Board Approved October 2021

Wilson Area School District
Planned Course Guide

Title of planned course: Algebra 2 Honors

Subject Area: Mathematics

Grade Level: 9

Course Description: *Prerequisites: Algebra 1.* Building on students' 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: One Full Academic Year / 1.0 credit

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Wilson Area School District
Planned Course Materials

Course Title: Algebra 2 Honors

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 Map

August/September: A Review of Basic Algebra (Unit 1)
The Real Number System – continued (Unit 1)

October: Graphs, Equations, Lines and Functions (Unit 2)

November: Systems of Linear Equations (Unit 3)
Inequalities (Unit 4)

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

January: Polynomials and Polynomial Functions – continued (Unit 5)

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

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

April: Radicals and Rational Exponents – continued (Unit 7)

May: Quadratic Functions, Inequalities, and Algebra of Functions (Unit 8)
Probability and Statistics/Advanced Algebraic Topics (Unit 9)

June: Probability and Statistics/Advanced Algebraic Topics (Chapter 10)

Curriculum Scope & Sequence

Planned Course: Algebra 2 Honors

Unit 1: The Real Number System

Time frame: 12 - 13 Blocks

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
- Assign more challenging problems for homework

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 Honors

Unit 2: Graphs, Equations of Lines, and Functions

Time frame: 9 - 10 Blocks

State Standards: 2.1.HS.F.3, 2.1.HS.F.5, 2.1.HS.C.1, 2.2.HS.C.2-6, 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
- Find the inverse of functions
- Use composite function to evaluate functions at a given value
- Find the domain of a composite function
- 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
- Assign more challenging problems for homework

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
- Hands on activity with partners matching linear graphs to their equations

Curriculum Scope & Sequence

Planned Course: Algebra 2 Honors

Unit 3: Systems of Linear Equations

Time frame: 4 - 5 Blocks

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
- Solve a system of two linear equations by using matrix operations (calculator only)
- Solve application problems involving systems of 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 (nuts and bolts activity)

Extensions:

- Work with more challenging problems
- Assign more challenging problems for homework

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 Honors

Unit 4: Inequalities

Time frame: 7 - 8 Blocks

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
- Assign more challenging problems for homework

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 Honors

Unit 5: Polynomials and Polynomial Functions

Time frame: 10 - 14 Blocks

State Standards: 2.2.HS.C.5, 2.2.HS.D.1-5, 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.2.2.1-2

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
- Find the GCF among monomial terms
- Solve polynomial inequalities by factoring and graphing
- Solve application problems involving polynomial 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 (polynomial bingo)

Extensions:
- Work with more challenging problems
- Assign more challenging problems for homework

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 Honors

Unit 6: Rational Expressions

Time frame: 15 - 16 Blocks

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.2.1.1-3, 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
- Find the range of a rational function
- Find the LCM among monomial terms
- 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
- Assign more challenging problems for homework

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 Honors

Unit 7: Radicals and Rational Exponents

Time frame: 11 - 12 Blocks

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.6-9

Anchor(s) or adopted anchor: A.1.1.3, A.2.1.1, A.2.2.1-2, C.1.4.1, C.3.1.1, D.2.1.2-3

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

- Simplify perfect roots (square, cube, n^{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 coordinates using the distance formula
- Identify the center of a circle and find the radius of a circle
- 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
- Assign more challenging problems for homework

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 Honors

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

Time frame: 6 - 8 Blocks

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

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
- Graph quadratic equation to find the intercepts of the parabola

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
- Assign more challenging problems for homework

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 Honors

Unit 9: Probability and Statistics and Advanced Algebraic Topics

Time frame: 5 - 6 Blocks

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
- Solve a system of two linear equations by using matrix operations (in two variables)
- Solve a system of three linear equations (in three variables)
- Find the roots of depressed equations
- Find all roots of rational polynomials
- Perform basic operations using natural logs
- Use the graphing calculator to enhance their understanding of many concepts

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
- Assign more challenging problems for homework

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