Blackwater Community School
Curriculum Map 2015-2016

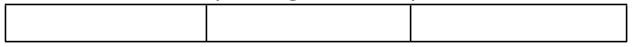
Fifth Grade Quarter 4

Module 6: Problem Solving with the Coordinate Plane

Approximately 40 Days – Begin around March 22nd

In this 40-day module, students develop a coordinate system for the first quadrant of the coordinate plane and use it to solve problems. Students use the familiar number line as an introduction to the idea of a coordinate, and they construct two perpendicular number lines to create a coordinate system on the plane. Students see that just as points on the line can be located by their distance from 0, the plane's coordinate system can be used to locate and plot points using two coordinates. They then use the coordinate system to explore relationships between points, ordered pairs, patterns, lines and, more abstractly, the rules that generate them. This study culminates in an exploration of the coordinate plane in real world applications.

Major Clusters:	
Supporting Clusters:	5.OA.A – Write and interpret numerical expressions. 5.OA.B – Analyze patterns and relationships. 5.G.A – Graph points on the coordinate plane to solve real-world and mathematical problems.
Vocabulary	Axis, coordinate, coordinate pair, coordinate plane, ordered pair, origin, quadrant

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
5.OA	A	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.* *5.MP.1.* Make sense of problems and persevere in solving them. *5.MP.2.* Reason abstractly and quantitatively. *5.MP.7.* Look for and make use of structure. *5.MP.8.* Look for and express regularity	Students use their understanding of operations and grouping symbols to write expressions and interpret the meaning of a numerical expression. **Examples**: • Students write an expression for calculations given in words such as "divide 144 by 12, and then subtract 7/8." They write (144 ÷ 12) – 7/8. • Students recognize that 0.5 x (300 ÷ 15) is ½ of (300 ÷ 15) without calculating the quotient. Students use tape diagrams to represent simple expressions. **Example:** • Show a tape diagram to represent 3 times the sum of 26 and 4.  26 + 4	**Engage NY** M6 Lessons 7-12 **enVision** Topic 8

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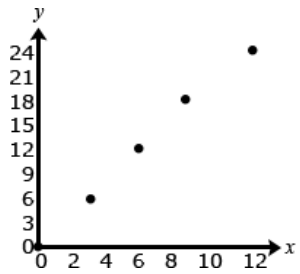
5.OA	B	3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting 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.* *5.MP.2.* Reason abstractly and quantitatively. *5.MP.7.* Look for and make use of structure.	• Use the rule "add 3" to write a sequence of numbers. Starting with a 0, students write 0, 3, 6, 9, 12, . . . • Use the rule "add 6" to write a sequence of numbers. Starting with 0, students write 0, 6, 12, 18, 24, . . . After comparing these two sequences, the students notice that each term in the second sequence is twice the corresponding terms of the first sequence. One way they justify this is by describing the patterns of the terms. Their justification may include some mathematical notation (See example below). A student may explain that both sequences start with zero and to generate each term of the second sequence he/she added 6, which is twice as much as was added to produce the terms in the first sequence. Students may also use the distributive property to describe the relationship between the two numerical patterns by reasoning that 6 + 6 + 6 = 2 (3 + 3 + 3). o 0, $\overset{+3}{}$ 3, $\overset{+3}{}$ 6, $\overset{+3}{}$ 9, $\overset{+3}{}$12, . . . o 0, $\overset{+6}{}$ 6, $\overset{+6}{}$ 12, $\overset{+6}{}$18, $\overset{+6}{}$ 24, . . . Once students can describe that the second sequence of numbers is twice the corresponding terms of the first sequence, the terms can be written in ordered pairs and then graphed on a coordinate grid. They should recognize that each point on the graph represents two quantities in which the second quantity is twice the first quantity. Ordered pairs (0, 0) (3, 6) (6, 12) (9, 18)  	**Engage NY** M6 Lessons 7-12, 18-20 **enVision** Topic 8

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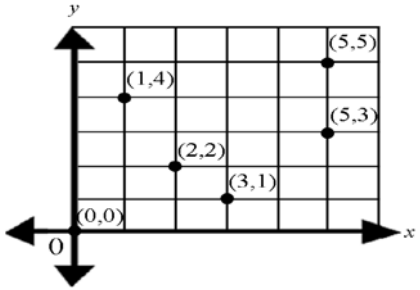
5.G	A	1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that 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.MP.4.* Model with mathematics. *5.MP.6.* Attend to precision. *5.MP.7.* Look for and make use of structure.	• Students can use a classroom size coordinate system to physically locate the coordinate point (5, 3) by starting at the origin point (0,0), walking 5 units along the x axis to find the first number in the pair (5), and then walking up 3 units for the second number in the pair (3). The ordered pair names a point in the plane.  • Graph and label the points below in a coordinate system. o A (0, 0) o B (5, 1) o C (0, 6) o D (2.5, 6) o E (6, 2) o F (4, 1) o G (3, 0)	**Engage NY** M6 Lessons 1-17 **enVision** Topic 16
5.G	A	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. *5.MP.1*. Make sense of problems and persevere in solving them. *5.MP.2*. Reason abstractly and quantitatively. *5.MP.4.* Model with mathematics. *5.MP.5.* Use appropriate tools strategically. *5.MP.6*. Attend to precision. *5.MP.7.* Look for and make use of structure.	• Sara has saved $20. She earns $8 for each hour she works. o If Sara saves all of her money, how much will she have after working 3 hours? 5 hours? 10 hours? o Create a graph that shows the relationship between the hours Sara worked and the amount of money she has saved. o What other information do you know from analyzing the graph? • Use the graph below to determine how much money Jack makes after working exactly 9 hours.	**Engage NY** M6 Lessons 13-20 **enVision** Topic 16

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