Mathematics Curriculum Guide

Plane Geometry ~ Senior Campus

2017-18

Topic 2: Coordinate Plane

Transfer Goals
1)   Demonstrate perseverance by making sense of a never-before-seen problem, developing a plan, and evaluating a strategy and solution.
2)   Effectively communicate orally, in writing, and using models (e.g., concrete, representational, abstract) for a given purpose and audience.
3)   Construct viable arguments and critique the reasoning of others using precise mathematical language.

Essential Questions:
- How can you write the equation of a line?
- How can you determine if two lines are parallel or perpendicular?
- How can you find the midpoint of a line segment?
- How can you find the length of a line segment or the distance between two points in the coordinate plane?
- How can you use the diagonals of a quadrilateral to show that it is a rectangle?
- How can the Distance, Slope, and Midpoint Formulas help you classify polygons in the coordinate plane?

Standards: G-GPE-5, G-GPE-4, G-GPE-7, G-CO-11

Timeframe: 3 weeks/15 days
Start Date: September 18, 2017
Assessment Dates: October 5-6, 2017

Time	Lesson/ Activity	Focus Questions for Lessons	Understandings	Knowledge	Skills	Resources
½ day		**Topic 2 Opening Activity (p. 203 #34 Reasoning)** Students do NOT need to solve this problem mathematically. They should engage in a discussion About the properties of the opposite lines that might indicate why they are parallel.				
1 ½ days)	**Lesson 3.7: Equations of Lines in the Coordinate Plane** SMP: 1, 3, 4 (pp. 189-196) **G-GPE-5**	**Focus Questions:** • How can you write the equation of a line? **Inquiry Question:** 3-7 Solve It! Pg 189	• You can write the equation of a line when you know certain facts about the line.	**Vocabulary:** Parallel lines, perpendicular lines (1st introduced on Pg 44 with notation), slope, positive slope, negative slope, zero slope, no slope, slope-intercept form	• Identify perpendicular lines using $\perp$ and box marked in diagram. • Identify slope o f a line given two coordinates on the line, a graphed line/segment, an equation in slope-intercept form, an equation in standard form • Write equation of a line in slope-intercept form given a graphed line, an equation in standard form, a point on the line and the slope of the line, two points on the line	**Common Core Problems:** #5, 6, 7, 42, 43, 48, 56, 57 **STEM Problems:** #48, 53 **Thinking Maps:** Double-bubble Map to compare Slope-Intercept Form with Point-Slope Form. *see notes at the end of this document

Common Core Practices

☐ Instruction in the Standards for Mathematical Practices   ☐ Use of Manipulatives   ☐ Project-based Learning

☐ Use of Talk Moves   ☐ Use of Technology   ☐ Thinking Maps

Time	Lesson/ Activity	Focus Questions for Lessons	Understandings	Knowledge	Skills	Additional Resources
2 days	**Lesson 3.8: Slopes of Parallel and Perpendicular Lines** SMP: 1, 3, 4 (pp. 197-204) **G-GPE-5**	**Focus Questions:** • How can you determine if two lines are parallel or perpendicular? **Inquiry Question:** 3-8 Solve It! Pg 197	• You can compare the slopes of lines to determine if they are parallel or perpendicular.	**Vocabulary:** slopes, parallel, perpendicular, opposite reciprocal **Concepts:** • Parallel lines have the same slope. • Perpendicular lines have opposite reciprocal slopes (product of their slopes is —1)	• Compare slopes of lines and segments to determine if they are parallel, perpendicular, or neither. • Write the equation of a line given a point on the line and the equation or graph of a line that is either parallel or perpendicular to it.	**Common Core Problems:** #5, 6, 27, 28, 29, 34, 39, 40, 41, 42, 44, 45, 46, 47 **STEM Problems:** #22 **Thinking Maps:** Double-bubble Map to compare slopes of parallel lines with slopes of perpendicular lines. *see notes at the end of this document
1 day	**Review Lessons 3.7, 3.8 & Quiz** Teacher Generated Quiz Use this day to assess student learning.					
2 days	**Lesson 1.7: Midpoint and Distance in the Coordinate Plane** SMP: 1, 3, 4 (pp. 50-56) **G-GPE-4**, and prepares for **G-GPE-7**	**Focus Questions:** • How can you find the midpoint of a line segment? • How can you find the length of a line segment or the distance between two points in the coordinate plane? **Inquiry Question:** 1-7 Solve It! Pg 50	• You can use formulas to find the midpoint and length of any segment in the coordinate plane.	**Vocabulary & Concepts:** • Midpoint Formula • Distance Formula	• Find the midpoint of a line segment given the coordinates of the endpoints or a graphed segment. • Find the length of a line segment / distance between two points given the coordinates of the endpoints or a graphed segment.	**Common Core Problems:** #4,5, 31-35, 45, 46, 47, 51, 52-56, 57, 58, 59, 60-61 **Thinking Maps:** Tree Map to record the Midpoint Formula and Distance Formula with examples. *see notes at the end of this document

Common Core Practices

☐ Instruction in the Standards for Mathematical Practices ☐ Use of Manipulatives ☐ Project-based Learning

☐ Use of Talk Moves ☐ Use of Technology ☐ Thinking Maps

☐ Note-taking ☐ Use of Real-world Scenarios

Time	Lesson/ Activity	Focus Questions for Lessons	Understandings	Knowledge	Skills	Additional Resources
1 day	**Lesson 6.2: Use Triangle Congruence to Prove Properties of Parallelograms** SMP: 1, 3, 4 (pp. 359-366) `G-CO-11`	**Focus Questions:** • What are the properties of parallelograms? **Inquiry Question:** 6-2 Pg 359	• Definition of parallelogram • Properties of parallelogram • A rectangle is a parallelogram with congruent diagonals.	**Vocabulary/Concepts:** Parallelogram, opposite sides, opposite angles, consecutive angles, diagonal	• Prove: opposite sides are congruent, opposite angles are congruent, diagonals bisect each other, and rectangles are parallelograms with congruent diagonals.	Focus on the Properties of Parallelograms. **Common Core Problems:** #6-8, 13, 28, 31-37
2 days	**Lesson 6.7: Polygons in the Coordinate Plane** SMP: 1, 3, 4, 8 (pp. 400-405) `G-GPE-7`	**Focus Questions:** • How can you use the diagonals of a quadrilateral to show that it is a rectangle? • How can the Distance, Slope, and Midpoint Formulas help you classify polygons in the coordinate plane? **Inquiry Question:** **6-7** Solve It! Pg 400	• The formulas for slope, distance and midpoint can be used to classify and to prove geometric relationships for figures in the coordinate plane.	**Vocabulary & Concepts:** • Midpoint Formula • Distance Formula • Slope Formula	• Use the Midpoint, Distance, and Slope Formula to classify polygons in the coordinate plane.	**Common Core Problems:** #3, 4, 31, 32, 33, 34, 35, 36, 37, 38, 39 **Thinking Maps:** Add new learnings from this lesson to the Tree Map created for Lesson 1.7.
1 day	**Topic 2 Performance Task** (p. 405 #39 Coordinate Geometry)					
2 days	**Review Topic 2 Concepts & Skills** Use Textbook Resources and/or Teacher Created Items					
2 days	**Topic 2 Assessment** (Created and provided by PUSD)					

<u>**Additional Notes About This Unit's Lessons**</u>

*Topic 2 – Coordinate Plane (15 days)

Lesson 3.7 – Equations of Lines in the Coordinate Plane (1 days)
Focus on terms such as parallel lines, perpendicular lines (1st introduced on Pg 44 with notation), slope, positive slope, negative slope, zero slope, no slope, slope-intercept form.
Identify perpendicular lines using "is perpendicular to" symbol and box marked in diagram.
Identify slope o f a line given two coordinates on the line, a graphed line/segment, an equation in slope-intercept form, an equation in standard form.
Write equation of a line in slope-intercept form given a graphed line, an equation in standard form, a point on the line and the slope of the line, two points on the line.
Teachers may want to show construction of parallel lines using http://www.mathopenref.com/constparallel.html
Teachers may want to show construction of perpendicular lines using
http://www.mathopenref.com/constperpextpoint.html

Lesson 3-8 – Slopes of Parallel and Perpendicular Lines (1 days)
Focus on the concepts that parallel lines have the same slope and perpendicular lines have opposite reciprocal slopes (product of their slopes is -1).
Compare slopes of lines and segments to determine if they are parallel, perpendicular, or neither.
Write the equation of a line given a point on the line and the equation of a line that is either parallel or perpendicular to it.

Lesson 1-7 – Midpoint and Distance in the Coordinate Plane (1 days)
Focus on the midpoint formula and distance formula.
Find the midpoint of a line segment given the coordinates of the endpoints or a graphed segment.
Find the length of a line segment / distance between two points given the coordinates of the endpoints or a graphed segment.