Mathematics (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.

Scope And Sequence

Timeframe	Unit	Instructional Topics
11 Day(s)	Expressions and Patterns	1. Expressions 2. Patterns 3. Square Roots
13 Day(s)	Integers	1. Integers and the Coordinate Plane 2. Add and Subtract Integers 3. Multiply and Divide Integers
16 Day(s)	Rational Numbers	1. Rational Numbers 2. Add and Subtract Fractions 3. Multiply and Divide Fractions 4. Monomials
17 Day(s)	Equations and Inequalities	1. Addition and Subtraction Equations 2. Multiplication and Division Equations 3. Multi-Step Equations 4. Inequalites
12 Day(s)	Proportions and Similarity	1. Proportions 2. Scale Drawings and Models 3. Similarity and Proportional Reasoning
14 Day(s)	Percent	1. Percents 2. Proportions and Equations 3. Applying Percents
15 Day(s)	Linear Functions	1. Rates and Functions 2. Slope 3. Variation
14 Day(s)	Probability and Predictions	1. Probability 2. Compound Events 3. Predictions
15 Day(s)	Statistical Displays	1. Measures of Central Tendency 2. Measures of Variation 3. Statistical Displays 4. More Statistical Displays
16 Day(s)	Volume and Surface Area	1. Volume 2. Surface Area 3. Composite Figures
11 Day(s)	Measurement and Proportional Reasoning	1. Convert Measurements 2. Similar Solids
16 Day(s)	Polygons and Transformations	1. Polygons 2. Translations 3. Reflections 4. Rotations 5. Dilations

Mathematics (7)

Mathematics

Materials and Resources

Glencoe McGraw-Hill Math Connects - Course 2 2012 edition
Kuta Software
Study Island
(1) Students extend their understanding of ratios and develop
understanding of proportionality to solve single- and multi-step problems.
Students use their understanding of ratios and proportionality to solve
a wide variety of percent problems, including those involving discounts,
interest, taxes, tips, and percent increase or decrease. Students solve
problems about scale drawings by relating corresponding lengths between
the objects or by using the fact that relationships of lengths within an
object are preserved in similar objects. Students graph proportional
relationships and understand the unit rate informally as a measure of the
steepness of the related line, called the slope. They distinguish proportional
relationships from other relationships.
(2) Students develop a unified understanding of number, recognizing
fractions, decimals (that have a finite or a repeating decimal
representation), and percents as different representations of rational
numbers. Students extend addition, subtraction, multiplication, and division
to all rational numbers, maintaining the properties of operations and the
relationships between addition and subtraction, and multiplication and
division. By applying these properties, and by viewing negative numbers
in terms of everyday contexts (e.g., amounts owed or temperatures below
zero), students explain and interpret the rules for adding, subtracting,
multiplying, and dividing with negative numbers. They use the arithmetic
of rational numbers as they formulate expressions and equations in one
variable and use these equations to solve problems.
(3) Students continue their work with area from Grade 6, solving problems
involving the area and circumference of a circle and surface area of threedimensional
objects. In preparation for work on congruence and similarity
in Grade 8 they reason about relationships among two-dimensional figures
using scale drawings and informal geometric constructions, and they gain
familiarity with the relationships between angles formed by intersecting
lines. Students work with three-dimensional figures, relating them to twodimensional
figures by examining cross-sections. They solve real-world
and mathematical problems involving area, surface area, and volume of
two- and three-dimensional objects composed of triangles, quadrilaterals,
polygons, cubes and right prisms.
(4) Students build on their previous work with single data distributions to
compare two data distributions and address questions about differences
between populations. They begin informal work with random sampling
to generate data sets and learn about the importance of representative
samples for drawing inferences.

Prerequisites

6th grade math

Course Details

Unit: Expressions and Patterns

Duration: 11 Day(s)

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Mathematics

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

Unit Overview

Evaluating expressions and extending patterns are two skills essential for mastering algebraic concepts. In this chapter, students evaluate numerical expressions involving powers and exponents and evaluate algebraic expressions for given variable values. They use properties to evaluate expressions. In addition, students describe and extend sequences. Lastly, they find square roots of perfect squares and estimate square roots of numbers that are not perfect squares.

Materials and Resources

Chapter 1 - Math Connects Course 2
connected.mcgraw-hill.com (student has login and password)

Academic Vocabulary

Algebraic expressions
Exponent
Powers
Property
Sequence
Square Root
factors
base
squared
cubed
evaluate
standard form
exponential form
numerical expression
order of operations
variable
algebra
algebraic expression
coefficient
define a variable
equivalent expressions

Summative Assessment

Chapter Test

Topic: Expressions	**Duration:** 4 Day(s)

Learning Targets

Powers and Exponents

Numerical Expressions

Algebraic Expressions

Properties

Topic: Patterns	**Duration:** 3 Day(s)

Learning Targets

Problem-Solving investigation: Look for a Pattern

Sequences

Extend Sequences

Topic: Square Roots	**Duration:** 2 Day(s)

Learning Targets

Explore Square Roots

Square Roots

Estimate Square Roots

Unit: Integers

Duration: 13 Day(s)

Mathematics (7)

Mathematics

Unit Overview

Integers provide ways to represent situations that involve such concepts as winning/losing, above/below, left/right, and positive/negative. In this unit, students read and write integers that correspond to positive and negative situations and find absolute values. They identify and plot ordered pairs in the four quadrants of the coordinate plane. Most of the attention focuses on using and justifying the rules for adding, subtracting, multiplying, and dividing integers. This skill building provides the foundation for students to apply integer rules to all rational numbers in order to solve algebraic equations and real-world problems.

Materials and Resources

Glencoe Course 2 book 2012, chapter 2.

Academic Vocabulary

Absolute Value,
integer,
negative integer,
positive integer,
coordinate plane,
graph,
origin,
y-axis,
x-axis,
quadrant,
ordered pair,
x-coordinate,
y-coordinate,
zero pair,
opposites,
additive inverse,

Summative Assessment

Chapter test

Topic: Integers and the Coordinate Plane	**Duration:** 3 Day(s)

Learning Targets

Explore Absolute Value

Integers and Absolute Value

The Coordinate Plane

Topic: Add and Subtract Integers	**Duration:** 4 Day(s)

Learning Targets

Explore Add Integers

Add Integers

Explore Subtract Integers

Subtract Integers

Topic: Multiply and Divide Integers	**Duration:** 4 Day(s)

Learning Targets

Explore Multiply and Divide Integers

Multiply Integers

Divide Integers

Unit: Rational Numbers	**Duration:** 16 Day(s)

Mathematics (7)

Mathematics

Unit Overview

Students develop an understanding of rational numbers and their different forms. They express fractions as decimals and decimals as fractions. Rational numbers are then compared and ordered. As with integers, students learn how to add, subtract, multiply, and divide fractions. Students solve real-world problems with rational numbers. Students use exponents to multiply and divide monomials and to express numbers in scientific notation.

Materials and Resources

Glencoe Course 2 2012 book, chapter 3

Academic Vocabulary

terminating decimal,
repeating decimal,
bar notation,
rational numbers,
common denominator,
least common denominator
like fractions,
unlike fractions,
monomial,
negative exponent,
scientific notation

Summative Assessment

Chapter 3 Test

Topic: Rational Numbers	**Duration:** 3 Day(s)

Learning Targets

Explore the Number Line

Terminating and Repeating Decimals

Compare and Order Rational Numbers

Topic: Add and Subtract Fractions	**Duration:** 4 Day(s)

Learning Targets

Add and Subtract Like Fractions

Explore Unlike Fractions with Models

Add and Subtract Unlike Fractions

Extend Use Properties to Multiply

Add and Subtract Mixed Numbers

Topic: Multiply and Divide Fractions	**Duration:** 4 Day(s)

Learning Targets

Explore Multiply Fractions with Models

Multiply Fractions

Problem Solving Investigation: Look for a Pattern

Divide Fractions

Topic: Monomials	**Duration:** 3 Day(s)

Learning Targets

Multiply and Divide Monomials

Negative Exponents

Scientific Notation

Unit: Equations and Inequalities	**Duration:** 17 Day(s)

Mathematics (7)

Mathematics

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

Unit Overview

Students explore, investigate, and solve equations and inqeualties using properties. Opportunities for students to practice and communicate about the strategies presented are provided. As they progress through these lessons, students use previously learned skills such as order of operations, mental math, and performing operations with rational numbers.

Materials and Resources

Glencoe Course 2 2012 book, chapter 4

Academic Vocabulary

Equation,
equivalent equations,
coefficient,
formula,
multiplicative inverse,
reciprocal
two-step equation,
inequality

Summative Assessment

Chapter 4 Test

Topic: Addition and Subtraction Equations	**Duration:** 4 Day(s)

Learning Targets

Problem Solving Investigation: Work Backwards

Methods for Solving Equations

Explore Solve Addition and Subtraction Equations with Algebra Tiles

Solve One-Step Addition and Subtraction Equations

Topic: Multiplication and Division Equations	**Duration:** 4 Day(s)

Learning Targets

Explore Multipication Equations with Bar Diagrams

Solve One-Step Multiplication and Division Equations

Explore Equations with Rational Coefficients

Solve Equations with Rational Coefficients

Topic: Multi-Step Equations	**Duration:** 4 Day(s)

Learning Targets

Explore Two-Step Equations with Bar Diagrams

Solve Two-Step Equations

Explore More Two-Step Equations

More Two-Step Equations

Explore Equations with Variables on Each Side

Solve Equations with Variables on Each Side

Topic: Inequalites	**Duration:** 3 Day(s)

Learning Targets

Explore Solve Inequalities

Solve Inequalities by Addition and Subtraction

Solve Inequalities by Multiplication and Division

Solve Two-Step Inequalities

Unit: Proportions and Similarity	**Duration:** 12 Day(s)

Mathematics (7)

Mathematics

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

Unit Overview
Students explore proportional reasoning and its applications in similarity. Students understand that two quantities are porportional when a change in one quantity corresponds to a predictable change in the other. The topics of ratio, rate, and proportion give students the opportunity to solve proportional relationships and to determine whether a relationship is nonproportional. Students examine and compose scale drawings as an introduction to similar figures. Proportional reasoning as it applies to similarity is extended to include perimeter and area of similar figures.

Materials and Resources
Glencoe Course 2 2012 book, chapter 5

Academic Vocabulary
rate,
unit rate,
proportional,
nonproportional,
equivalent rations,
proportion,
cross products,
scale drawing,
scale model,
scale,
scale factor,
similar figures,
corresponding sides,
correstpoing angles,
indirect measurement,
side-side-side similarity (SSS),
angle-angle similarity (AA),
Side-Angle-Side Similarity (SAS),

Summative Assessment
Chapter 5

Topic: Proportions | **Duration:** 5 Day(s)

Learning Targets
Explore Unit Rates

Rates

Complex Fractions and Unit Rates

Proportional and Nonproportional Relationships

Solve Proportions

Graph Proportional Relationships

Topic: Scale Drawings and Models | **Duration:** 3 Day(s)

Learning Targets
Extend Wildlife Sampling

Problem Solving Investigation: Draw a Diagram

Explore Investigate Online Maps and Scale Drawings

Scale Drawings

Extend Spreadsheet Scale Drawings

Topic: Similarity and Proportional Reasoning | **Duration:** 2 Day(s)

Learning Targets
Similar Figures

Perimeter and Area of Similar Figures

Extend The Golden Triangle

Unit: Percent | **Duration:** 14 Day(s)

Mathematics (7)

Mathematics

Unit Overview

The students focus on problem solving using percents. Students learn to apply percent proportions, percent equations, and percent estimation skills to real-world problems. Using decimal and fraction equivalents for percents, students solve problems involving percent of change, sales tax, tip, discount, and simple interest. Students will use the reasoning skills they learn to make decisions in the real world about products and services they intend to purchase.

Materials and Resources

Glencoe Course 2 2012 book, chapter 6

Academic Vocabulary

percent proportion,
percent equation,
percent of change,
percent of increase,
percent of decrease,
sales tax,
gratuity,
discount,
principal,
simple interest

Summative Assessment

Chapter 6 Test

Topic: Percents	**Duration:** 3 Day(s)

Learning Targets

Explore Percent Diagrams

Percent of a Number

Percent and Estimation

Topic: Proportions and Equations	**Duration:** 4 Day(s)

Learning Targets

Explore Find Percents

The Percent Proportion

The Percent Equation

Problem Solving Investigation: Determine Reasonable Answers

Topic: Applying Percents	**Duration:** 5 Day(s)

Learning Targets

Explore Percent of Change

Percent of Change

Sales Tax and Tips

Discount

Financial Literacy: Simple Interest

Extend Spreadsheet: Simple Interest

Unit: Linear Functions	**Duration:** 15 Day(s)

Mathematics (7)

Mathematics

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

Unit Overview
Students learn that a function is a relationship that assigns exactly one output value for each input value according to a function rule. Students use words, equations, tables, and graphs to represent the relationship between two sets of numbers. They use prior knowledge about solving for variables in equations to complete function tables. Students also apply prior knowledge about proportions and proportional relationships to find constant rate of change, slope of a line, and constant of variation. The emphasis is on developing an understanding of proportionality and its use in real-world applications so that students become competent and confident in their ability to determine if values are either directly or inversely related.

Materials and Resources
Glencoe Course 2 2012 book, chapter 7
connected.mcgraw-hill.com

Academic Vocabulary
relation,
function,
function rule,
function table,
domain,
range,
independent variable,
dependent variable,
function notation,
linear function,
rate of change,
constant rate of change,
nonliner function,
slope,
direct variation,
constant of variation,
slope-intercept form,
y-intercept.
inverse variation

Summative Assessment
Chapter 7 Test

Topic: Rates and Functions	**Duration:** 4 Day(s)

Learning Targets
Explore Relations and Functions

Equations and Functions

Functions and Graph

Extend Graphing Technology: Graphing Relationships

Topic: Slope	**Duration:** 4 Day(s)

Learning Targets
Explore Rate of Change

Constant Rate of Change

Slope

Extend Graphing Technology: Compare Graphs

Topic: Variation	**Duration:** 5 Day(s)

Learning Targets
Problem Solving Investigation: Use a Graph

Explore proportional and nonproportional Relationships

Direct Variation

Explore Inverse Variation

Inverse Variation

Mathematics (7)

Mathematics

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

Unit: Probability and Predictions

Duration: 14 Day(s)

Unit Overview
Students explore theoretical and experimental probabilities and determine whether particular events are likely or unlikely. As part of the learning process, they conduct experimental simulations and compare results to theoretical values. Students will understand the distinction between independent and dependent events. After studying probability, they will be able to use sample data to make predictions and determine if samples are valid.

Materials and Resources
Glencoe Coure 2 2012 book, chapter 8
connected.mcgraw-hill.com

Academic Vocabulary
outcome,
simple event,
probabilty,
random,
complementary event,
geometric probability,
sample space,
tree diagram,
odds in favor,
fundamental counting principle,
permutation,
combination,
compound event,
independent events,
dependent events,
disjoing events,
theoretical probability,
experimental probability,
fair game,
unfair game,

Summative Assessment
Chapter 8 Test

Topic: Probability

Duration: 4 Day(s)

Learning Targets
Probability and Simple Events

Sample Spaces

Count Outcomes

Permutations

Topic: Compound Events

Duration: 2 Day(s)

Learning Targets
Explore Independent and Dependent Events

Independent and Dependent Events

Topic: Predictions

Duration: 6 Day(s)

Learning Targets
Probability Experiments

Extend Simulations

Problem Solving Investigations: Act it Out

Explore Fair and Unfair Games

Use Data to Predict

Unbiased and Biased Samples

Mathematics (7)

Mathematics

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

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Unit: Statistical Displays

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Duration: 15 Day(s)

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Unit Overview

Students build on their previous knowledge of measure of central tendency and variability and stastical displays to perform more in-depth analysis of statistics. Specifically, they explore how changes in data values and extreme values affect measures of central tendency (mean, median, and mode) and why a specific measure of central tendency provides the most useful information in a given context. They draw conclusions and make predictions based on trends and relationships among data. An understanding of how to select and construct appropriate data displays for different kinds of data is developed.

Materials and Resources

Glencoe Course 2 2012 book, Chapter 9
connectED.mcgraw-hill.com

Academic Vocabulary

measures of central tendency,
mean,
median,
mode,
measures of variation,
range,
quartile,
lower quartile,
upper quartile,
interquartile range,
outlier,
circle graph,
stem-and-leaf plot,
leaf,
stem,
back-to-back stem-and-leaf plot

Summative Assessment

Chapter 9 Test

Topic: Measures of Central Tendency	**Duration:** 3 Day(s)

Learning Targets

Explore Changes in Data Values

Measures of Central Tendency

Extend Spreadsheet: Mean, Median, Mode

Topic: Measures of Variation	**Duration:** 2 Day(s)

Learning Targets

Measures of Variation

Box-and-Whisker Plots

Topic: Statistical Displays	**Duration:** 5 Day(s)

Learning Targets

Explore Circle Graphs

Circle Graphs

Histograms

Extend Graphing Technology: Histograms

Stem-and-Leaf Plots

Topic: More Statistical Displays	**Duration:** 3 Day(s)

Learning Targets

Problem Solving Investigation: Use a Graph

Scatter Plots and Lines of Best Fit

Select an Appropriate Display

Mathematics (7)
Mathematics

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

Unit: Volume and Surface Area

Duration: 16 Day(s)

Unit Overview

Students explore the concepts of surface area and volume of three-dimensional shapes including prisms, cylinders, pyramids, and cones. They will discover relationships between the volumes of prisms and pyramids and cylinders and cones to justify and apply surface area and volume formulas. Students will also use the formulas to find volume and surface areas of three-dimensional composite shapes. Students will build on these concepts as they work with similar solids.

Materials and Resources

Glencoe Course 2 2012 book, chapter 10
connectED.mcgraw-hill.com

Academic Vocabulary

prism,
volume,
rectangular prism,
triangular prism,
cylinder,
precision,
net,
sureface area,
composite figure

Summative Assessment

Chapter 10 test

Topic: Volume	**Duration:** 5 Day(s)

Learning Targets

Explore Meaning of Volume

Volume of Prisms

Volumes of Cylinders

Explore Volumes of Pyramids and Cones

Volume of Pyramids

Volume of Cones

Topic: Surface Area	**Duration:** 6 Day(s)

Learning Targets

Explore Nets of Three-Dimensional Figures

Surface Area of Prisms

Surface Area of Cylinders

Extend Surface Area and Volume

Surface Area of Pyramids

Extend Net of a Cone

Topic: Composite Figures	**Duration:** 3 Day(s)

Learning Targets

Problem Solving Investigation: Solve a Simpler Problem

Explore Building Composite Shapes

Volume and Surface Area of Composite Figures

Unit: Measurement and Proportional Reasoning

Duration: 11 Day(s)

Mathematics (7)

Mathematics

Unit Overview

Students build on their knowledge of ratios and rates as they explore concepts related to measurement and proportional reasoning. They use common ratios to convert units of length, weight/mass, and capacity within the customary system, the metric system, and between the two systems. They convert rates, square units of measure, and cubic units of measure within and between systems as well. Students will also learn how changes in dimensions affect the surface area and voume of similar solids. Proportional reasoning is applied throughout to solve real-world measurement problems.

Materials and Resources

Glencoe Course 2 2012 book, chapter 11

connectED.mcgraw-hill.com

Academic Vocabulary

unit ratio,
dimensional analysis,
metric system,
meter,
liter,
gram,
kilogram,
accuracy,
similar solids,

Summative Assessment

Chapter 11 Test

Topic: Convert Measurements	**Duration:** 6 Day(s)

Learning Targets

Explore Units of Measure

Convert Customary Units

Convert Metric Units

Convert Metric Units

Convert Between Systems

Convert Rates

Convert Units of Area and Volume

Topic: Similar Solids	**Duration:** 3 Day(s)

Learning Targets

Problem Solving Investigation: Make a Model

Explore Changes in Scale

Changes In Dimensions

Unit: Polygons and Transformations   **Duration:** 16 Day(s)

Mathematics (7)

Mathematics

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

Unit Overview
Students find the sum of the measures of the angles of triangles and quadrilaterals. Students also develop a formula to find the interior angle sums of polygons. Students learn that an original figure can be transformed to an image by a translation (slide), a rotation (turn), a reflection (flip), or a dilation (enlargement or reduction).

Materials and Resources
Glencoe Course 2 2012 book, chapter 12
connectED.mcgraw-hill.com

Academic Vocabulary
angle,
straight angle,
vertical angles,
adjacent angles,
complementary angles,
supplementary angles,
alternate interior angles,
alternate exterior angles,
corresponding angles,
triangle,
congruent segments,
acute triangle,
right triangle,
obtuse triangle,
scalene triangle,
isosceles triangle,
equilateral triangle,
quadrilateral,
rectangle,
square,
parallelogram,
rhombus,
trapezoid,
transformation,
translation,
congruent figures,
image,
tessellation,
regular tessellation,
line symmetry,
line of summetry,
reflection,
line of reflection,
image,
rotatinal symmetry,
angle of rotation,
diation,
center,
enlargement,
reduction

Summative Assessment
Chapter 12 test

Topic: Polygons	**Duration:** 5 Day(s)

Learning Targets
Angle Relationships

Explore Draw Triangles

Triangles

Quadrilaterals

Polygons and Angles

Topic: Translations	**Duration:** 3 Day(s)

Learning Targets
Explore Congruence

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Translations in the Coordinate Plane

Extend Tesselations

| **Topic:** Reflections | **Duration:** 2 Day(s) |

Learning Targets

Explore Symmetry in Reflections

Reflections in the Coordinate Plane

| **Topic:** Rotations | **Duration:** 2 Day(s) |

Learning Targets

Explore Rotational Symmetry

Rotations in the Coordinate Plane

| **Topic:** Dilations | **Duration:** 2 Day(s) |

Learning Targets

Dilations

Problem Solving Investigation: Work Backward