

## Wilson Area School District Planned Course Guide

**Title of planned course:** Algebra 2

**Subject Area:** Mathematics

**Grade Level:** 10th

**Course Description:** *Prerequisites: Algebra 1* Building on their work with linear, quadratic, exponential and trigonometric functions, students will expand on their knowledge of polynomial, rational and radical functions. Also, students will expand their abilities to model situations and solve equations pertaining to complex numbers. Students will apply properties of logarithms and make sense of problem situations.

**Time/Credit for this Course:** 1 Full Academic Year / 1.0 credit

**Curriculum Writing Committee:** Kimberly Kauffman

## Curriculum Map

**August:** A Review of Basic Algebra (Chapter 1)

**September:** The Real Number System (Chapter 1)

**October:** Graphs, Equations, Lines and Functions (Chapter 2)

**November:** Systems of Linear Equations (Chapter 3)  
Inequalities (Chapter 4)

**December:** Inequalities – continued (Chapter 4)  
Polynomials and Polynomial Functions (Chapter 5)

**January:** Polynomials and Polynomial Functions – continued (Chapter 5)

**February:** Polynomials and Polynomial Functions – continued (Chapter 5)  
Rational Expressions (Chapter 6)

**March:** Rational Expressions – continued (Chapter 6)  
Radicals and Rational Exponents (Chapter 7)

**April:** Radicals and Rational Exponents – continued (Chapter 7)

**May:** Quadratic Functions, Inequalities, and Algebra of Functions (Chapter 8)  
Probability and Statistics (Chapter 11)

**June:** Probability and Statistics (Chapter 11)

## Wilson Area School District Planned Course Materials

**Course Title:** Algebra 2

**Textbook:** Intermediate Algebra, Ninth Edition  
2011, Brooks/Cole  
Cengage Learning

**Teacher Resources:** Textbooks  
Enhanced WebAssign  
Infinite Algebra 2 Software  
Overhead answers and activities  
Worksheets  
Internet  
Teacher created worksheets

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 1:** The Real Number System

**Time frame:** 24-26 class periods

**State Standards:** 2.4.HS.B.3, 2.2.HS.C.4, 2.2.HS.C.5, 2.2.HS.D.9, 2.2.HS.D.10

**Anchor(s) or adopted anchor:** A.1.1.1, A.1.1.2, A.1.3.1, A.1.3.2, A.2.2.1, A.2.2.2, A.3.1.1, B.2.1.1, B.2.2.2, D.2.1.3, E.2.1.1

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

- Identify, classify, compare and graph numbers
- Apply the order of operations to expressions
- Identify properties of real numbers
- Evaluate algebraic expressions for a given value
- Simplify and evaluate expressions using the properties of exponents
- Use scientific notations to simplify expressions
- Solve linear equations
- Model application problems by setting up and solving linear equations

**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
- Complete hands on activity (on uniform motion)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 2:** Graphs, Equations of Lines, and Functions

**Time frame:** 18-20 days

**State Standards:** 2.1.HS.F.3, 2.1.HS.F.5, 2.1.HS.C.1, 2.2.HS.C.2, 2.2.HS.C.3, 2.2.HS.C.4, 2.2.HS.C.5, 2.2.HS.C.6, 2.2.HS.D.7, 2.2.HS.D.8, 2.2.HS.D.10, 2.4.HS.B.2, 2.4.HS.B.3

**Anchor(s) or adopted anchor:** C.3.1.1, C.3.1.2, D.1.1.2, D.1.1.3, D.2.1.2, D.2.1.3, D.3.2.1, D.3.2.2, D.3.2.3, D.4.1.1

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

- Graph linear equations by plotting points, x- and y-intercepts and slope-intercept form
- Graph vertical and horizontal lines
- Find the slope of a line (given a graph, equation, two points, or in applications)
- Determine whether two lines are parallel or perpendicular
- Find the midpoint of a line segment
- Write equations of lines in slope-intercept and point-slope form
- Write equations of parallel or perpendicular lines
- Write equations of lines representing real-world data
- Find the domain and range of a relation and determine if it represents a function
- Use function notation to evaluate a function at a given value
- Graph functions using translations and reflections

**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
- Complete hands on activity (scatter plots)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 3:** Systems of Linear Equations

**Time frame:** 8-10 class periods

**State Standards:** 2.2.HS.D.10

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

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

- Solve a system of two linear equations by graphing (in one variable and two variables)
- Solve a system of two linear equations by substitution (in two variables)
- Solve a system of two linear equations by elimination (in two variables)
- Identify dependent and inconsistent systems

**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
- Complete hands on activity (nuts and bolts activity)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators



**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 4:** Inequalities

**Time frame:** 14-16 class periods

**State Standards:** 2.2.HS.D.7, 2.2.HS.D.10

**Anchor(s) or adopted anchor:** D.2.2.1, D.2.1.2

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

- Solve and graph linear inequalities in one variable
- Solve and graph compound (and/or) inequalities in one variable
- Solve application problems using linear inequalities in one variable
- Solve and graph absolute value equations and inequalities
- Solve and graph linear inequalities in two variables
- Solve and graph compound linear inequalities in two variables
- Solve and graph application problems requiring 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
- Complete hands on activity (tolerance)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 5:** Polynomials and Polynomial Functions

**Time frame:** 21-23 class periods

**State Standards:** 2.2.HS.C.5, 2.2.HS.D.1, 2.2.HS.D.2, 2.2.HS.D.3, 2.2.HS.D.4, 2.2.HS.D.5, 2.2.D.7, 2.2.HS.D.9

**Anchor(s) or adopted anchor:** A.1.2.1, A.2.2.2, A.3.1.1, D.2.1.5, D.2.2.1, D.2.2.2

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

- Classify polynomials by type and degree
- Evaluate and graph polynomial functions
- Perform basic operations on polynomials
- Factor polynomials by various methods
- Solve polynomial equations by factoring

**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
- Complete hands on activity (polynomial bingo)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 6:** Rational Expressions

**Time frame:** 30-32 class periods

**State Standards:** 2.1.HS.F.4, 2.2.HS.D.6, 2.2.D.7, 2.2.HS.D.9

**Anchor(s) or adopted anchor:** A.1.2.1, A.2.1.1, A.2.1.2, A.2.1.3, D.2.2.2, D.2.2.3

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

- Simplify rational expressions
- Find the domain of a rational function
- Perform basic operations on rational expressions
- Simplify complex fractions
- Solve rational equations (including formulas and application problems)
- Divide polynomials using long division and synthetic division
- Apply the remainder theorem and factor theorem
- Solve proportions (including inverse and direct variation)

**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
- Complete hands on activity (variation)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 7:** Radicals and Rational Exponents

**Time frame:** 22-24 class periods

**State Standards:** 2.1.HS.F.1, 2.1.HS.F.6, 2.2.HS.C.2, 2.2.HS.C.4, 2.2.HS.D.2, 2.2.HS.D.6, 2.2.HS.D.7, 2.2.HS.D.8, 2.2.HS.D.9

**Anchor(s) or adopted anchor:** A.1.1.3, A.2.1.1, A.2.2.1, A.2.2.2, C.1.4.1, C.3.1.1, D.2.1.2, D.2.1.3

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

- Simplify perfect roots (square, cube,  $n^{\text{th}}$ )
- Find the domain of square root and cube root functions
- Apply the Pythagorean Theorem to find the missing part of a right triangle
- Find the distance between two coordinated using the distance formula
- Simplify expressions that contain radical exponents by rewriting as rational exponents
- Simplify expressions with rational exponents by applying the properties of exponents
- Simplify radical expression by applying the properties of radicals
- Perform operations on two or more radicals
- Solve application problems containing radical expressions
- Solve radical equations containing one or more radicals
- Solve a formula containing radicals for a specific variable
- Simplify imaginary and complex numbers
- Rationalize the denominator of a fraction that contains a complex number

**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
- Complete hands on activity (Pythagorean Theorem)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island



**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 8:** Quadratic Functions, Inequalities, and Algebra of Functions

**Time frame:** 13-15 class periods

**State Standards:** 2.2.HS.C.2, 2.2.HS.D.6, 2.2.HS.D.9, 2.2.HS.D.10, 2.1.HS.F.6, 2.1.HS.F.7

**Anchor(s) or adopted anchor:** A.1.1.3, D.2.1.2

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

- Solve quadratic equations by factoring, applying the square-root property and completing the square
- Solve application problems requiring the use of the square-root property
- Apply the quadratic formula to solve quadratic equations and applications of quadratic equations

**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
- Complete hands on activity (simulated rocket launch)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies

- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques

## Curriculum Scope & Sequence

**Planned Course:** Algebra 2

**Unit 9:** Probability and Statistics (Chapter 11)

**Time frame:** 10-12 class periods

**State Standards:** 2.4.HS.B.4, 2.4.HS.B.5, 2.4.HS.B.6, 2.4.HS.B.7

**Anchor(s) or adopted anchor:** E.3.1.1, E.3.1.2, E.4.1.2

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

- Process statistical experiments
- Justify conclusions based on sample surveys and experiments
- Identify and use the properties of independence and conditional probability
- Find probabilities of an event and compound 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
- Complete hands on activity (statistical experiment)

**Extensions:**

- Work with more challenging problems

**Remediation:**

- Additional exercises
- Less complex problems to work with to build prior knowledge
- Chapter review exercises that revisit concepts and vocabulary
- Teacher / peer tutoring
- Math lab assignment
- Study Island

**Instructional Methods:**

- Notes on SmartBoard
- Higher order thinking questions
- Warm ups
- Teacher directed examples

**Materials & Resources:**

- Warm ups
- Textbook
- SmartBoard
- Notes and examples
- Handouts / worksheets
- Activity supplies
- Calculators / graphing calculators

**Assessments:**

- Warm ups
- Teacher observations of student work
- Homework / assignments
- Quizzes / tests
- Questioning techniques