Title of planned course: Pre-Algebra

Subject Area: Mathematics

Grade Level: 8

Course Description: Prerequisites: Complete 7th grade math. The course is the study of Variables, Expressions, and Integers, Solving Equations, Factors, Fractions, and Exponents, Rational Numbers and Equations, Linear Functions, Volume, and Transformations.

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: 1.0

Curriculum Writing Committee: Kathleen Zane, Julia Morrissey
Wilson Area School District
Curriculum Map

August: Variables, Expressions, and Integers (8-11 class periods)

September: Variables, Expressions, and Integers (cont.)
Solving Equations (11-14 class periods)

October: Multi-step Equations (12-15 class periods)
Factors, Fractions, and Exponents (12-15 class periods)

November: Factors, Fractions, and Exponents (cont.)
Linear Functions (31-40 class periods)

December: Linear Functions (cont.)

January: Linear Functions (cont.)
Systems of Equations (10-14 class periods)

February: Systems of Equations (cont.)
Geometry (16-19 class periods)

March: Geometry (cont.)
Transformations (9-12 class periods)
Probability (7-9 class periods)

April: Probability (cont.)
Inequalities (10-15 class periods)

May: Inequalities (cont.)
Applications/ Prior Topics (10-15 class periods)

June: Applications/ Prior Topics (cont.)
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Planned Course Materials

Course Title: Pre-Algebra

Textbook: Pre-Algebra
Larson/Houghton Mifflin © 2012

Supplemental Books: Pre-Algebra
Holt/Rinehart/Winston © 2008

Teacher Resources:
- Textbooks
- Worksheets
- Internet
- Teacher created worksheets
- Additional worksheets and cooperative learning books
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 1:** Variables, Expressions, and Integers

**Time frame:** 8-11 class periods

**Anchor(s) or adopted anchor:** M08.B-E.1.1.2, M08.A-N.1.1, CC.2.1.8.E.4, A1.1.1.1.1

**Essential content/objectives:** At end of the unit, students will be able to:
- Evaluate and write variable expressions
- Use powers to describe repeated multiplication
- Represent numbers using exponential and square root forms
- Identify and plot points in a coordinate plane and use them to graph functions

**Core Activities:** Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Create flash cards to memorize required square roots and cube roots

**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

**Instructional Methods:**
- Higher order thinking questions
- Individual, pair, and small group practice
- Warm ups
- Teacher directed examples
- Demonstration of how to use flashcards

**Materials & Resources:**
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Activity supplies – flash cards
- Calculators
Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
Curriculum Scope & Sequence

Planned Course: Pre-Algebra

Unit 2: Solving Equations

Time frame: 11-14 class periods

Anchor(s) or adopted anchor: M08.B-E.3.1.2

Essential content/objectives: At end of the unit, students will be able to:
- Use properties of addition and multiplication
- Use the distributive property with algebraic expressions
- Simplify variable expressions
- Solve one step equations with variables
- Solve equations involving decimals

Core Activities: Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Use visual aids to assist in learning
- Work in centers to review properties

Extensions:
- Use less technology to assist in operations with numbers

Remediation:
- Additional exercises
- Use more technology to assist in operations with numbers
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

Instructional Methods:
- Teacher directed examples
- Higher order thinking questions
- Individual, pair, and whole group practice
- Calculator instruction
- Warm ups
- Whiteboard activity

Materials & Resources:
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators
Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
Curriculum Scope & Sequence

Planned Course: Pre-Algebra

Unit 3: Multi-Step Equations

Time frame: 12-15 class periods

Anchor(s) or adopted anchor: M08.B-E.3.1.1, M08.B-E.3.1.2

Essential content/objectives: At end of the unit, students will be able to:
- Solve two-step equations
- Use distributive property and combining like terms
- Solve equations with like terms and parentheses
- Solve equations with variables on both sides

Core Activities: Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Work in centers to practice solving
- Choose between projects (headline story, word problems, or mobile)

Extensions:
- Solve more difficult problems
- Design real world application problems
- Peer tutoring

Remediation:
- Additional exercises
- Chunk problems into parts to help organize students
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

Instructional Methods:
- Teacher directed examples
- Higher order thinking questions
- Individual, pair, and small group practice
- Warm ups
- Student directed projects
Materials & Resources:
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators
- Project supplies – paper, string, scissors, hole punch, chromebooks

Assessments:
- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Project
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 4:** Factors, Fractions, and Exponents

**Time frame:** 12-15 class periods

**Anchor(s) or adopted anchor:** M08.B.E.1.1.1, M08.B.E.1.1.3, M08.B.E.1.1.4

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

- Simplify exponential expressions
- Multiply and divide powers
- Work with numbers in scientific notation

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

- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Student exploration of negative and zero exponents

**Extensions:**

- Demonstrate multi-step operations on numbers in scientific notation with no calculator

**Remediation:**

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

**Instructional Methods:**

- Teacher directed examples
- Higher order thinking questions
- Individual, pair, and small group practice
- Warm ups

**Materials & Resources:**

- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators

**Assessments:**

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 5:** Linear Functions

**Time frame:** 31-40 class periods

**Anchor(s) or adopted anchor:** M08.B-E.2.1, M08.B-F.1.1, M08.B-F.2.1, A1.1.2.1

**Essential content/objectives:** At end of the unit, students will be able to:
- Use graphs to represent relations and functions
- Find solutions of equations in two variables
- Use x- and y-intercepts to graph linear equations
- Solve for y in a linear equation
- Find and interpret slopes of lines equations in slope-intercept form.
- Write linear equations.
- Write equations of parallel and perpendicular lines.
- Use function notation to describe lines.

**Core Activities:** Students will complete/participate in the following:
- Define key terms relating to Pre-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
- Whiteboard activities to practice skills

**Extensions:**
- Work with problems that have fractional and decimal values
- Consider what happens when two linear equations come together

**Remediation:**
- Additional exercises
- Break problems into smaller sections
- Chunk problems into component parts
- Give more instructions on what process to use for particular problems
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

**Instructional Methods:**
- Teacher directed examples
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Teacher directed physical activity
Materials & Resources:
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators
- Activity supplies – tape, rope

Assessments:
- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
- Activity observation
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 7:** Systems of Equations

**Time frame:** 10-14 class periods

**Anchor(s) or adopted anchor:** M08.B-E.3.1.3-5, A1.1.2.2

**Essential content/objectives:** At end of the unit, students will be able to:
- Connect solving equations with solving systems of equations
- Identify solutions of systems of linear equations in two variables
- Solve systems of linear equations in two variables by graphing
- Solve a system of linear equations using the substitution method

**Core Activities:** Students will complete/participate in the following:
Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts by elimination

**Remediation:**
- Use of technology to assist in graphing solutions
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

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

**Materials & Resources:**
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Individual whiteboards
- Calculators
Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 8:** Geometry

**Time frame:** 16-19 class periods

**Anchor(s) or adopted anchor:** M08.C-G.3.1, M08.C-G.2.1, A1.1.1.1.2

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

- Determine area and circumference of circles
- Find volume of spheres
- Find volume of cylinders
- Find volume of cones
- Use Pythagorean Theorem
- Apply all topics to applications

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

- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Relate different formulas to each other
- Read non-fiction on the history of the Pythagorean Theorem

**Extensions:**

- Work with more complex multi-step problems

**Remediation:**

- Use visual aids
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

**Instructional Methods:**

- Teacher directed examples
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice
- Partner project

**Materials & Resources:**

- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Questioning techniques
Curriculum Scope & Sequence

Planned Course: Pre-Algebra

Unit 9: Transformations

Time frame: 9-12 class periods

Anchor(s) or adopted anchor: M08.C-G.1.1

Essential content/objectives: At end of the unit, students will be able to:
  - Translate points and figures
  - Reflect points and figures
  - Rotate points and figures
  - Dilate points and figures

Core Activities: Students will complete/participate in the following:
  - Define key terms relating to Pre-Algebra
  - Complete examples of problems in class
  - Participate in individual, pair, and small group practice of concepts

Extensions:
  - Look for patterns to develop shortcuts to transformations

Remediation:
  - Chapter review exercises which revisits concepts and vocabulary
  - Teacher/peer tutoring
  - Visual and technological aids

Instructional Methods:
  - Teacher directed examples
  - Warm ups
  - Higher order thinking questions
  - Individual, pair, and small group practice

Materials & Resources:
  - Warm Ups
  - Textbook
  - Projector
  - Teacher directed notes
  - Handouts (worksheets)

Assessments:
  - Warm Ups
  - Teacher observation of student work
  - Homework assignments
  - Test/quizzes
Curriculum Scope & Sequence

**Planned Course:** Pre-Algebra

**Unit 10:** Probability

**Time frame:** 7-9 class periods

**Anchor(s) or adopted anchor:** M08.D-S.1.1, M08.D-S.1.2

**Essential content/objectives:** At end of the unit, students will be able to:
- Write lines of best fit to match scatterplots
- Use two-way tables to find information

**Core Activities:** Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Connect lines of best fit to linear equations
- Complete project to connect line of best fit to scatterplots

**Extensions:**
- Extend knowledge into deeper applications.

**Remediation:**
- Teacher/peer tutoring

**Instructional Methods:**
- Teacher directed examples
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice

**Materials & Resources:**
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators
- Activity supplies – tape measurers

**Assessments:**
- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
- Project
Curriculum Scope & Sequence

Planned Course: Pre-Algebra

Unit 11: Inequalities

Time frame: 9-12 class periods

Anchor(s) or adopted anchor: A1.1.3.1

Essential content/objectives: At end of the unit, students will be able to:
- Graph inequalities
- Solve one-step inequalities by using addition and subtraction
- Solve one-step inequalities by using multiplication and division
- Solve inequalities with more than one operation
- Solve inequalities with variables on both sides
- Solve and graph compound inequalities

Core Activities: Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class
- Participate in individual, pair, and small group practice of concepts
- Whiteboard activities
- Complete centers to relate inequalities to real world situations

Extensions:
- Make connections between solving equations and solving inequalities
- Work with more difficult problems

Remediation:
- Chapter review exercises which revisits concepts and vocabulary
- Teacher/peer tutoring

Instructional Methods:
- Teacher directed examples
- Warm ups
- Higher order thinking questions
- Individual, pair, and small group practice

Materials & Resources:
- Warm Ups
- Textbook
- Projector
- Teacher directed notes
- Handouts (worksheets)
- Calculators
- Individual whiteboards
Assessments:

- Warm Ups
- Teacher observation of student work
- Homework assignments
- Test/quizzes
Curriculum Scope & Sequence

Planned Course: Pre-Algebra

Unit 12: Applications/Prior Topics

Time frame: 10-15 class periods

Anchor(s) or adopted anchor: CC.2.2.HS.D.9, CC.2.2.7.B.3, A1.1.1.4.1, A1.1.1.5.1, A1.1.2.1, A1.2.1.1, A1.2.1.2

Essential content/objectives: At end of the unit, students will be able to:
- Demonstrate proficiency on objectives throughout the year in order to prepare for Keystone testing in 9th grade

Core Activities: Students will complete/participate in the following:
- Define key terms relating to Pre-Algebra
- Complete examples of problems in class Participate in individual, pair, and small group practice of concepts
- Create a presentation on prior learned topics
- Present information to the class

Extensions: Students can use creativity to enhance presentations

Remediation:
- Teacher/peer tutoring
- Group work to help struggling students

Instructional Methods:
- Higher order thinking activities
- Individual, pair, and small group practice
- Student and Teacher directed examples

Materials & Resources:
- Textbook
- Student and Teacher directed notes
- Handouts (worksheets) – Student designed
- Calculators

Assessments:
- Teacher observation and evaluation of student work
- Homework assignments
- Test/quizzes