

Richmond Public Schools
Curriculum Framework
Algebra, Functions, and Data Analysis

Strand: Algebra Functions	
AFDA.5 The student will determine optimal values in problem situations by identifying constraints and using linear programming techniques.	
Suggested Pacing	
10 Class Periods	
Spiraling Standards	
A.4-The student will solve d) systems of two linear equations in two variables algebraically e) practical problems involving equations and systems of equations. A.5-The student will d) represent the solution to a system of inequalities graphically.	
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> • What do the various regions mean, including the feasibility region, with regard to the real-world situation being illustrated graphically? • How does the objective function relate to the real-world situation? • How can the solution to a system of linear equations be interpreted in terms of the problem's context? 	Student may have trouble solving systems of equations and inequalities with paper and pencil (particularly more than 2 equations) Students may misidentify solutions in the feasible region
Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> • Linear programming models an optimization process. • A linear programming model consists of a system of constraints and an objective quantity that can be maximized or minimized. 	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to <ul style="list-style-type: none"> • Model practical problems with systems of linear inequalities.

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<ul style="list-style-type: none"> Any maximum or minimum value will occur at the vertices of a feasible region. 	<ul style="list-style-type: none"> Solve systems of no more than four linear inequalities with pencil and paper and using a graphing utility. Solve systems of no more than four equations algebraically and graphically. Identify the feasible region of a system of linear inequalities. Identify the coordinates of the vertices of a feasible region. Determine and describe the maximum or minimum value for the function defined over a feasible region.
Vocabulary	
<p>linear programming, optimization, system of constraints, objective quantity, maximize, minimize, vertices, feasible region, system of linear inequalities, system of equations, coordinates</p>	<p>Textbook Eureka Math Algebra 1 Module 1 Topic D Lesson 27</p>
Assessment	
<p>Classroom Teacher Developed Assessments</p>	<p>Notes Solving Non-Linear Systems of Equations Linear Programming and Systems of Inequalities (MathBits) Linear Programming (Purple Math)</p> <p>Resources</p> <ul style="list-style-type: none"> Print Coach book Algebra 1, Virginia edition, Lesson(s) 15-16 page(s) 72-93 Coach book Algebra 2, Virginia edition, Lesson(s) 18-20 page(s) 169-212, 228-236 Technology-based Linear and Quadratic Systems (Khan Academy) <p>Station Activities</p>

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	Linear Programming Matching (Math Guide) Regions: Writing Inequalities (Math Guide)
Cross-Curricular Connections	Tiered Differentiations
<p>Science-Science may need to develop and maintain parameters for experimentation.</p> <p>Business-Businesses may need to use linear inequalities as predictions of ranges they may need to stay in when developing, producing, marketing product.</p>	<p>Tier 1-Students can be given graphs and have to develop the inequalities to determine the feasibility region.</p> <p>Tier 2-Students can be given inequalities that must be graphed to determine the feasibility region.</p> <p>Tier 3-Students can be given both graphs and inequalities to help determine the feasibility region.</p>