

COMMUNITY UNIT SCHOOL DISTRICT 200

Algebra 1 Block

High School

Intermediate Level – Double Period for Two Semesters

- 1. Subject Expectation (State Goal 6)** **The student will demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.**

Essential Learning 1 (Learning Standard A)	Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings
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| Critical Content | 6.A.3 | a. | represent fractions, decimals, percentages, exponents and scientific notation in equivalent forms <ul style="list-style-type: none">• multiply and divide monomials• simplify expressions involving laws of exponents• express numbers in scientific and decimal notation• write two numbers as a ratio in simplest form |
| | 6.A.4 | b. | identify and apply the associative, commutative, distributive and identity properties of real numbers, including special numbers such as pi and square roots <ul style="list-style-type: none">• use properties of real numbers• recognize and combine like terms• add, subtract, and multiply polynomials• use the GCF and the distributive property to factor polynomials• use grouping techniques to factor polynomials• simplify expressions involving rationalizing denominator (no conjugates) |

Essential Learning 2 (Learning Standard B)	Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, and division) and their properties, algorithms and relationships
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| Critical Content | 6.B.3a | a. | solve practical computation problems involving whole numbers, integers and rational numbers <ul style="list-style-type: none">• simplify expressions using rational numbers including<ul style="list-style-type: none">– applying the four arithmetic operations– positive or negative numbers raised to even or odd powers– absolute value |
| | 6.B.3b | b. | apply primes, factors, divisors, multiples, common factors and common multiples in solving problems <ul style="list-style-type: none">• develop fluency in operations with real numbers using mental computations or paper and pencil calculations for |

- 6.B.3c c. identify and apply properties of real numbers, including pi, squares, and square roots
- identify numbers as integers, rational or irrational
 - simplify square roots with and without variables (assume all variables are positive)
 - state approximate values for square roots

Essential Learning 3 (Learning Standard C)	Compute and estimate using mental mathematics, paper and pencil methods, calculators and computers
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| Critical Content | <p>6.C.3a d. select computational procedures and solve problems with whole numbers, fractions, decimals, percents and proportions</p> <ul style="list-style-type: none"> • solve proportions • solve percent problems (is, of, percent) • solve problems involving percent of increase or decrease • solve problems involving discount and/or sales tax • solve problems involving uniform motion ($d = rt$) <p>6.C.3b e. show evidence that computational results using whole numbers, fractions, decimals, percents and proportions are correct and/or that estimates are reasonable</p> <p>6.C.4 f. determine whether exact values or approximations are appropriate</p> <ul style="list-style-type: none"> • develop fluency in operations with real numbers using mental computations or paper and pencil computations for simple cases and technology for more complicated cases |
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Essential Learning 4 (Learning Standard D)	Solve problems using comparison of quantities, ratios, proportions and percents
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| Critical Content | <p>6.D.4 a. solve problems using ratios, proportions and percents</p> <ul style="list-style-type: none"> • solve application problems <ul style="list-style-type: none"> – recipes – mixtures – scale drawings – simple interest – multi-step |
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2. Subject Expectation (State Goal 7) **The student will estimate, make, and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.**

Essential Learning 1 (Learning Standard A)	Measure and compare quantities using appropriate units, instruments and methods
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| Critical Content | <p>7.A.4a a. apply units and scales to describe and compare numerical data and physical objects</p> <p>7.A.4b b. apply formulas in a wide variety of theoretical and practical real-world measurement applications, involving perimeter, area, volume, angle, time, temperature, speed, distance, and monetary values</p> |
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- solve application problems by
 - defining variables
 - setting up an equation
 - applying formula

Essential Learning 2 (Learning Standard B)	Estimate measurements and determine acceptable levels of accuracy
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| Critical Content | 7.B.4 | h. estimate and measure the magnitude and directions of physical quantities (e.g., velocity, force, slope) using rulers, protractors and other scientific instruments including timers, calculators and/or computers <ul style="list-style-type: none"> • state and estimate the slope of a line from <ul style="list-style-type: none"> – graph |
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Essential Learning 3 (Learning Standard C)	Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings
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| Critical Content | 7.C.4a | a. make indirect measurements, including heights and distances, using proportions (e.g., finding the height of a tower by its shadow) |
| | 7.C.4b | b. interpret scale drawings and models using maps and blueprints <ul style="list-style-type: none"> • solve applications <ul style="list-style-type: none"> – scale drawings – indirect measurement |
| | 7.C.4c | c. convert within and between measurement systems and monetary systems using technology where appropriate <ul style="list-style-type: none"> • introduce students to the use of technology (TI graphing calculators) <ul style="list-style-type: none"> – decimals to fractions – fractions to decimals – order of operations – absolute value • add and subtract rational numbers • multiply and divide rational numbers • express numbers in scientific and decimal notation |

3. Subject Expectation (State Goal 8)	The student will use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.
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Essential Learning 1 (Learning Standard A)	Describe numerical relationships using variables and patterns
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| Critical Content | 8.A.3a | a. apply the basic properties of commutative, associative, distributive, transitive, inverse, identify, zero, equality and order of operations to solve problems <ul style="list-style-type: none"> • use order of operations to evaluate expressions |
| | 8.A.3b | b. solve problems using linear expressions, equations and inequalities |

- solve linear equations systematically using addition, subtraction, multiplication, and division
 - one-step problems
 - two-step problems
 - multi-step problems
- 8.A.4a c. use algebraic methods to convert repeating decimals to fractions
- convert repeating decimal to a fraction
- 8.A.4b d. represent mathematical patterns and describe their properties using variables and mathematical symbols
- name the coefficient of a term
 - state the degree of a polynomial
 - arrange terms of a polynomial in descending and ascending order
 - write an equation for horizontal and vertical lines
 - factor trinomials in the form $ax^2 + bx + c$
 - factor binomials that are the difference of squares
 - factor perfect square trinomials
 - simplify rational expressions
 - state the excluded values of the variables
 - multiply and divide rational expressions

Essential Learning 2 (Learning Standard B)	Interpret and describe numerical relationships using tables, graphs and symbols
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- Critical Content
- 8.B.3 a. use graphing technology and algebraic methods to analyze and predict linear relationships and make generalizations from linear patterns
- determine whether a given relation is a function
 - identify and graph ordered pairs on a coordinate plane
- 8.B.4a b. represent algebraic concepts with physical materials, words, diagrams, tables, graphs, equations, and inequalities and use appropriate technology
- translate verbal expressions into mathematical expressions
 - graph quadratic functions using a table
 - translate verbal sentences into equations, formulas, or inequalities
 - solve application problems by
 - setting up an equation
 - applying formulas
 - identify domain and range of a relation
 - graph lines and determine point of intersection
 - graph horizontal and vertical lines given an equation
 - write the equation of a line using
 - point and slope
 - two points
 - table
 - graph
 - line of best fit from data
 - solve one-variable inequalities and graph the solutions
 - compound
 - write an equation of a line that passes through a given

- point and is parallel or perpendicular to the graph of a given equation
 - graph linear inequalities in one or two variables (coordinate plane)
 - graph a solution to a system of inequalities (coordinate plane)
 - find roots of a quadratic equation by graphing
 - solve quadratic equations by using
 - factoring
 - quadratic formula
 - square roots
 - evaluate discriminant of a quadratic equation to determine nature of roots
- 8.B.4b c. use the basic functions of absolute value, square root, linear, quadratic and step to describe numerical relationships
- state and estimate the slope of a line from
 - graph
 - two points
 - equation
 - table
 - graph a line using
 - table
 - x and y intercept
 - point and slope
 - $y = mx + b$

Essential Learning 3 (Learning Standard C)

Solve problems using systems of numbers and their properties

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| Critical Content | <p>8.C.4a d. analyze and report the effects of changing coefficients, exponents and other parameters on functions and their graphs</p> <ul style="list-style-type: none"> • compare equations and graphs to their parent function <ul style="list-style-type: none"> – linear – quadratic – absolute value <p>8.C.4.b e. apply algebraic properties and procedures with matrices, vectors, functions and sequences using data found in business, industry and consumer situations</p> <ul style="list-style-type: none"> • state the vertex and the equation of the axis of symmetry • solve application problems |
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Essential Learning 4 (Learning Standard D)

Use algebraic concepts and procedures to represent and solve problems
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| Critical Content | <p>8.D.3a a. solve problems using numeric, graphic or symbolic representations of variables, expressions, equations and inequalities</p> <ul style="list-style-type: none"> • solve a system of equations using <ul style="list-style-type: none"> – graphing – elimination – substitution • solve radical equations • graph inequalities on number lines |
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- 8.D.3b b. propose and solve problems using proportions, formulas and linear functions
- 8.D.3c c. apply properties of powers, perfect squares and square roots
 - use the rules of exponents to simplify expressions
 - identify perfect squares
 - simplify radical expressions
- 8.D.4 d. formulate and solve linear and quadratic equations and linear inequalities algebraically and investigate nonlinear inequalities using graphs, tables, calculators and computers
 - solve linear equations involving
 - absolute values
 - variables on both sides of equations
 - grouping symbols
 - identity or no solution
 - more than one variable for a specific variable
 - fractions or decimals
 - solve one-variable inequalities using addition, subtraction, multiplication, and division and graph the solutions (number line)
 - one-step problems
 - two-step problems
 - multi-step problems
 - solve application problems
 - solve quadratic equations

**4. Subject Expectation
(State Goal 10)**

The student will collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

**Essential Learning 1
(Learning Standard A)** **Organize, describe, and make predictions from existing data**

- Critical Content 10.A.4a d. represent and organize data by creating lists, charts, tables, frequency distributions, graphs, scatterplots, and box-plots
- 10.A.4b e. analyze data using mean, median, mode, range, variance and standard deviation of a data set, with and without the use of technology
- calculate and interpret the mean, median, mode and range
 - f. predict from data using interpolation, extrapolation and trend lines, with and without the use of technology
 - write the equation of a line using
 - graphs
 - two points
 - tables
 - write the equation of the line of best fit from data
 - make predictions from the graph

**Essential Learning 2
(Learning Standard C)** **Determine, describe and apply the probabilities of events**

- Critical Content
- 10.C.4a a. solve problems of chance using the principles of probability including conditional settings
 - solve problems with or without replacement
 - 10.C.4b b. design and conduct simulations (e.g., waiting times at restaurant, probabilities of births, likelihood of game prizes), with and without the use of technology