Math 7 Plus Unit 5 Overview: Proportional Reasoning and Slope

Unit Outcomes
At the end of this unit, your student should be able to:

- ✓ Extend their understanding of proportional relationships to similar figures and scale
- ✓ Use their understanding of graphing proportional relationships (and constant of proportionality) to determine the slope of lines

Key Vocabulary
Terms to deepen the student's understanding

- ✓ Coefficient
- ✓ Congruent
- ✓ Constant of Proportionality
- ✓ Corresponding
- ✓ Dimensions
- ✓ Distributive Property
- ✓ Equivalent Ratios
- ✓ Horizontal
- ✓ Indirect Measurement
- ✓ Like Terms
- ✓ Number line diagram
- ✓ Proportion
- ✓ Proportional Relationship
- ✓ Rate
- ✓ Rate of Change
- ✓ Ratio Scale
- ✓ Scale Drawing
- ✓ Scale Factor
- ✓ Scale Model
- ✓ Similar Figures
- ✓ Similarity
- ✓ Similar Triangles
- ✓ Slope
- ✓ Slope-Intercept Form
- ✓ Tape diagram
- ✓ Unit Rate
- ✓ Vertical
- ✓ Y-intercept

Key Standards Addressed
Connections to Common Core/NC Essential Standards

7.G.1 - Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

7.RP.1 (Review) - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*

7.RP.2 (Review) - Recognize and represent proportional relationships between quantities.

7.RP.2a.- Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

7.RP.2b.- Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

7.RP.2c.- Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*

Where This Unit Fits
Connections to prior and future learning

Coming into this unit, students should have a strong foundation in:

- ✓ Proportional reasoning
- ✓ Finding unit rates

This unit builds to the following future skills and concepts:

- ✓ Proving figures to be similar or congruent shapes using proportional reasoning
- ✓ Linear equations
- ✓ Systems of linear equations
- ✓ Linear inequalities
- ✓ Systems of linear inequalities
- ✓ Graphing quadratic equations
- ✓ Translations of functions

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7.RP.2d. - Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. 8.EE.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.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*.	
Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
✓ Teaching videos made by Wake county teachers ✓ WCPSS YouTube Channel – Math Playlist ✓ Determining If Figures are Similar ✓ Similar Figures – *Be sure to work through all four pages. They build on each other and provide more insight on the topic.* ✓ Finding a Scale Factor for Similar Figures ✓ Find Missing Side Lengths of Similar Figures Using Scale Factor ✓ Constant of Proportionality Found in Tables ✓ Constant of Proportionality Found in Graphs ✓ Understanding Rates and Unit Rates ✓ Finding Unit Rates – *The video that follows the first video is also helpful to understand Unit Price and then it finishes with practice questions for both concepts.* ✓ Indirect Measurement and Similar Figures ✓ Using Similar Figures to Find and Understand Slope - *This entire series of videos really allows students to see the concept multiple times and ends with a self assessment.* ✓ Understanding Slope ✓ Practice Identifying the Y-Intercept ✓ Graphing a Linear Equation in Slope-Intercept Form ✓ Writing Linear Equations	✓ What are three real-life experiences where a person would need to know how to find a unit rate? ✓ What real-world situations or occupations could use the idea of slope to solve problems? ✓ Does finding the rate of change for just one pair of points mean that the rate of change is the same for all of the data?