Mathematics
Algebra II: CP
Unit 2: Linear Systems

Essential Understandings	▪ Linear systems can be used to model real-life situations.
Essential Questions	▪ What are the properties of Algebra and how are these used to solve linear systems? ▪ What types of data are modeled by linear systems? ▪ How do you solve a system of linear equations? ▪ How do you solve and graph linear inequalities?
Essential Knowledge	▪ The solution to a linear system is the point of intersection of the lines. ▪ Linear systems can be solved by graphing. ▪ Linear systems can be solved by substitution. ▪ Linear systems can be solved by linear combinations. ▪ Linear system can be solved using matrix algebra. ▪ Systems may have no solution or infinitely many solutions.
Vocabulary	▪ <u>Terms</u>: o linear system of equations, point of intersection, ordered pairs, substitution, elimination, independent, dependent and inconsistent system, linear programming, linear system of inequalities
Essential Skills	▪ Graph linear equations. ▪ Use Algebraic properties and the substitution principle. ▪ Use the technique of linear combinations. ▪ Solve a system of linear equations. ▪ Graph systems of linear inequalities and determine the feasible region.

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Related Maine Learning Results	<u>Mathematics</u>
	A. Number
	  Real Number
	  A1.Students will know how to represent and use real numbers.
	    a. Use the concept of nth root.
	    b. Estimate the value(s) of roots and use technology to approximate them.
	    c. Compute using laws of exponents.
	    d. Multiply and divide numbers expressed in scientific notation.
	    e. Understand that some quadratic equations do not have real solutions and that there exist other number systems to allow for solutions to these equations.
	B. Data
	  Measurement and Approximation
	  B1.Students understand the relationship between precision and accuracy.
	    a. Express answers to a reasonable degree of precision in the context of a given problem.
	    b. Represent an approximate measurement using appropriate numbers of significant figures.
	    c. Know that most measurements are approximations and explain why it is useful to take the mean of repeated measurements.
	D. Algebra
	  Symbols and Expressions
	  D1.Students understand and use polynomials and expressions with rational exponents.
	    a. Simplify expressions including those with rational numbers.
	    b. Add, subtract, and multiply polynomials.
	    c. Factor the common term out of polynomial expressions.
	    d. Divide polynomials by (ax+b).

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Related Maine Learning Results	Equations and Inequalities
	D2. Students solve families of equations and inequalities.
	    a. Solve systems of linear equations and inequalities in two unknowns and interpret their graphs.
	    b. Solve quadratic equations graphically, by factoring in cases where factoring is efficient, and by applying the quadratic formula.
	    c. Solve simple rational equations.
	    d. Solve absolute value equations and inequalities and interpret the results.
	    e. Apply the understanding that the solution(s) to equations of the form $f(x) = g(x)$ are x-value(s) of the point(s) of intersection of the graphs of $f(x)$ and $g(x)$ and common outputs in table of values.
	    f. Explain why the coordinates of the point of intersection of the lines represented by a system of equations is its solution and apply this understanding to solving problems.
	D3. Students understand and apply ideas of logarithms.
	    a. Use and interpret logarithmic scales.
	    b. Solve equations in the form of $x + b^y$ using the equivalent form $y = \log_b x$.
	
	Functions and Relations
	D4. Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques.
	    a. Recognize the graphs and sketch graphs of the basic functions.
	    b. Apply functions from these families to problem situations.
	    c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values.
	    d. Use the concepts of average rate of change (table of values) and increasing and decreasing over intervals, and use these characteristics to compare functions.
	D5. Students express relationships recursively and use iterative methods to solve problems.
	    a. Express the (n+1)st term in terms of the nth term and describe relationships in terms of starting point and rule followed to transform one terms to the next.
	    b. Use technology to perform repeated calculations to develop solutions to real life problems involving linear, exponential, and other patterns of change.

Sample Lessons And Activities	▪ Solve systems of linear equations using a variety of techniques. These include graphing, substitution, and linear combinations. ▪ Solve linear programming problems by finding a maximum or minimum value of a function that satisfies a given set of condition

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	known as constraints.
Sample Classroom Assessment Methods	▪ Evaluate homework. ▪ Quizzes. ▪ Chapter test.

Sample Resources	▪ <u>Publications:</u>
	   o McDougal Littell Algebra 2
	▪ <u>Other Resources:</u>
	   o Graphing calculators.
	   o The A+ learning system for remediation.