

**Bud Carlson Academy  
Algebra**

This course is designed to continue student investigations of functions and algebra that explore algebraic concepts using informal representations (e.g., words, physical models, tables and graphs). In this Algebra I course students will continue their investigations by progressing to more abstract representations such as linear and nonlinear functions, algebraic expressions, and equality. Students will find that a central theme of this course and algebraic thinking in general, is the study of patterns which in turn leads to an understanding of relations and functions. Students will recognize, describe, and generalize patterns and build mathematical models to describe, interpret, and predict the behavior of real-world phenomenon. And finally, students will come to understand that algebraic processes are important tools that students can use throughout their lives.

*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

**Algebra 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 COURSE PROCESS COMPETENCIES

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.]

<b>Topics</b>	<p><u>The Language of Algebra</u></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Real numbers</td> <td style="text-align: right;">Absolute Value</td> </tr> <tr> <td style="text-align: center;">Variables</td> <td style="text-align: right;">Polynomials</td> </tr> <tr> <td style="text-align: center;">Expressions</td> <td style="text-align: right;">Exponents</td> </tr> <tr> <td style="text-align: center;">Patterns</td> <td style="text-align: right;">Radicals</td> </tr> </table> <p><u>Equivalence (Equality)</u></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Equations</td> <td style="text-align: right;">Rational Equations</td> </tr> <tr> <td style="text-align: center;">Inequalities</td> <td style="text-align: right;">Radicals</td> </tr> <tr> <td style="text-align: center;">Exponents</td> <td style="text-align: right;">Linear Systems</td> </tr> </table> <p><u>Patterns, Functions and Relations</u></p>	Real numbers	Absolute Value	Variables	Polynomials	Expressions	Exponents	Patterns	Radicals	Equations	Rational Equations	Inequalities	Radicals	Exponents	Linear Systems
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<b>Knowledge/Skills</b>	<p>M:F&amp;A:10:1 <b>Identifies, extends, and generalizes a variety of patterns</b> (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations.</p> <p>M:F&amp;A:10:2 <b>Demonstrates conceptual understanding of linear and nonlinear functions and relations</b> (including characteristics of classes of functions) through an analysis of constant, variable, or average rates of change, intercepts, domain, range, maximum and minimum values, increasing and decreasing intervals and rates of change (e.g., the height is increasing at a decreasing rate); describes how change in the value of one variable relates to change in the value of a second variable; or works between and among different representations of functions and relations (e.g., graphs, tables, equations, function notation).</p> <p>M:F&amp;A:10:3 <b>Demonstrates conceptual understanding of algebraic expressions</b> by solving problems involving algebraic expressions, by simplifying expressions (e.g., simplifying polynomial or rational expressions, or expressions involving integer exponents, square roots, or absolute values), by evaluating expressions, or by translating problem situations into algebraic expressions.</p> <p>M:F&amp;A:10:4 <b>Demonstrates conceptual understanding of equality</b> by solving problems involving algebraic reasoning about equality; by translating problem situations into equations; by solving linear equations (symbolically and graphically) and expressing the solution set symbolically or graphically, or provides the meaning of the graphical interpretations of solution(s) in problem-solving situations; or by solving problems involving systems of linear equations in a context (using equations or graphs) or using models or representations.</p>
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<p><b>Process Skills</b></p>	<p>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>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>Students will understand that actively exploring, investigating, describing, and explaining mathematical ideas promotes communication which leads to a greater comprehension of mathematical concepts.</p> <p>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.</p> <p>Students will understand that representing ideas and connecting the representations lies at the heart of understanding mathematics.</p>
<p><b>Performance Assessment</b></p>	<p>Student evidence will demonstrate mastery of concepts, broad themes, and individual proficiency standards. Student assessment is based on progress of individual mastery of set lesson objectives, research projects, and power point presentations and in depth student response journals and student portfolios.</p>