Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Intermediate Algebra	Unit 1 Title:	Linear Inequalities and Systems of Linear Inequalities	Grade Level(s):	9
Assessed Trimester:	Trimester A	Pacing:	14-16 Days	Date Created:	1/27/2013	Last Revision Date:	7/26/2014

Course Understandings: *Students will understand that:*

A. Relationships exist between real-world situations, mathematical equations, inequalities and graphs for linear, exponential, absolute value, radical, and polynomial functions.

B. Equations and inequalities can be categorized by form and that each form has specific processes to consider when solving and graphing.

C. The context of a problem is important in recognizing the reasonableness of a solution.

F. There are benefits and limitations in the use of calculators and other technology to solve mathematical situations.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

Minnesota State/Local/Technology Standard(s) addressed (2007):

- **Standard (9.2.2.# - Modified):** Recognize linear and other common functions in real-world and mathematical situations. Represent these functions with tables, verbal descriptions, symbols and graph. Solve problems involving these functions, and explain results in the original context.
  Benchmark:
  9.2.2.1 Represent and solve problems in various contexts using linear and quadratic functions.
  9.2.2.3 Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.

- **Standard (9.2.4.# - Modified):** Represent real-world and mathematical situations using equations and inequalities involving linear functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.
  Benchmark:
  9.2.4.4 Represent relationships in various contexts using systems of linear inequalities; solve them graphically. Indicate which parts of the boundary are included in and excluded from the solution set using solid and dotted lines.
  9.2.4.5 Solve linear programming problems in two variables using graphical methods.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- Design a solution for a real-world situation requiring the application of linear programming. (i.e. planning... prom, a fund-raising project, an on-line store, etc.)

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● Real-world situations can be represented as a linear programming problem and demonstrate an understanding of how to find reasonable solutions.	**Students will keep considering:** ● Where can I find systems of inequalities in the real-world? ● How do the skills and knowledge that we're learning influence the task of making decisions and planning a... prom, a fund-raising project, an on-line store, etc.?

Acquisition

Knowledge - Students will:

- Recognize situations that can be modeled by linear inequalities
- Understand various forms (slope-intercept, standard, point-slope) of linear equations and inequalities
- Understand what a solid or dotted line represents for inequalities
- Recognize the difference between linear equations and inequalities graphically, symbolically and in real-world situations
- Know that the maximum or minimum value for the objective function will come from a vertex or edge of the feasible region.

Reasoning - Students will:

- Analyze the real-world situation to determine the variables, write the constraints and identify the objective function.
- Organize information given by various forms of linear situations (words, graphs, tables and symbols).

Skills - Students will:

- Graph various forms (slope-intercept, standard, point-slope) of linear equations and inequalities
- Model real world situations with linear inequalities
- Solve systems of inequalities graphically
- Demonstrate knowledge of real-life situations with linear applications
- Solve problems using systems of linear equations
- Solve linear programming problems in 2 variables using graphical methods
- Evaluate linear functions at specific values
- Demonstrate the use of graphing technology

Common Misunderstandings

- Students often forget to substitute initial variable back into original equation to find 2nd variable
- Linear combination – students forget to multiply 'factor' by ALL terms of the equation (forget the constant)
- Linear combination – students forget to 'rearrange' variables into 'standard' form
- Students have difficult time interpreting the number of solutions when solving a system (simplify to 7 = 7 or 5 = 8 representing no solution or infinitely many solutions, etc.)
- Students have a difficult time acknowledging that x = 0… is a true and honest possible value for a solution… they misinterpret this to be "no solution"

Essential new vocabulary

- Constraints
- Feasible region
- Linear inequality
- Linear programming
- Objective function
- Optimization
- Vertices