Pre-Algebra (7)

Mathematics

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

Course Overview

In Grade 7, instructional time focuses on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

In addition students will be instructed in the areas of irrational numbers, solving more complex equations, interpreting graphs, congruence and similarity, and solving real world problems involving volume.

Scope And Sequence

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

Materials and Resources
Glencoe McGraw-Hill Pre-Algebra 2010 edition
Studyisland.com
connect-mcgraw-hil.com (student was given login and password)

Prerequisites
6th Grade Math

Course Details

Unit: Rational Numbers and Equations

Duration: 64 Day(s)

Materials and Resources
Glencoe Mc-Graw Hill Pre-Algebra book, 2010 copyright
studyisland.com
connected.mcgraw-hill.com

Academic Vocabulary
numerical expression
evaluate
order of operations
algebra
variable
algebraic expression
counterexample
simplify
y-axis
coordinate plane
origin
x-axis
ordered pair
function
function rule
function table
equation
sum
difference
operations
product
quotient

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

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

| **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

| **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

| **Topic:** 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 comon multiple

| **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

| **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

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

| **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

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| **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 displaying relationships among collected data

Learning Targets

Fractions and Percents

Fractions, Decimals, and Percents

Using the Percent Proportion

Find Percent of a Number Mentally

Using Percent Equations

Percent of Change

Simple and Compound Interest

Circle Graphs

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

| **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

Learning Targets

Functions

Rate of Change

Constant Rate of Change and Direct Variation

Slope

Slope-Intercept Form

| **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

Learning Targets

Powers and Exponents

Prime Factorization

Multiplying and Dividing Monomials

Negative Exponents

Scientific Notation

Powers and Monomials

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

| **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

Learning Targets

Squares and Square Roots

The Real Number System

Triangles

The Pythagorean Theorem

Special Right Triangles

| **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

Learning Targets

Angle and Line Relationships

Congruent Triangles

Rotations

Quadrilaterals

Polygons

Area of Parallelograms, Triangles, and Trapezoids

Circles and Circumference

Area if Circles

| **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

Learning Targets

Three-Dimensional Figures

Volume of Prisms

Volume of Cylinders

Volumes of Pyramids, Cones, and Spheres

Surface Area of Prisms

Surface Area of Cylinders

Surface Area of Pyramids and Cones

Similar Solids

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

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

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

Learning Targets

Theoretical and Experimental Probability

Using Sampling to Predict

Counting Outcomes

Probability of Compound Events

Unit: Looking Ahead to Algebra　　　　　　　　　　　　　　　　**Duration:** 8 Day(s)

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 opearations with polynomials.

Learning Targets

Polynomials

Adding Polynomials

Subtracting Polynomials

Multiplying a Binomial by a Monomial

Multiplying Two Binomials

Dividing a Polynomial by a Monomial

Using the GCF to Factor Polynomials

Factoring Trinomials