

Wilson Area School District Planned Course Guide

Title of planned course: Algebra 2

Subject Area: Mathematics

Grade Level: 10th

Course Description: Students will continue solving linear equations and inequalities, graphing linear functions and linear inequalities and solving systems of equations and inequalities. Factoring polynomials will be reviewed and expanded on extensively as well. Students will be able to apply exponent knowledge and radical knowledge from Algebra I to simplify expression and solve equations with complex applications.

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

Curriculum Writing Committee: Kimberly Kauffman

Curriculum Map

August: Simplifying Algebraic Expressions (Chapter 1, Lessons 2, 5 & 6)
Solving Equations (Chapter 1, Lesson 5)
Solving Absolute Value Equations (Chapter 4, Lesson 2)

September: Solving Equations (Chapter 1, Lesson 6)
Polynomials, Polynomial Functions and Equations (Chapter 5, Lessons 1-4)

October: Polynomials, Polynomial Functions and Equations (Chapter 5, Lessons 4-8)

November: Polynomials, Polynomial Functions and Equations (Chapter 5, Lesson 8)
Graphs, Equations of Lines and Functions (Chapter 2, Lessons 1-3)

December: Graphs, Equations of Lines and Functions (Chapter 2, Lesson 4)
Inequalities (Chapter 4, Lessons 1 & 3)

January: Inequalities (Chapter 4, Lesson 3)

February: Quadratic Inequalities (Chapter 8, Lesson 5)
Inequalities (Chapter 4, Lesson 4)
Properties of Exponents (Chapter 1, Lesson 3)

March: Rational Expressions (Chapter 6, Lessons 1-5)
Radicals and Rational Exponents (Chapter 7, Lessons 1 & 3)

April: Radicals and Rational Exponents (Chapter 7, Lessons 4-6)
Systems of Linear Equations (Chapter 3, Lessons 1 & 2)
System of Linear Equation Word Problems (Chapter 1, Lesson 7)

May: System of Linear Equation Word Problems (Chapter 1, Lesson 7)
Imaginary and Complex Numbers (Chapter 7, Lesson 7)
Quadratic Equations (Chapter 8, Lessons 1 & 2)

June: Quadratic Equations (Chapter 8, Lessons 1 & 2)

Wilson Area School District Planned Course Materials

Course Title: Algebra 2

Textbook: Intermediate Algebra, Tenth Edition
2015
Cengage Learning

Teacher Resources:

- Textbooks
- Instructor Resource Binder (If purchased)
- Enhanced WebAssign (If purchased)
- Infinite Algebra 2 Software
- Teacher created worksheets
- Internet Resource

Curriculum Scope & Sequence

Planned Course: Algebra 2

Unit 1: Algebraic Expressions and Equations
Chapter 1, Lessons 2, 5 and 6
Chapter 4, Lesson 2

Time frame: 6-7 class periods

State Standards: CC.2.1.HS.F.4, CC.2.2.HS.D.8, CC.2.2.HS.D.9

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

- Apply the order of operations to expressions
- Evaluate algebraic expressions for a given value
- Use scientific notations to simplify expressions
- Solve linear equations
- Model application problems by setting up and solving linear equations
- Solve absolute value 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
- Analyze problems and do one of the following:
 - i. find the mistake
 - ii. determine the next step
 - iii. give a reason that includes mathematical terminology to explain a particular step in the problem
- Complete hands on activity (absolute value equation card sort)

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Algebra 2

Unit 2: Polynomials
Chapter 5, Lessons 1 - 8

Time frame: 20 days

State Standards: CC.2.2.HS.D.2, CC.2.2.HS.D.3, CC.2.2.HS.D.8, CC.2.2.HS.D.9

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

- Classify polynomials by type and degree
- Evaluate polynomial functions
- Perform basic operations on polynomials
- Factor polynomials by various methods
- Solve polynomial equations by factoring
- Solve polynomial inequalities 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 (factoring puzzles for $a = 1$ and $a > 1$)

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Algebra 2

Unit 3: Graphs, Equations of Lines and Functions
Chapter 2, Lessons 1 - 4

Time frame: 9-10 days

State Standards: CC.2.2.HS.D.7, CC.2.2.HS.D.10, CC.2.2.HS.C1, CC.2.2.HS.C.3, CC.2.2.HS.C.6, CC.2.4.HS.B.4

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
- 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
- Stained Glass Graphing 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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

Chapter 4, Lessons 1 and 2

Chapter 8, Lesson 5

Time frame: 4-5 class periods

State Standards: CC.2.2.HS.D.2, CC.2.2.HS.D.10

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
- Solve quadratic inequality problems that require 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
- Analyze problems and do one of the following:
 - i. find the mistake
 - ii. determine the next step
 - iii. give a reason that includes mathematical terminology to explain a particular step in the problem

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Algebra 2

Unit 5: Properties of Exponents
Chapter 1, Lesson 3

Time frame: 1-2 class period

State Standards: CC.2.1.HS.F.1

Essential content/objectives: At end of the unit, students will be able to simplify expressions using properties of exponents.

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
- Analyze problems and do one of the following:
 - i. find the mistake
 - ii. determine the next step
 - iii. give a reason that includes mathematical terminology to explain a particular step in the problem

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

- Warm ups
- Textbook
- ThinkPad
- Notes and examples
- Handouts / worksheets
- Activity supplies
- 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 and Equations
Chapter 6, Lessons 1 - 5

Time frame: 10-11 class periods

State Standards: CC.2.2.HS.D.2, CC.2.2.HS.D.6

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

- Simplify rational expressions
- Perform basic operations on rational expressions
- Simplify complex fractions
- Solve rational equations (including formulas and application problems)

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
- Analyze problems and do one of the following:
 - i. find the mistake
 - ii. determine the next step
 - iii. give a reason that includes mathematical terminology to explain a particular step in the problem

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

- Warm ups
- Textbook
- ThinkPad
- Notes and examples
- Handouts / worksheets
- Activity supplies
- 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
Chapter 7, Lessons 1 and 3-7

Time frame: 10-12 class periods

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

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

- Simplify perfect roots (square, cube, n^{th})
- 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 such as addition and subtraction on two or more radicals
- Rationalize the denominator of a fraction
- 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
- Complex Numbers Activity 1 - DESMOS

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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

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: Systems of Linear Equations and Inequalities

Time frame: 8-10 class periods

State Standards: CC.2.2.HS.D.7, CC.2.2.HS.D.1, CC.2.2.HS.C.2

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 inequalities by graphing (in two variables)
- Solve a system of two linear inequalities by elimination (in two variables)
- Solve and graph application problems requiring linear equations 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 (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

Instructional Methods:

- Direct Instruction / Group Work / Individual Work
- Higher order thinking questions
- Warm ups
- Teacher directed examples

Materials & Resources:

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

Assessments:

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

Curriculum Scope & Sequence

Planned Course: Algebra 2

Unit 9: 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 by 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
- Model, solve and graph quadratic equations using a vertex and axis of symmetry

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