



ALGEBRA I

This course is designed to continue student investigations of functions and algebra. In this Algebra I course students will continue their investigations by progressing to more abstract representations such as linear and nonlinear functions, algebraic expressions, equations and inequalities. Students will recognize, describe, and generalize patterns and build mathematical models to describe, interpret, and predict the behavior of real-world phenomenon. Students will understand that algebraic processes are important tools that students can use throughout their lives.

Content Strand:

Functions and Algebra

Process Strands:

Problem solving, reasoning, and proof
Communications, connections, and representations

Major Concepts:

The Language of Algebra

Real numbers	Absolute Value
Variables	Polynomials
Expressions	Exponents
Patterns	Radicals

Patterns, Functions and Relations

Linear Equations	Slope/ Rates of Change
Quadratics	System of Equations
Inequalities	Models
Exponential Equations	

Equivalence (Equality)

Equations	Rational Equations
Inequalities	Radicals
Exponents	Linear Systems

Major Stems:

Identifies, extends, and generalizes a variety of patterns

Generalization and conceptual understanding of linear and nonlinear functions and relations

Conceptual understanding of algebraic expressions

Conceptual understanding of equality

ALGEBRA I COURSE CONTENT COMPETENCIES

1. *Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.*
2. *Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.*
3. *Students will understand that models can be used to represent and understand quantitative relationships.*
4. *Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.*
5. *Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.*

ALGEBRA I COURSE PROCESS SKILLS

1. *Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.*
2. *Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.*
3. *Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.*
4. *Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.*
5. *Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.*
6. *[Students will understand that progress is made by asking relevant questions, conducting careful investigations evaluating the validity of results and developing models to explain what has been found.]*
7. *[Students will understand that when analyzing data to draw conclusions about the questions or hypotheses being tested, limitations of the data must be considered that could affect interpretations.]*
8. *[Students will understand that appropriate representations and mathematical language is used to present ideas clearly and logically for a given situation.]*

Functions and Algebra Strand - Stem 1

Identifies, extends, and generalizes a variety of linear and nonlinear patterns

<p>Topics</p>	<p>Arithmetic and geometric sequences; linear and nonlinear patterns; variables, expressions and equivalent expressions</p>
<p>Competencies</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 1. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 2. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 3. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 4. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>
<p>Knowledge/Content</p>	<ol style="list-style-type: none"> 1. <i>Identifies, extends, and generalizes a variety of patterns (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations.</i> 2. <i>Generalizes a linear relationship (non-recursive explicit equation).</i> 3. <i>Generalizes a linear relationship to a specific case.</i> 4. <i>Generalizes a nonlinear relationship using words or symbols or generalizes a common nonlinear relationship to a specific case</i> 5. <i>Identifies arithmetic and geometric sequences to the nth term then uses the generalization to find a specific term.</i>
<p>Process Skills</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i>

	<ol style="list-style-type: none"> 3. <i>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i> 4. <i>Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</i> 5. <i>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics</i>
<p>Sample Performance Assessment (SPA) # 1</p>	<p>You are the Quizmaster for your classroom's Mathematics Computation Bee. Your task is to form 10 expressions that equal any whole numbers 1 through 20. The expressions you write must be formed with five 5's and must use the operations of addition, subtraction, multiplication, division, integer exponents, and/or absolute value. Your expressions may contain parentheses. Include a key for each problem that shows how you obtained the answer using the correct order of operations. Give your ten expressions to another student in your classroom, and have them complete your ten expressions. Analyze their response.</p>
<p>Topics in SPA # 1</p>	<p>Numerical expressions, exponents, order of operations, absolute value, equivalent expressions</p>
<p>Mathematics Process Skills Addressed in SPA # 1</p>	<ol style="list-style-type: none"> 1. <i>Students will recognize that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i>
<p>Mathematics Competencies Addressed in SPA # 1</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena</i> 3. <i>Students will recognize that representing ideas and connecting the representations lies at the heart of understanding mathematics.</i>

SPA # 1 Rubric			
Level 4	Level 3	Level 2	Level 1
The student creates 10 different expressions that equal the numbers 1 through 20 using five 5's, the four operations, integer powers and/or absolute value. The student uses the order of operations to simplify their expressions to check for accuracy and make corrections as needed. The student accurately analyzes the work of the other student and defends their analysis.	The student creates 10 different expressions that equal the numbers 1 through 20 using five 5's, the four operations, integer powers and/or absolute value. The student may use the order of operations to simplify their expressions. The student should have no more than one error. The student analyzes the work of the other student with minimal errors and defends their analysis.	The student creates 10 different expressions that equal the numbers 1 through 20 using five 5's, the four operations, integer powers and/or absolute value with two or more having errors. The student may use the order of operations to simplify their expressions and the student may have errors. The student analyzes the work of the other student	The student creates 10 different expressions that equal the numbers 1 through 20 using five 5's, the four operations, integer powers and/or absolute value with four or more having errors. And there is no analysis.

Sample Performance Assessment (SPA) # 2	Brian thinks he has found some number patterns on a calendar. He says his patterns work for any two-by-two square on a calendar. For example Brian believes that the positive difference between the products of each diagonal is always 7. Decide whether you agree with his pattern and justify your answer. Investigate this pattern for different size squares on the calendar, such as a three-by-three, four-by-four, etc, Make a generalization based upon the different squares used in your investigation.
Topics in SPA # 2	Algebraic expressions, exponents, order of operations, equivalent algebraic expressions; linear and nonlinear patterns
Mathematics Process Skills Addressed in SPA # 2	<ol style="list-style-type: none"> 1. <i>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i> 3. <i>Students will understand that actively exploring, investigating, describing and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i>

<p>Mathematics Competencies Addressed in SPA # 2</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena</i> 3. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>
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SPA # 2 Rubric			
Level 4	Level 3	Level 2	Level 1
<p>The student accurately justifies and defends Brian's pattern on the 2 by 2 square through the use of algebraic expressions and equivalent algebraic expressions. The student accurately generalizes the results of patterns based on additional squares with different dimensions. The student clearly articulates generalizations through the use of algebraic expressions and equivalent algebraic expressions. The student demonstrates a deep comprehension of algebraic expressions through his/her explanation and communication of mathematical concepts. The student demonstrates a variety of problem solving strategies.</p>	<p>The student justifies and defends Brian's pattern on the 2 by 2 square through the use of some algebraic expressions and equivalent algebraic expressions. The student generalizes the results of patterns based on additional squares with different dimensions. The student articulates some generalizations through the use of algebraic expressions and equivalent algebraic expressions. The student demonstrates comprehension of algebraic expressions through his/her explanation and communication of mathematical concepts. The student demonstrates a consistent problem solving strategy with some minor errors.</p>	<p>The student partially justifies and defends Brian's pattern on the 2 by 2 square through the use of a limited number of algebraic expressions and equivalent algebraic expressions. The student generalizes some of the results of patterns based on additional squares with different dimensions. The student articulates a limited number of generalizations through the use of algebraic expressions and equivalent algebraic expressions. The student demonstrates some comprehension of algebraic expressions through his/her explanation and communication of mathematical concepts. The student demonstrates inconsistent problem solving strategies with some errors.</p>	<p>The student makes a statement about Brian's pattern on the 2 by 2 square. The student makes one generalization from the results of patterns based on additional squares with different dimensions. The student provides an incomplete or incorrect explanation and communication of mathematical concepts. The student demonstrates an incomplete problem solving strategy with several errors.</p>

ALGEBRA I

<p>Functions and Algebra Strand - Stem 2</p>
<p>Demonstrates conceptual understanding of linear and nonlinear functions and relations.</p>

<p>Topics</p>	<p>Classes of functions; rates of change; representations of functions and relations; variable relationships</p>
<p>Competencies</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 5. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>
<p>Knowledge/Content</p>	<ol style="list-style-type: none"> 1. <i>Analyzes characteristics of classes of functions (polynomial, rational and exponential) to include domain, range, intercepts, increasing and decreasing intervals, maximum and minimum values and rates of change.</i> <ul style="list-style-type: none"> • <i>Recognize, describe, and extend patterns governed by a linear, quadratic, inverse and direct variation, or exponential functional relationship.</i> • <i>Identify the domain, range, dependent and independent variables of functions.</i> • <i>Translate between different representations of functions and relations, i.e. graphs, equations, sets of ordered pairs, word descriptions, and tables.</i> • <i>Describe how change in the value of one variable relates to change in the value of the second variable.</i> 2. <i>Graphs linear, quadratic, inverse and direct variation functions, including vertical and horizontal shifts.</i> <ul style="list-style-type: none"> • <i>Determine a linear graph by describing its geometric properties from the linear function.</i> • <i>Determine perpendicular or parallel lines by describing their geometric properties from linear functions.</i>

	<ul style="list-style-type: none"> • Explain the significance of a positive, negative, zero, or undefined slope from a graphical representation. • Demonstrate an understanding of the relationship between various representations of a line. • Determine a line's slope and x and y intercepts from its graph. • Find solutions to quadratic equations through graphical representation. • Given a quadratic function display the key features of a quadratic graph: line of symmetry, vertex, x intercepts and y-intercepts. • Find solutions to inverse and direct variation through graphical representation. • Given inverse and direct variation functions, display the key features of its graph. <p>3. Applies knowledge of functions to interpret and understand situations, design mathematical models, and solve problems in mathematics as well as in the natural and social sciences.</p> <ul style="list-style-type: none"> • Solve everyday problems (e.g. compound interest and direct and inverse variation problems) that can be modeled using linear or quadratic functions and apply appropriate graphical or symbolic methods to the solution. • Solve everyday problems (e.g. mixture, rate, and work problems) that can be modeled using systems of linear equations or inequalities and apply algebraic and graphical methods to solution. • Interprets a given representation(s) (e.g. regression function including linear, quadratic, and exponential) to analyze the data to make inferences and to formulate, justify, and critique conclusions. • Interprets scatter plots to make observations, to answer questions, to analyze the data to formulate or justify conclusions, critique conclusions, make predictions, or to solve problems within mathematics or across disciplines or contexts) • Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using estimated line of best fit, regression line, or correlation to solve problems • Organizes and displays one- and two- variable data using a variety of representations (e.g., scatter plots, linear, quadratic, and exponential regression functions) to analyze data to formulate or justify conclusions, make predictions, or to solve problems.
<p>Process Skills</p>	<p>1. Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</p> <p>2. Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</p>

	<p>3. <i>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i></p> <p>4. <i>Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</i></p> <p>5. <i>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics</i></p>
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<p>Sample Performance Assessment (SPA) #1</p>	<p>The local Conservation Commission has approached your Algebra I class with the following situation. The frog population in your area has been decreasing as shown. As we know frogs are vital to the ecosystem. The Commission would like you to analyze the data and present your findings with algebraic models, tables, and graphs to the Commission.</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>2004</td> <td>2141</td> </tr> <tr> <td>2005</td> <td>2010</td> </tr> <tr> <td>2006</td> <td>1891</td> </tr> <tr> <td>2007</td> <td>1778</td> </tr> <tr> <td>2008</td> <td></td> </tr> </tbody> </table>	Year	Population	2004	2141	2005	2010	2006	1891	2007	1778	2008	
Year	Population												
2004	2141												
2005	2010												
2006	1891												
2007	1778												
2008													
<p>Topics in SPA #1</p>	<p>Rates of change; representations of functions and relations; variable relationships</p>												
<p>Mathematics Process Skills Addressed in SPA #1</p>	<p>1. <i>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i></p> <p>2. <i>[Students will understand that progress is made by asking relevant questions, conducting careful investigations evaluating the validity of results and developing models to explain what has been found.]</i></p> <p>3. <i>[Students will understand that when analyzing data to draw conclusions about the questions or hypotheses being tested, limitations of the data must be considered that could affect interpretations.]</i></p>												

<p>Mathematics Competencies Addressed in SPA #1</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i>
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SPA # 1 Rubric			
Level 4	Level 3	Level 2	Level 1
<p>The student presents an attractive, comprehensive written portfolio of findings interspersed with an accurate algebraic model, tables, and graphs to explain the data received. In the portfolio the student is able to make long term predictions using the data.</p>	<p>The student presents a written portfolio of findings interspersed with an algebraic model, with limited errors in the tables and/or graphs, to explain the data received. In the portfolio the student is able to make predictions using the data.</p>	<p>The student presents a written portfolio of findings interspersed with tables, and graphs to explain the data received. In the portfolio the student is able to predict what will happen to the frog population in 2008.</p>	<p>The student presents a paper that predicts what will happen to the frog population in 2008.</p>

ALGEBRA I

Functions and Algebra Strand - Stem 3

Demonstrates conceptual understanding of algebraic expressions.

Topics	Algebraic and numerical expressions; polynomials; rational expressions; absolute value, square roots, exponents, factoring, order of operations, properties of numbers and field properties
Competencies	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 5. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>
Knowledge/Content	<ol style="list-style-type: none"> 1. <i>Manipulates, evaluates, and simplifies algebraic and numerical expressions:</i> <ul style="list-style-type: none"> • <i>Polynomial or rational expressions involving integer exponents, square roots or absolute values</i> • <i>Add, subtract, multiply and divide polynomial and rational expressions</i> • <i>Factors quadratic polynomials</i> 1. <i>Identifies and is able to explain the effect of simplifying rational expressions on the domain of the related functions.</i> 2. <i>Translates problem situations into algebraic expressions.</i> 3. <i>Applies properties of numbers and field properties to simplify computations</i>

<p>Process Skills</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i> 3. <i>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i> 4. <i>Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</i> 5. <i>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.</i>
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<p>Sample Performance Assessment (SPA) #1</p>	<p>You work for the local tile contractor creating decorative tile designs. All the office floors in a particular building are going to be tiled with three colors of tile: black, gray, and white in the pattern shown below. All the offices are square but come in different sizes. An office with three tiles on one side and an office with five tiles on one side are shown. You need to come up with a formula that the tile setters can use to determine how many tiles they need for any size room.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>Design a new three color tile pattern for a square room and write a formula for the total number of tiles needed for each color for a room with n tiles along one side of the room.</p> <p>White tiles cost \$1.25 each and black and gray tiles cost \$1.50 each. Will you be able to tile a room with 20 tiles along one side for under \$550 using your design?</p>
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<p>Topics in SPA #1</p>	<p>Polynomials (first and second degree); algebraic expressions, exponents, field properties, domain</p>
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<p>Mathematics Process Skills Addressed in SPA #1</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i>
<p>Mathematics Competencies Addressed in SPA #1</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 5. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements</i>

SPA # 1 Rubric			
Level 4	Level 3	Level 2	Level 1
<p>Student correctly determines a formula for the total number of tiles for a room that has n tiles along one side of the room. Student verifies the formula. Student designs a new three-color tile pattern for a square room and writes a formula for the total number of tiles needed. Student verifies if their design can tile the room for under \$550.</p>	<p>Student correctly determines a formula for the total number of tiles for a room that has n tiles along one side of the room. Student may verify the formula. Student designs a new three-color tile pattern for a square room and writes a formula with minor errors for the total number of tiles needed. Student verifies if their design can tile the room for under \$550.</p>	<p>Student determines with some error a formula for the total number of tiles for a room that has n tiles along one side of the room. Student designs a new three-color tile pattern for a square room and writes a formula (with error) for the total number of tiles needed. Student may not have verified if their design can tile the room for under \$550.</p>	<p>Student determines an incorrect formula for the total number of tiles for a room that has n tiles along one side of the room. Student designs a new three-color tile pattern for a square room.</p>

ALGEBRA I

Functions and Algebra Strand - Stem 4
Demonstrates conceptual understanding of equality

Topics	Equality; linear and quadratic equations and inequalities; graphical interpretation of solutions; systems of equations
Competencies	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 5. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>
Knowledge/Content	<ol style="list-style-type: none"> 1. <i>Solve problems involving algebraic reasoning about equality.</i> <ul style="list-style-type: none"> • <i>Determine a linear function by using the point slope or slope intercept formulas.</i> • <i>Given perpendicular or parallel lines to a given line and through a point, determine the linear functions (e.g. by using point slope or slope intercept form).</i> • <i>Determine solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula and demonstrate equivalence of methods.</i> • <i>Apply properties of numbers and field properties.</i> • <i>Use a variety of mental computation strategies to determine the reasonableness of answers</i> • <i>Solve problems involving rational numbers within mathematics across content strands, disciplines or contexts (with emphasis on, but not limited to, proportions, percents, ratios, and rates).</i>

	<ol style="list-style-type: none"> 2. <i>Translate problem situations into equations.</i> <ul style="list-style-type: none"> • <i>Translate problem situations into equations and inequalities and solves linear and non-linear equations and inequalities, symbolically and graphically.</i> 3. <i>Solve linear, quadratic, inverse and direct variation equations, and expresses the solution set symbolically or graphically.</i> <ul style="list-style-type: none"> • <i>Determine the significance of a positive, negative, zero, or undefined slope given linear functions.</i> • <i>Determine slope and x and y intercepts from a linear equation that represents the line.</i> • <i>Solve problems on and off the coordinate plane involving distance, midpoint, perpendicular and parallel lines, or slope</i> 4. <i>Determine the meaning of graphical interpretations of solutions in problem solving situations.</i> <ul style="list-style-type: none"> • <i>Solve equations involving polynomial, rational, and radical expressions. Graphs and interprets the solutions.</i> • <i>Interpret extraneous solutions.</i> 5. <i>Solve problems involving systems of linear equations in a context or using models/representations.</i> <ul style="list-style-type: none"> • <i>Solve systems of equations involving linear and non-linear expressions and graphically interprets the solutions.</i>
<p>Process Skills</p>	<ol style="list-style-type: none"> 1. <i>Students will recognize that a variety of problem-solving strategies can be used to investigate everyday as well as increasingly complex mathematical situations.</i> 2. <i>Students will understand that exploring, justifying, and synthesizing mathematical conjectures are part of systemic reasoning which is common to all content areas and a defining feature of mathematics.</i> 3. <i>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i> 4. <i>Students will recognize that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</i> 5. <i>Students will recognize that representing ideas and connecting the representations lies at the heart of understanding mathematics.</i>

<p>Sample Performance Assessment (SPA) #1</p>	<p>You are selling tickets for the Central/Memorial football game. You have \$5,315 at the end of the night and have sold a total of 1,225 tickets. Write up a report for the ticket manager outlining how the revenues should be accounted for given that an adult's ticket costs \$5 and a child's ticket costs \$3. Choose the most appropriate algebraic method to solve this problem. Appropriate variables should be chosen. Be sure to put your solutions into context in written form and include a graph in your report.</p>
<p>Topics in SPA #1</p>	<p>Systems of linear of equations, graphical interpretation of solutions, equality</p>
<p>Mathematics Process Skills Addressed in SPA #1</p>	<ol style="list-style-type: none"> 1. <i>[Students will understand that appropriate representations and mathematical language is used to present ideas clearly and logically for a given situation.]</i> 2. <i>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</i> 3. <i>Students will understand that mathematical connections will help them become aware of the usefulness of mathematics, serve to bridge the concrete and the abstract, and enable deeper understanding of important ideas.</i> 4. <i>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.</i>
<p>Mathematics Competencies Addressed in SPA #1</p>	<ol style="list-style-type: none"> 1. <i>Students will understand that Algebra is the language through which much of mathematics, science, and technology are communicated.</i> 2. <i>Students will understand that patterns, relations, and functions can be used to describe, interpret, and predict real world phenomena.</i> 3. <i>Students will understand that models can be used to represent and understand quantitative relationships.</i> 4. <i>Students will understand that tables, graphs, and equations are ways for depicting and analyzing patterns of change in data.</i> 5. <i>Students will understand that symbolic statements can be manipulated by mathematical rules to produce equivalent statements.</i>



SPA # 1 Rubric			
Level 4	Level 3	Level 2	Level 1
The student determines the correct system of equations, solves the system correctly, states the answers in correct form, and applies an accurate context in the written interpretation of their results.	The student determines the correct system of equations, solves the system correctly, and states the answers in correct form. The student misinterprets the results and writes an incorrect interpretation of the problem.	The student determines a correct solution but does not use a system of equations method, or the student determines the correct system of equations but cannot solve the system algebraically. Interpretation of the results is not given.	The student uses the information in the situation incorrectly, or used information not given in the situation.