

Wilson Area School District Planned Course Guide

Title of planned course: Algebra I

Subject Area: Mathematics

Grade Level: 9th

Course Description: *Prerequisites: Pre-Algebra.* The course is the study of patterns in Algebra, operations in Algebra, writing and solving equations, proportional reasoning, statistics, linear functions, inequalities and absolute value, systems of equations, exponents and exponential functions, polynomials and factoring, rational functions, and probability. Applications of real-world problems will be included. (Course requirements include: tests, quizzes, projects, presentations, notebook, daily homework, and usage of calculators.) It is highly recommended that each student have a calculator.

Time/Credit for this Course: One Full Academic Year / 1.0

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Curriculum Map

August / September: Equations (Unit 1)

October: Inequalities (Unit 2)

November: Functions (Unit 3)

December / January: Linear Functions (Unit 4)

February: Systems of Equations and Inequalities (Unit 5)

March: Exponents and Polynomials (Unit 6)

April: Factoring Polynomials (Unit 7)

May/June: Data Analysis and Probability (Unit 8)

Wilson Area School District Planned Course Materials

Course Title: Algebra I

Textbook: Algebra I
Holt, McDougal © 2012

Supplemental Books: Unified Mathematics Books 1-3
Gerald R. Rising, et. al.

Algebra I
Holt, Rinehart, and Winston © 2003
www.hrw.com

Teacher Resources:

- Textbooks
- Worksheets
- Internet
- Teacher created worksheets
- Teacher One Stop (included with textbook)
- Smartboard

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 1: Equations

Time frame: 18 – 24 class periods

Keystone Standards: A1.1.1.3.1, A1.1.2.1.1, A1.1.2.1.2

Anchor(s) or adopted anchor: M11.A.1.3.1, M11.A.1.3.2, M11.A.3.1.1, M11.A.3.2.1, M11.D.1.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Identify rational and irrational expressions and compare their values
- Translate between words and algebra
- Evaluate algebraic expressions
- Solve one-step equations in one variable by using addition, subtraction, multiplication, or division
- Solve equations in one variable that contain more than one operation
- Solve equations in one variable that contain variable terms on both sides
- Solve a formula for a given variable
- Solve an equation in two or more variables for one of the variables
- Solve equations in one variable that contain absolute-value expressions
- Analyze and compare measurements for precision and accuracy and choose an appropriate level of accuracy when reporting measurements

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Create visual representation in the form of a mobile on balance equations

Extensions:

- Work with more challenging patterns and problems

Remediation:

- Additional exercises
- Less complex numbers to work with to build prior knowledge
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Higher order thinking questions
- Individual, pair, and small group practice
- Power point presentations
- Warm ups
- Teacher directed examples

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Notes/examples
- Handouts (worksheets)
- Activity supplies
- Calculators

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Project
- Higher order questioning

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 2: Inequalities

Time frame: 15 – 21 class periods

Keystone Standards: A1.1.3.1

Anchor(s) or adopted anchor: M11.D.2.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Identify solutions of inequalities in one variable
- Write and graph inequalities in one variable
- Solve one-step inequalities by using addition, subtraction, multiplication, and division
- Solve inequalities that contain more than one operation
- Solve inequalities that contain variable terms on both sides of the inequality
- Solve and graph compound inequalities in one variable
- Solve inequalities in one variable involving absolute-value expressions

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Use visual aids to assist in learning

Extensions:

- Solve inequalities that contain multiple operations and absolute-value expressions

Remediation:

- Additional exercises
- Use more technology to assist in operations with numbers
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Teacher directed examples
- Overhead notes
- Higher order thinking questions
- Individual, pair, and whole group practice
- Calculator instruction
- Power point presentations
- Warm ups

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Notes
- Handouts (worksheets)
- Calculators

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 3: Functions

Time frame: 13 – 19 class periods

Keystone Standards: A1.1.2.1.1, A1.2.1.1, A1.2.1.1.2, A1.2.1.1.3

Anchor(s) or adopted anchor: M11.A.3.2.1, M11.D.1.1.2, M11.D.1.1.3, M11.D.2.1.2, M11.D.2.1.3, M11.D.3.1.1, M11.D.4.1.1, M11.E.4.2.2

Essential content/objectives: At end of the unit, students will be able to:

- Match simple graphs with situations.
- Graph a relationship.
- Identify functions and find the domain and range of relations and functions.
- Identify independent and dependent variables.
- Write an equation in function notation and evaluate a function for given input values.
- Graph functions given a limited domain or a domain of all real numbers
- Create and interpret scatter plots and use trend lines to make predictions.
- Recognize and extend an arithmetic sequence to find a given.

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra.
- Complete examples of problems in class.
- Participate in individual, pair, and small group practice of concepts.
- Participate in a physical activity to help with concepts of relations and functions.

Extensions:

- Work with problems that have fractional and decimal values.

Remediation:

- Additional exercises.
- Break problems into smaller sections.
- Give more instructions on what process to use for particular problems.
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Teacher directed physical activity

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Teacher directed notes
- Handouts (worksheets)
- Calculators
- Project supplies

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
- Activity observation

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 4: Linear Functions

Time frame: 21 – 27 class periods

Keystone Standards: A1.2.1.1, A1.2.1.2, A1.2.2.1, A1.2.2.2.1, A1.2.3.2.3

Anchor(s) or adopted anchor: M11.A.2.1.2, M11.C.3.1.2, M11.D.1.1.2, M11.D.1.1.3, M11D.3.2, M11.D.4.1.1, M11.E.4.2

Essential content/objectives: At end of the unit, students will be able to:

- Identify linear functions and linear equations
- Graph linear functions that represent real-world situations and give their domain and range
- Find x- and y-intercepts and interpret their meaning in real-world situations
- Use x- and y-intercepts to graph lines
- Find rates of change and slope and relate a constant rate of change to the slope of a line
- Find slope by using the slope formula
- Identify, write, and graph direct variation.
- Write and graph a linear equation in slope-intercept form
- Graph a line and write a linear equation using point-slope form given a slope and a point or two points
- Determine a line of best fit for a set of linear data
- Determine and interpret the correlation coefficient
- Identify and graph parallel and perpendicular lines
- Write equations to describe lines parallel or perpendicular to a given line

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Participate in a physical activity to help with concepts of slope and line of best fit

Extensions:

- Research and present data in some of these data displays
- Create and solve more challenging problems involving proportion and percent

Remediation:

- Use more technology to assist in representing data and calculating
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Teacher directed physical activity

Materials & Resources:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
- Activity observation

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 5: Systems of Equations and Inequalities

Time frame: 16 – 22 class periods

Keystone Standards: A1.1.2.2.1, A1.1.3.2

Anchor(s) or adopted anchor: M11.D.2.1.2, M11.D.2.1.4

Essential content/objectives: At end of the unit, students will be able to:

- Identify solutions of systems of linear equations in two variables
- Solve systems of linear equations in two variables by graphing
- Solve systems of linear equations in two variables by substitution
- Solve systems of linear equations in two variables by elimination
- Compare and choose an appropriate method for solving systems of linear equations
- Solve special systems of linear equations in two variables
- Classify systems of linear equations and determine the number of solutions
- Graph and solve linear inequalities in two variables
- Graph and solve systems of linear inequalities in two variables

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts

Extensions:

- System of equations in three variables

Remediation:

- Use of technology to assist in graphing solutions
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Teacher directed examples
- Warm ups
- Individual, pair, and whole group practice
- Higher ordering questioning

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Teacher directed examples
- Handouts (worksheets)
- Calculators

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 6: Exponents and Polynomials

Time frame: 20 – 25 class periods

Keystone Standards: A1.1.1.1.2, A1.1.1.3.1, A1.1.1.5.1

Anchor(s) or adopted anchor: M11.A.2.2.1, M11.A.2.2.2, M11.D.2.2.1

Essential content/objectives: At end of the unit, students will be able to:

- Simplify expressions utilizing the rules of exponents.
- Evaluate expressions containing zero and integer exponents.
- Simplify expressions containing zero and integer exponents.
- Simplify expressions containing square roots.
- Evaluate and simplify expressions containing rational exponents.
- Classify polynomials and write polynomials in standard form.
- Evaluate polynomial expressions.
- Add, subtract, and multiply polynomials
- Find special products of binomials

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra.
- Complete examples of problems in class.
- Participate in individual, pair, and small group practice of concepts.
- Compare linear and exponential models to discover importance.

Extensions:

- Work with problems involving more variables and fractions within fractions.

Remediation:

- Break types of problems into sections according to what type they are.
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Partner project

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Teacher directed examples
- Handouts (worksheets)
- Calculators

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 7: Factoring Polynomials

Time frame: 17 – 23 class periods

Keystone Standards: A1.1.1.2.1, A1.1.1.5.2, A1.1.1.5.3

Anchor(s) or adopted anchor: M11.A.1.2.1, M11.D.2.2.2, M11.D.2.2.3

Essential content/objectives: At end of the unit, students will be able to:

- Write the prime factorization of numbers
- Find the greatest common factor (GCF) of monomials
- Factor polynomials by using the greatest common factor
- Factor quadratic trinomials of the form $x^2 + bx + c$
- Factor perfect-square trinomials
- Factor the difference of two squares
- Choose an appropriate method for factoring a polynomial
- Combine methods for factoring a polynomial
- Simplify and/or reduce a rational algebraic expression

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Develop a flow chart process of how to factor

Extensions:

- Factor problems where the leading coefficient is not one
- Solve real world problems using factoring techniques

Remediation:

- Review of when to apply different techniques based on the appearance of the polynomial
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Teacher directed examples
- Handouts (worksheets)
- Calculators

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes

Curriculum Scope & Sequence

Planned Course: Algebra I

Unit 8: Data Analysis and Probability

Time frame: 14 – 19 class periods

Keystone Standards: A1.2.3.2.1, A1.2.3.1, A1.2.3.2.2, A1.2.3.3.1

Anchor(s) or adopted anchor: M11.E.1.1.1, M11.E.1.1.2, M11.E.2.1.1, M11.E.2.1.2, M11.E.3.1.1, M11.E.3.1.2, M11.E.4.1.2

Essential content/objectives: At end of the unit, students will be able to:

- Choose a table or a graph to organize/display data
- Create and interpret stem-and-leaf plots
- Create and interpret frequency tables and histograms
- Describe the central tendency of a data set
- Create and interpret box-and-whisker plots
- Recognize misleading graphs and statistics
- Determine the experimental probability of an event
- Use experimental probability to make predictions
- Determine the theoretical probability of an event
- Convert between probabilities and odds
- Find the probability of independent and dependent events

Core Activities: Students will complete/participate in the following:

- Define key terms relating to Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Hands on experiments to compare theoretical and experimental probabilities

Extensions:

- Design and present their own probability experiments. Compare their experiments with the theoretical probability of the event

Remediation:

- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring
- Mathlab assignment
- Study island

Instructional Methods:

- Overhead notes
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Group experiments

Materials & Resources:

- Warm Ups
- Textbook
- Overhead
- Teacher directed examples
- Handouts (worksheets)
- Calculators
- Activity supplies

Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
- Observation of experiments