



## Topic C

## Slope and Equations of Lines

## 8.EE.B.5, 8.EE.B.6

<b>Focus Standards:</b>	8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i>
	8.EE.B.6	Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$ .
<b>Instructional Days:</b>	9	
<b>Lesson 15:</b>	The Slope of a Non-Vertical Line (P) <sup>1</sup>	
<b>Lesson 16:</b>	The Computation of the Slope of a Non-Vertical Line (S)	
<b>Lesson 17:</b>	The Line Joining Two Distinct Points of the Graph $y = mx + b$ Has Slope $m$ (S)	
<b>Lesson 18:</b>	There Is Only One Line Passing Through a Given Point with a Given Slope (P)	
<b>Lesson 19:</b>	The Graph of a Linear Equation in Two Variables Is a Line (S)	
<b>Lesson 20:</b>	Every Line Is a Graph of a Linear Equation (P)	
<b>Lesson 21:</b>	Some Facts About Graphs of Linear Equations in Two Variables (P)	
<b>Lesson 22:</b>	Constant Rates Revisited (P)	
<b>Lesson 23:</b>	The Defining Equation of a Line (E)	

Topic C begins with students examining the slope of non-vertical lines. Students relate what they know about unit rate in terms of the slope of the graph of a line (**8.EE.B.5**). In Lesson 16, students learn the formula for computing slope between any two points. Students reason that any two points on the same line can be used to determine slope because of what they know about similar triangles (**8.EE.B.6**). In Lesson 17, students transform the standard form of an equation into slope-intercept form. Further, students learn that the slope of a line joining any two distinct points is the graph of a linear equation with slope,  $m$ . In Lesson 18, students investigate the concept of uniqueness of a line and recognize that if two lines have the same slope and a common point, the two lines are the same.

<sup>1</sup>Lesson Structure Key: **P**-Problem Set Lesson, **M**-Modeling Cycle Lesson, **E**-Exploration Lesson, **S**-Socratic Lesson

Lessons 19 and 20 prove to students that the graph of a linear equation is a line and that a line is a graph of a linear equation. In Lesson 21, students learn that the  $y$ -intercept is the location on the coordinate plane where the graph of a linear equation crosses the  $y$ -axis. Also in this lesson, students learn to write the equation of a line given the slope and a point. In Lesson 22, constant rate problems are revisited. Students learn that any constant rate problem can be described by a linear equation in two variables where the slope of the graph is the constant rate (i.e., rate of change). Lesson 22 also presents students with two proportional relationships expressed in different ways. Given a graph and an equation, students must use what they know about slope to determine which of the two has a greater rate of change. Lesson 23 introduces students to the symbolic representation of two linear equations that would graph as the same line.