Trimester:	Unit Title:	Recommended Instructional Days:
2	**Graphing and Writing Linear Equations**	**18-22 days**

Domain

Strand:

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. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*

8.EE.B.6 Use similar triangles to explain why the slope m is the 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.

8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Key:

Major Cluster **Supporting Cluster** **Additional Cluster** **Climate Change Opportunity**

Progress Indicators: ◊ Tests ◊ Homework / Classwork ◊ Projects ◊ Formative Assessments ◊ Summative Assessments

Mathematical Practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Questions:
How can you use tables, graphs, and equations to represent proportional relationships?
How do you find a rate of change or a slope?
What does the slope tell you about the line?
How do you interpret the unit rate as slope?
How can you determine the slope and the y-intercept of a line?
How can you graph a line using the slope and y-intercept?
What pieces of information are needed to write an equation for a linear relationship?
How do you write an equation to model a linear relationship given a graph or a description?
How do you write an equation to model a linear relationship given a table?
How does the standard form of a linear equation help your graph the line?

Essential Understandings:
Slope of linear relationships can be found from graphs, tables, and ordered pairs.
The slope of a linear graph is the same between any two points on the line.
Linear relationships can be classified as either proportional or non-proportional based on certain characteristics.
The rate of change and initial value of linear relationships can be found and expressed in multiple representations (graphs, tables, descriptions)

Vocabulary:
- linear equation
- solution of a linear equation
- slope
- x-intercept
- y-intercept

**Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts. When students encounter a new definition, encourage them to write in their Big Ideas Student Journals. They will revisit these definitions during the Chapter Review.*

Suggested Activity Descriptions:
- STEAM Video *Hurricane* and performance task *Anatomy of a Hurricane*
- Chapter Exploration TB page 141 Creating Graphs
- Chapter Explorations TB page 147 Measuring the Steepness of a Line and Using Right Triangles

- Chapter Explorations TB page 155 Using a Ratio Table to Find Slope and Deriving an Equation
- Chapter Exploration TB page 161 Deriving an Equation
- Chapter Exploration TB page 167 Using Intercepts
- Chapter Explorations TB page 173 Writing Equations of Lines and Interpreting the Slope and the y-intercept
- Chapter Explorations TB page 179 Deriving an Equation and Writing an Equation
- Puzzle Time for each section (teacher resources)
- Enrichment and Extension Worksheets
- Big Ideas Math Game Closet Tic - Tac - Toe
- ***Climate Change:*** Students may solve real-world problems involving creating and solving equations comparing temperature changes over the decades.

Interdisciplinary Connections:
Science:

1. Example # 3 TB page 144 *Modeling Real Life*: The wind speed y (in miles per hour) of a tropical storm is y = 2x + 66…
2. Example # 4 TB page 151 *Modeling Real Life:* The table shows the distance y (in miles) of a space probe from a comet x minutes after it begins its approach…
3. Example 2 TB page 157 Writing and Using an Equation: The wright y of an object on Titan, one of Saturn's moons, is proportional…
4. Question # 8 TB page 158 The speed of sound in air is 343 meters per second…
5. Question # 18 TB page 160 *Dig Deeper:* The graph relates the temperature change y (in degrees Fahrenheit) to the altitude change x (in thousand feet)...
6. Example # 3 TB page 176 *Modeling Real Life:* Engineers are digging a 3500-foot long tunnel at a constant rate…

Physical Education:

1. Question # 14 TB page 144: The total cost y (in dollars) to join a cheerleading team and attend x competitions is represented by the equation $y = 10x + 50$….
2. Question # 12 TB page 151: You in-line skate from an elevation of 720 feet to an elevation of 750 feet in 30 minutes…
3. Example 3 TB page 158 *Modeling Real Life:* The distance y (in meters) that a four-person ski lift travels in x seconds …
4. Question # 14 page 160 *Modeling Real Life:* The cost y (in dollars) to rent a kayak is proportional to the number x of hours…
5. Question # 33 TB page 166 *Problem Solving:* A skydiver parachutes to the ground …
6. Question # 24 TB page 172 *Problem Solving:* A group of friends go scuba diving…
7. Question # 12 TB page 182 *Dig Deeper:* You and your friend begin to run along a path at different constant speeds…

Technology:

1. Question # 23 TB page 145 *Modeling Real Life:* The equation $y = 20$ represents the cost y (in dollars) for sending x text messages a month…
2. Question # 33 TB page 146 *Dig Deeper:* One second of video on your cell phone uses the same amount of energy as two pictures…

3. Question # 34 TB page 166 *Dig Deeper:* Six friends create a website…

Language Arts:

1. Vocabulary Question #6 TB page 150 What does it mean for a line to have a slope of 4?
2. Question # 5 TB page 163 *In your own words*: Consider the graph of the equation $y = mx + b$. (a). How does changing the value of m affect the graph of the equation? (b). How does changing the value of b affect the graph of the equation?
3. Writing Question # 10 TB page 169: Describe two ways to graph the equation $4x + 2y = 6$.

Spot Light On: Climate Change Using the STEAM video and performance task on hurricanes, students can discuss and theorize how climate change in recent years has had an effect on storms throughout the world. Students can research hurricanes and create a table comparing the atmospheric pressure inside the hurricane.

Social and Emotional Learning: *Competencies*	**Social and Emotional Learning: *Sub-Competencies***
SEL Competencies: • Self-Awareness • Social Awareness • Self-Management • Relationship Skills • Responsible Decision-Making	• Recognizing the importance of self-confidence in handling daily tasks and challenges. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Identify and apply ways to persevere through alternative methods to achieve goals. • Utilize positive communication and social skills to interact effectively with others. • Develop, implement, and model effective problem solving and critical thinking skills.
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Teacher Observations • Exit Tickets • Quizzes • Self Assessments • Big Ideas Student Journals • Homework/Classwork • Teacher Created Assessments • Progress Monitoring Items • Formative Assessment Tips in Big Ideas Teacher Edition	**Benchmarks & Summative Assessments:** • Chapter/Unit Assessments • Standardized Tests • Project-based Assessments • Benchmark Tests

Differentiated Student Access to Content: Teaching and Learning *Resources/Materials*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Big Ideas Student Journal, Dynamic Assessment System, iReady, Khan Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core, Desmos	Reteach worksheets, Extra Practice worksheets, Math manipulatives, Scaffolding Instructions in each section of textbook, Tutorial Videos, Skills Review Handbook, Skills Trainer	Dictionary for native language, Video tutorial in native language, ELL Support in each section of Big Ideas Teacher's Edition	ST Math Challenge Objectives, G&T tasks, Enrichment and Extension worksheets, Art of Problem Solving, Leveled assessments
Supplemental Resources			
Technology: • Chromebooks • Scientific Calculators • Online math manipulatives **Other:** • Google Classroom, Google Meets, Schoology, Interactive Workbooks • Illustrative Mathematics • insidemathematics.org • National Library of Virtual Manipulatives			
Differentiated Student Access to Content: Recommended *Strategies & Techniques*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics.	Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit,	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related content.

	provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept(s):** Planning and Budgeting	
	Core Ideas:	A budget aligned with an individual's financial goals can help prepare for life events.
	Performance Expectation/s:	9.1.8.PB.1: Predict future expenses or opportunities that should be included in the budget planning process.
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	**X**	Standards in Action: *Climate Change*