parentheses in expression and evaluate expressions** **5.OA.2 interpret expressions**	**Classify Two-Dimensional Figures** (5.G.3-4) Investigating Quadrilaterals My Many Triangles Polygon Capture Property List of Quadrilaterals Quadrilateral Hierarchy Diagram Rectangles and Parallelograms Shapely Pairs and Logic of Shapes Tangling with Triangles Triangle Hierarchy Triangle Hierarchy ver. 1 Triangle Hierarchy ver. 2 Polygon Hierarchy Quadrilateral Hierarchy



DIVIDE the unit into weeks and **DISTRIBUTE** the standards

Technology Resources
Games and Activities
Literature Connections
Number Talks for Unit 5
Teacher Created Resources for Unit 5
Assessments

Lesson Resources

Lessons, Tasks, and Investigations The following lessons were written by the *Georgia Department of Education* and correspond with the standards in this unit.

Graph Points on Coordinate Plane with Real-world Problems (5.G.1-2)
Air Traffic Controller
Earth Day Project (includes 5.OA.3, 5.OA.5)
First to Arrive (includes 5.OA.3)
Shoo Fly
Tell Me a Story
What's the Better Buy (includes 5.OA.3)

Classify Two-Dimensional Figures (5.G.3-4)
Investigating Quadrilaterals
My Many Triangles
Polygon Capture
Property List of Quadrilaterals
Quadrilateral Hierarchy Diagram
Rectangles and Parallelograms
Shapely Pairs and Logic of Shapes
Tangling with Triangles
Triangle Hierarchy

Building with Triangles This unit of four lessons, from Illuminations, focuses on triangles and their properties. Each investigation begins with an open-ended question that challenges students to become actively involved in mathematical experiments, ideas, discussions, manipulative materials, tools, and techniques. (5.G.3)
Graphing Patterns This multi-step task engages students in describing a recursive pattern. (5.OA.3)

Growing Towers This multi-step task engages students in finding a formula to describe a pattern of growth. (5.OA.3)

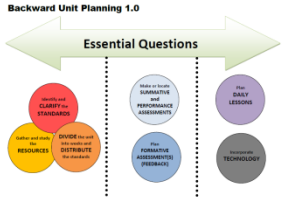
Rescue Mission Game In this lesson, from Illuminations, students play a game to learn about the four forces of flight: lift, drag, thrust, and gravity. Before playing the game, students conduct a probability experiment with spinners and record their results in tally tables and bar graphs. They then use their findings to select spinners with the greatest probability of helping them win the game. In a portion of the game, students use ordered pairs to plot points on a coordinate grid to show their flight path. (5.G.1, 5.G.2)

Running Races In this lesson, one of a multi-part unit from Illuminations, students generate and compare paths that model given problem situations on graphing grids. They graph sets of ordered pairs on a graphing grid and compare graphs of linear equations. (5.OA.3)

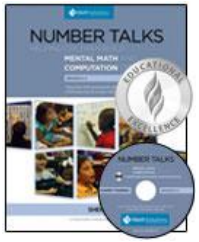
Two Runners In this lesson, one of a multi-part unit from Illuminations, students physically demonstrate two scenarios involving rate of change and then use software to simulate two runners along a track. While moving runners along a line, changing their step size and starting positions, students identify, describe, and compare situations with a constant rate of change. (5.OA.3)

Rectangles and Parallelograms In this lesson, from Illuminations, students use dynamic software to examine the properties of rectangles and parallelograms and then identify what distinguishes a rectangle from a more general parallelogram. Using spatial relationships, they examine the properties of two- and three-dimensional shapes. The lesson links to a virtual manipulative that allows students to compare rectangles and parallelograms. (5.G.3)

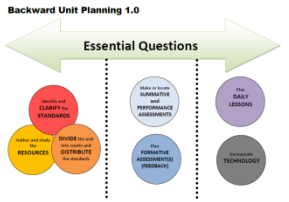
Support for 5.OA.1 and 5.OA.2 - Order of Operations



Gather and study the RESOURCES



Options for Assessment – available online for Unit 5



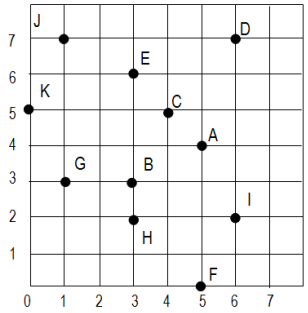
Name
5g1

Identify the ordered pairs for the given points.

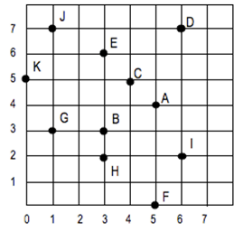
Point B (____, ____)
Point J (____, ____)
Point I (____, ____)

Locate the points for the ordered pairs.

(3, 6) Point _____
(1, 3) Point _____
(5, 0) Point _____



Name
5g1



Points G, B, and H are 3 corners of a rectangle. What is the ordered pair of the fourth corner?

_____

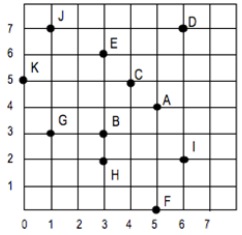
Once you have found the ordered pair of the fourth corner, connect the corners to create the rectangle.

Name
5g1

Write the ordered pair for the points below.

Point D: _____

Point A: _____



Use what you know about the relationship to ordered pair and the location on the coordinate plane to explain your thinking.

_____
_____
_____
_____
_____
_____

Name_____ Date_____
5.OA.3

Chocolate Chip Cookies need to bake for 9 minutes in the oven. Oatmeal cookies need to bake for 12 minutes in the oven.

Create a table for each type of cookie that shows the rule for the baking time.

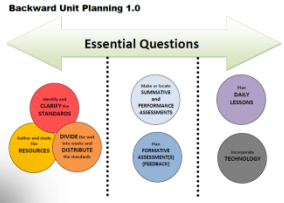
Graph the resulting coordinate pairs on a coordinate plane.

How long will it take to make 4 batches of each cookie? Explain how you know.

_____
_____
_____
_____

Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

Options for Assessment – available online for Unit 5



Name:
5g3

Which shape is described by the clues below?

The shape has no right angles.
All of the sides are congruent.
The total of its angles is less than 360°

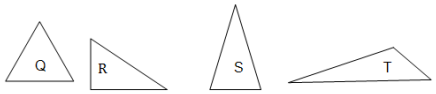
_____

What shape has two sets of parallel sides, two sets of equal sides, and four 90° vertices?

_____

Name
5g4

Use the figures below to answer the questions.



Which figure is an equilateral triangle? _____

Which figure is an isosceles triangle? _____

Which figure is a right triangle? _____

Which figure is a scalene triangle? _____

Explain your reasoning about each triangle.

_____
_____
_____
_____
_____
_____
_____
_____

Name
5g3

Jason made these 2 quadrilaterals on his geoboard.

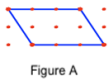


Figure A

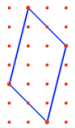


Figure B

Step A
What is the name of the quadrilateral in Figure A?

_____

Step B
Jason thinks both quadrilaterals have the same name. Use what you know about geometry to explain why this is true. Use words and/or numbers in your explanation.

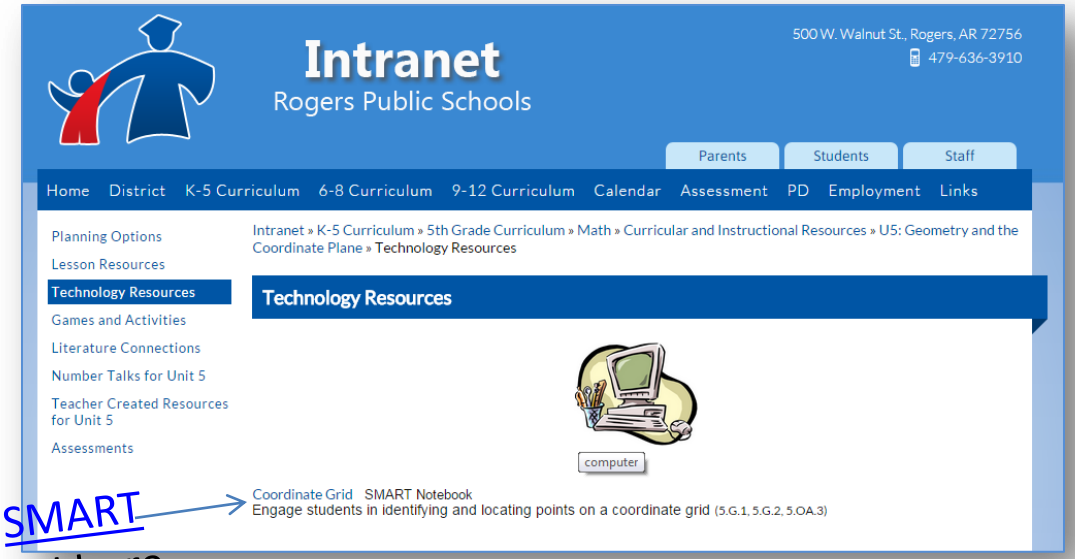
_____
_____
_____
_____
_____

Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

Week 1
Possible Lesson

Plan
DAILY LESSONS

Incorporate
TECHNOLOGY



Use the SMART Board linked here.

Goal: Today we will locate and identify points on a coordinate grid.

APK: Show picture of kids in a tree- Turn and Talk- How did they get there? Create Analogy with students.

New Learning: How to use a Coordinate Plane

Application: Students Act out the Coordinate Plane in small groups, then do independent practice.

Goal: Revisit Goal

5.G.1

Week 3
Possible Lesson

Plan
DAILY LESSONS

Incorporate
TECHNOLOGY

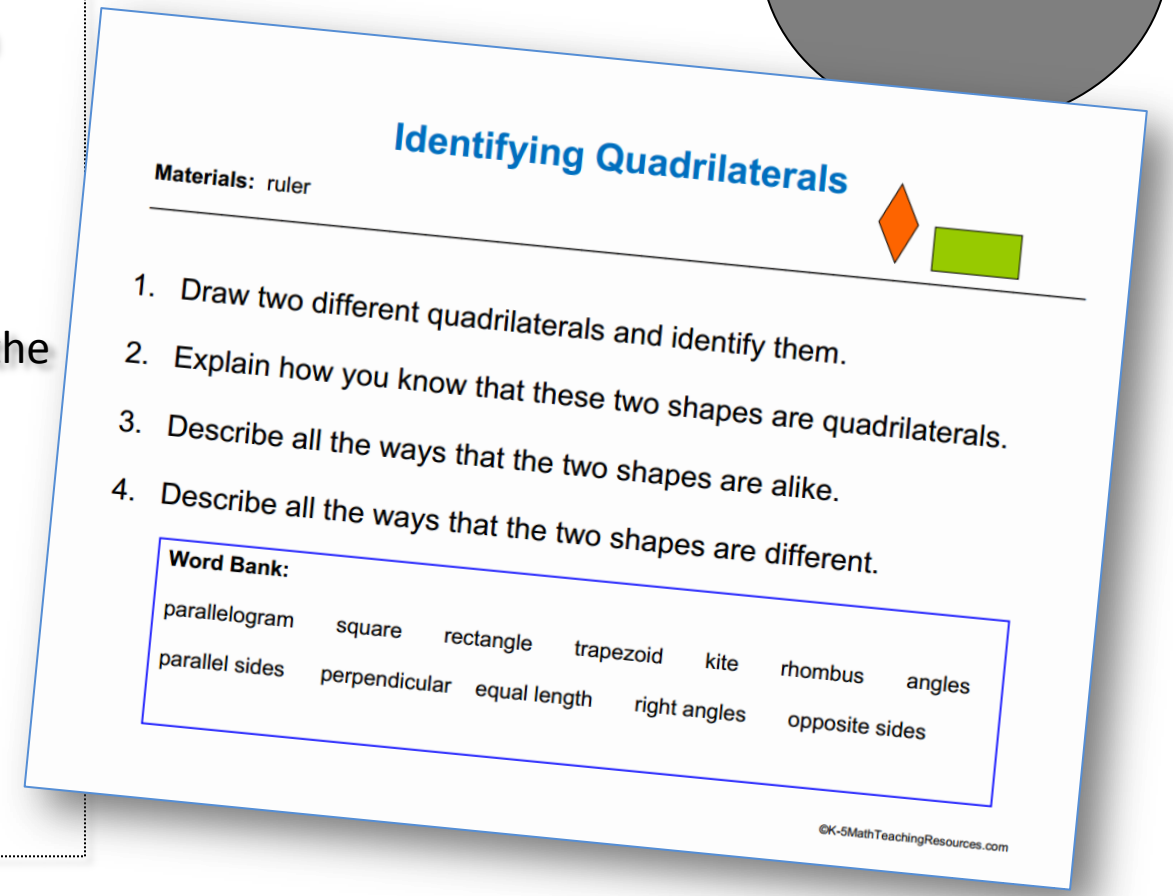
Goal: I can compare quadrilaterals based on their properties.

APK: Ask students to brainstorm how we classify shapes.

New Information: Have students take notes on the properties of the shapes listed in the word bank.

Application: Have students complete the activity in the task card.

Goal: Revisit Goal



5.G.1

OTHER LESSONS AND RESOURCES ARE AVAILABLE ONLINE.

Plan
DAILY
LESSONS

Incorporate
TECHNOLOGY

Teacher Created Resources pages!!!

RESOURCES

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