Curriculum Units and Learning Outcomes

Content Area: Honors Algebra I	**Grade Level: 9**
Unit 3: Linear Systems	

Unit Summary: Student will learn methods for solving, writing and interpreting solutions of linear systems of equations and inequalities. Parallel and perpendicular lines are discussed. Applications and real-world content will be embedded throughout the unit. The elimination method will be extended to solve specific quadratic systems (not requiring factoring or quadratic formula), as time permits.

Massachusetts Standards:

- **A.CED.2, 3**
  Create equations that describe numbers or relationships.
  2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  3. Represent constraints by linear equations or inequalities, and by systems of linear equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.

- **A.REI.6, 12**
  Solve systems of equations.
  6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
  Represent and solve equations and inequalities graphically.
  12. Graph the solutions of a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set of a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

- **F-IF.C.7**
  7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*

- **A.REI.11, D12**
  Represent and solve equations and inequalities graphically.

11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions and make tables of values. Include cases where $f(x)$ and/or $g(x)$ are linear and exponential functions.
12.d.Graph the solutions of a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set of a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

- **N.Q.1, 2**
  Reason quantitatively and use units to solve problems.
  1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
  2. Define appropriate quantities for the purpose of descriptive modeling.

Enduring Understandings:

- The solution to a system can be found graphically or algebraically
- The solution to a system of equations or inequalities represents the point(s) that are solutions to all equations / inequalities in that system.

Essential Questions:

- What does it mean to be a solution to a (linear) system of equations?
- How can we create algebraic models to solve problems?

Students will demonstrate KNOWLEDGE of:

- Methods of solving a system of linear equations.
- The difference between parallel and perpendicular lines and how to interpret their slopes
- Writing the equation of a line
- How and why to shade the graph of a linear system of inequalities

Students will be SKILLED at:

- Solving a systems by methods of graphing, substitution and elimination.
- Classifying and identifying solutions to special systems
- Modeling a word problem using a system of linear equations.
- Writing systems of parallel and perpendicular lines.
- Graphing and writing a system of linear inequalities

Estimated Duration: 3 weeks