Topic B

Patterns in the Coordinate Plane and Graphing Number Patterns from Rules

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

Focus Standard:	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.*
	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.*
	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 plan 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).
Instructional Days:	6	
Coherence -Links from:	G4–M4	Angle Measure and Plane Figures
	G4–M7	Exploring Measurement with Multiplication
-Links to:	G6–M1	Ratios and Unit Rates
	G6–M3	Rational Numbers
	G6–M4	Expressions and Equations

In Topic B, students plot points and use them to draw lines in the plane (**5.G.1**). Students begin by investigating patterns relating the x- and y-coordinates of the points on the line and reasoning about the patterns in the ordered pairs, which lays important groundwork for Grade 6 work with proportional reasoning**.** Topic B continues as students use given rules (e.g., multiply by 2, then add 3) to generate coordinate pairs, plot points, and investigate relationships. Patterns in the resultant coordinate pairs are analyzed to discover that such rules produce collinear sets of points, or lines. Students next generate two number patterns from two given rules, plot the points, and analyze the relationships within the sequences of the ordered pairs and the graphs (**5.OA.3**). Patterns continue to be the focus as students analyze the effect on the steepness of the line when the second coordinate is produced through an addition rule as opposed to a multiplication rule (**5.OA.3**). They also create rules to generate number patterns, plot the points, connect those points with lines, and look for intersections.

A Teaching Sequence Towards Mastery of Patterns in the Coordinate Plane and Graphing Number Patterns from Rules	
Objective 1:	**Plot points, use them to draw lines in the plane, and describe patterns within the coordinate pairs. (Lesson 7)**
Objective 2:	**Generate a number pattern from a given rule, and plot the points. (Lesson 8)**
Objective 3:	**Generate two number patterns from given rules, plot the points, and analyze the patterns. (Lesson 9)**
Objective 4:	**Compare the lines and patterns generated by addition rules and multiplication rules. (Lesson 10)**
Objective 5:	**Analyze number patterns created from mixed operations. (Lesson 11)**
Objective 6:	**Create a rule to generate a number pattern, and plot the points. (Lesson 12)**