Pre-Algebra (7) B

Mathematics

Course Overview

Students will develop skills in using variables, evaluating algebraic expressions by the use of the order of operations, solving equations and inequalities, graphing linear equations, functions and linear and linear inequalities, writing linear equations, and using functions. Problem solving skills will be emphasized and developed.

Scope And Sequence

Timeframe	Unit	Instructional Topics
64 Day(s)	Unit 1: Rational Numbers and Equations	1. Preparing for Pre-Algebra 2. The Tools of Algebra 3. Operations with Integers 4. Operations with Rational Numbers 5. Expressions and Equations 6. Multi-Step Equations and Inequalities
26 Day(s)	Unit 2: Proportions and Similarity	1. Ratio, Proportions, and Similar Figures 2. Percent
28 Day(s)	Unit 3: Linear and Nonlinear Functions	1. Linear Functions and Graphing 2. Powers and Nonlinear Functions
42 Day(s)	Unit 4: Two- and Three-Dimensional Space	1. Real Numbers and Right Triangles 2. Distance and Angle 3. Surface Area and Volume
16 Day(s)	Unit 5: Data Sets	1. Statistics and Probability
8 Day(s)	Unit 6: Looking Ahead to Algebra	1. Looking Ahead to Algebra

Course Details

Unit: Unit 1: Rational Numbers and Equations

Duration: 64 Day(s)

Pre-Algebra (7) B

Mathematics

Unit Overview

Students will understand how to add, subtract, multiply, and divide integers and other rational numbers. They will also learn to solve equations and inequalities.

Academic Vocabulary

Numerical Expression
Evaluate
Order of Operations
Variable
Algebraic Expression
Properties
Simplify
Coordinate System
Coordinate Plane
Origin
Ordered Pair
Relation
Domain, Range
Function
Function table
Function Rule
Equation
Scatter Plot
Negative Number
Positive Number
Integers
Coordinate
Inequality
Absolute Value
Zero Pair
Opposites
Additive Inverse
Mean
Quadrants
Translation
Reflection
Terminating Decimal
Repeating Decimal
Bar Notation
Rational Numbers
Multiplicative Inverse
Reciprocal
Like Fractions
Unlike Fraction
Equivalent Expressions
Distributive Property
Term
Coefficient
Constant
Equation
Solution
Inverse Operation
Two-Step Equation
Formula
Perimeter
Area
Inequality
Null/ Empty Set
Identify

Topic: Preparing for Pre-Algebra	**Duration:** 9 Day(s)

Topic Overview

Students will review several concepts, skills, and vocabulary terms as they study this chapter.

Learning Targets

A Plan for Problem Solving

Problem-Solving Strategies

Number and Operations

Pre-Algebra (7) B
Mathematics

Grade(s) 7th, Duration 1 Year, 1 Credit
Required Course

Algebra	
Geometry	
Measurement	
Data Analysis	

Topic: The Tools of Algebra   **Duration:** 14 Day(s)

Topic Overview
1) Use variables, expressions, and equations to model real-world problems
2) Predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations
3) Locate and name points on a coordinate graph
4) Draw conclusions and make predictions using scatter plots

Learning Targets
Variables and Expressions

Spreadsheet Lab: Expressions and Spreadsheets

Properties

Words, Equations, Tables, and Graphs

Algebra Lab: Scatter Plots

Scatter Plots

Graphing Technology Lab: Scatter Plots

Topic: Operations with Integers   **Duration:** 13 Day(s)

Topic Overview
1) Compare and Order Integers
2) Select appropriate operations to solve problems involving integers
3) Locate and name points on a coordinate plane using ordered pairs of integers
4) Graph reflections and translations on a coordinate plane

Learning Targets
Algebra Lab: Adding Integers

Adding Integers

Algebra Lab: Subtracting Integers

Subtracting Integers

Multiplying Integers

Dividing Integers

Translations and Reflections on the Coordinate Plane

Topic: Operations with Rational Numbers   **Duration:** 9 Day(s)

Topic Overview
1) Explore rational numbers
2) Multiply and divide fractions
3) Add and subtract like fractions and unlike fractions
4) Convert fractions to decimals
5) Factor numbers
6) Determine least common multiple

Learning Targets
Fractions and Decimals

Rational Numbers

Multiplying Rational Numbers

Dividing Rational Numbers

Adding and Subtracting Like Fractions

Adding and Subtracting Unlike Fractions

Topic: Expressions and Equations	**Duration:** 10 Day(s)

Topic Overview
1) Communicate mathematical ideas using algebraic mathematical models
2) Use inverse operations to solve equations
3) Predict, find, and justify solutions to application problems using algebraic equations

Learning Targets
Distributive Property

Simplifying Algebraic Expressions

Solving Equations by Adding or Subtracting

Solving Equations by Multiplying or Dividing

Solving Two-Step Equations

Writing Equations

Topic: Multi-Step Equations and Inequalities	**Duration:** 9 Day(s)

Topic Overview
1) Predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations
2) Use formulas to solve problems
3) Translate verbal phrases into inequalities

Learning Targets
Perimeter and Area

Solving Equations with Variables on Each Side

Inequalities

Solving Inequalities

Solving Multi-Step Equations and Inequalities

Unit: Unit 2: Proportions and Similarity	**Duration:** 26 Day(s)

Pre-Algebra (7) B

Mathematics

Grade(s) 7th, Duration 1 Year, 1 Credit
Required Course

Unit Overview

Students will learn the connection between ratios, proportions, and similar figures. They will also study percent and percent of change.

Academic Vocabulary

Ratio
Rate
Unit Rate
Dimensional Analysis
Proportional
Nonproportional
Constant of Proportionality
Proportion
Cross Products
Inverse Proportion
Scale Drawing
Scale Model
Scale
Scale Factor
Similar Figures
Corresponding Parts
Dilation
Indirect Measurement
Percent
Percent Proportion
Percent Equation
Percent of Change
Percent of Increase
Percent of Decrease
Interest
Principal
Compound Interest
Circle Graph

Topic: Ratio, Proportions, and Similar Figures	**Duration:** 13 Day(s)

Topic Overview

1) Compare and contrast proportional and nonproportional linear relationships
2) Use proportional relationships in similar two-deimnsional figures to find missing measurements

Learning Targets

Ratios

Unit Rates

Proportional and Non-Proportional Relationships

Solving Proportions

Scale Drawings and Models

Similar Figures

Dilations

Indirect Measurement

Topic: Percent	**Duration:** 13 Day(s)

Topic Overview

1) Use ratios, proportions, and percent of change to solve problems
2) Evaluate a solution for reasonableness
3) Select and use appropriate representations for presenting and displyaing relationships among collected data

Unit: Unit 3: Linear and Nonlinear Functions	**Duration:** 28 Day(s)

Course Summary
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Page 5

02/13/2015 03:30 PM
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Pre-Algebra (7) B

Mathematics

Unit Overview

Students will learn to identify functions and graph them using various forms of equations. They will also learn the rules of exponents.

Academic Vocabulary

Independent Variable
Dependent Variable
Vertical Line Test
Function Notation
Sequence
Term
Arithmetic Sequence
Common Difference
Linear Equation
X-intercept
Y-intercept
Rate of Change
Linear Relationship
Constant rate of change
Direct Variation
Constant of Variation
Slope
Slope-Intercept Form
Point-Slope Form
Line of Fit
System of Equations
Substitution
Exponent
Power
Base
Prime Number
Composite Number
Prime Factorization
Factor Tree
Monomial
Factor
Standard Form
Scientific Notation
Nonlinear Function
Quadratic Function
Parabola
Cubic Function
Exponential Function

Topic: Linear Functions and Graphing	**Duration:** 15 Day(s)

Topic Overview
1) Generate a different representation of data given another representation of data
2) Predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations
3) Draw conclusions and make predictions by analyzing trends in scatter plots

Topic: Powers and Nonlinear Functions	**Duration:** 13 Day(s)

Topic Overview
1) Examine factors and monomials
2) Evaluate expressions with powers and exponents
3) Multiply and divide monomials
4) Express numbers using positive and negative exponents
5) Use scientific notation
6) Communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models

Unit: Unit 4: Two- and Three-Dimensional Space	**Duration:** 42 Day(s)

Unit Overview

Students will learn the characteristics of triangles, angles, and three-dimensional figures.

Pre-Algebra (7) B

Mathematics

Academic Vocabulary

Perfect Square
Square Root
Radical Sign
Irrational Numbers
Real Numbers
Vertex,
Acute Angle
Right Angle
Obtuse Angle
Straight Angle
Congruent
Acute Triangle
Obtuse Triangle
Right Triangle
Scalene Triangle
Isosceles Triangle
Equilateral Triangle
Legs
Hypotenuse
Pythagorean Theorem
Solving a Right Triangle
Converse
Distance Formula
Parallel Lines
Transversal
Alternate Interior Angles
Alternate Exterior Angles
Corresponding Angles
Perpendicular Lines
Vertical Angles
Adjacent Angles
Complementary Angles
Supplementary Angles
Congruent
Corresponding Parts
Rotation
Center of Rotation
Rotational Symmetry
Quadrilateral
Polygon
Diagonal
Interior Angle
Regular Polygon
Tessellation
Base
Altitude
Circle
Center
Radius
Diameter
Chord
Circumference
Pi
Composite Figure
Plane
Solid
Polyhedron
Edge
Vertex
Face
Prism
Base
Pyramid
Cylinder
Cone
Cross Section
Volume

Pre-Algebra (7) B

Mathematics

Sphere
Lateral Face
Lateral Area
Surface Area
Regular Pyramid
Slant Height
Similar Solids

Topic: Real Numbers and Right Triangles	**Duration:** 12 Day(s)

Topic Overview
   1) Communicate mathematical ideas using algebraic mathematical models
   2) Use geometric concepts and properties to solve problems in fields such as art and architecture
   3) Use the Phthagorean Theorem to solve real-world problems

Topic: Distance and Angle	**Duration:** 14 Day(s)

Topic Overview
   1) Use geometric concepts and properties to solve problems in fields such as art and architecture
   2) Graph rotations on a coordinate plane
   3) Use properties to classify quadrilaterals and other polygons

Topic: Surface Area and Volume	**Duration:** 16 Day(s)

Topic Overview
   1) Draw three-dimensional figures from different perspectives
   2) Connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects
   3) Estimate measurements and use formulas to solve application problems involving lateral and surface area
   4) Use proportional relationships in similar three-dimensional figures to find missing measurements

Unit: Unit 5: Data Sets   **Duration:** 16 Day(s)

Unit Overview
   Students will create graphs using specific data and find the probabilities of events.

Academic Vocabulary
   Measure of Central Tendency
   Mean
   Median
   Mode
   Stem-and-Leaf Plot
   Stems
   Leaves
   Measure of Variation
   Range
   Quartiles
   Outlier
   Box-and-Whisker Plot
   Histogram
   Outcomes
   Theoretical Probability
   Experimental Probability
   Sample
   Population
   Unbiased Sample
   Biased Sample
   Tree Diagram
   Fundamental Counting Principle
   Permutations
   Combinations
   Independent Events
   Dependent Events
   Mutually Exclusive Events

Topic: Statistics and Probability	**Duration:** 16 Day(s)

Pre-Algebra (7) B

Mathematics

Topic Overview
1) Select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem-and-leaf plots, circle graphs, bar graphs, box-and-whisker plots, histograms, and Venn diagrams, with and without the use of technology
2) Find the probabilites of dependent and independent events
3) Evaluate methods of sampling to determine validity of an inference made from a set of data

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Unit: Unit 6: Looking Ahead to Algebra

Duration: 8 Day(s)

Unit Overview
Students will use this time to explore different types of polynomials and simplify expressions involving polynomials.

Academic Vocabulary
Polynomial
Binomial
Monomial
Trinomial

Topic: Looking Ahead to Algebra

Duration: 8 Day(s)

Topic Overview
These topics help students get ready for the next year by introducing key standards from algebra at a concrete level. Students will investigate operations with polynomials.