7th Grade Math

Mathematics

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

Course Overview

During the 7th grade year, students will learn about the number system, ratios and proportional relationships, expressions, equations and inequalities, geometry, statistics and probability. After acquiring these skills, the students will apply that knowledge to solve everyday problems related to the topics.

Scope And Sequence

Timeframe	Unit	Instructional Topics
9 Week(s)	The Number System	1. Adding and subtracting integers 2. Multiplying and dividing integers 3. Rational numbers
5 Week(s)	Expressions, Equations, and Inequalities	1. Expressions, equations and inequalities 2. Expressions and Equations 3. Inequalities
4 Week(s)	Ratios and Proportional Relationships	1. Rates and porportionality 2. Proportions and percent
5 Week(s)	Statistics	1. Statistics 2. Random samples and populations 3. Analyzing and comparing data
6 Week(s)	Probability	1. Probability 2. Experimental probability 3. Theoretical probability and simulations
7 Week(s)	Geometry	1. Geometry 2. Modeling geometric figures 3. Circumference, area and volume

Course Details

Unit: The Number System

Duration: 9 Week(s)

Unit Description

In this unit, students will learn about addition, subtraction, multiplication and division of integers. They will learn the sets and subsets of rational numbers. This, along with past knowledge, will be used to work with all rational numbers.

Enduring Understandings (Knowledge & Skills)

How can you use addition and subtraction of integers to solve real-world problems?
How can you use multiplication and division of integers to solve real-world problems?
How can you use rational numbers to solve real-world problems?

Materials and Resources (optional)

module quizzes
unit test

quizzes and test attached

Topic: Adding and subtracting integers

Duration: 14 Day(s)

Topic Description (short)

The students will learn how to add and subtract integers with the same sign and different signs. After gaining basic knowledge, they will use that knowledge to apply to real life situations.

Learning Targets

Review words - difference, integers, negative number, opposites, positive number, sum, whole number
New words - absolute value, additive inverse, expression, model

Learning Targets

Students will learn to add integers fluently
Assessment: problems from lesson 1.1, pages 11-12
problems from lesson 1.2, pages 17-18
The student will subtract integers fluently.
Assessment: problems from lesson 1.3, pages 23-24
The students will solve multi step problems involving addition and subtraction of integers.
Assessment: problems from lesson 1.4, pages 29-30

Learning Targets linked to Priority Standard = ✣

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Topic: Multiplying and dividing integers **Duration:** 10 Day(s)

Topic Description (short)
The students will learn how to multiply and divide integers with the same sign and different signs. After gaining basic knowledge, they will use that knowledge to apply to real life situations.

Learning Targets
divide, dividend, divisor, integers, multiply, negative number, operation, opposites, positive number, product, quotient

Learning Targets
The students will multiply integers fluently.
Assessment: problems from lesson 2.1, pages 41-42
The students will divide integers fluently.
Assessment: problems from lesson 2.2, pages 47-48
The students will use operations with integers to solve problems.
Assessment: problems from lesson 2.2, pages 47-48
problems from lesson 2.3, pages 53-54

Learning Targets linked to Priority Standard = ✙

Topic: Rational numbers **Duration:** 19 Day(s)

Topic Description (short)
The students will learn the difference between rational and irrational numbers. Lessons include using all operations with rational numbers to solve real world problems.

Learning Targets
Review words - integers, negative numbers, pattern, positive numbers, whole numbers
New words - additive inverse, opposite, rational number, repeating decimal, terminating decimal

Learning Targets
The students will convert between types of rational numbers.
Assessment: problems from lesson 3.1, pages 65-66
The students will add rational numbers.
Assessment: problems from lesson 3.2, pages 73-74
The students will subtract rational numbers.
Assessment: problems from lesson 3.3, pages 80-82
Students will multiply rational numbers.
Assessment: problems from lesson 3.4, pages 87-88
Students will divide rational numbers.
Assessment: Problems from lesson 3.5, pages 93-94
Students will uses different forms of rational numbers to solve multi step problems.
Assessment: problems from lesson 3.6, pages 99-100

Learning Targets linked to Priority Standard = ✙

Unit: Expressions, Equations, and Inequalities **Duration:** 5 Week(s)

Unit Description
In this unit, student will learn about writing and solving two-step equations. After mastering that, they will use that knowledge to write and solve two-step inequalities.

Enduring Understandings (Knowledge & Skills)
How can you use algebraic expressions and equations to solve real-world problems?
How can you use inequalities to solve real-world problems?

Materials and Resources (optional)
module quizzes
unit test

test and quizzes attached

Topic: Expressions, equations and inequalities **Duration:** 1 Day(s)

Learning Targets
algebraic expression, distributive property, equation, factor, operation, solution, variable

Formative Assessment
bell work
exit slip
fist of 5
teacher observation

Learning Targets
Students will relate algebraic expressions to real life activities.

Students write and illustrate a situation that goes with a specific algebraic equation.

Students will use two-color counters to solve equations.

Students will use algebra tiles to model equations and inequalities.

Students will create and complete tables to show inequality properties of equality.

Students will use real life situations to illustrate inequalities on a life size number-line.
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Learning Targets linked to Priority Standard = ✣

Topic: Expressions and Equations
Duration: 13 Day(s)

Topic Description (short)
The students will write and simplify algebraic expressions. They will write and solve one- and two-step equations to solve real life problems.

Learning Targets
algebraic expression, distributive property, equation, factor, operation, solution, variable

Learning Targets
Students will add, subtract, factor, and multiply algebraic expressions.
Assessment: problems from lesson 6.1, pages 177-178
Students will use one-step equations with rational coefficients to solve problems.
Assessment: problems from lesson 6.2, pages 183-184
Students will write two-step equations.
Assessment: problems from lesson 6.3, pages 189-190
Students will solve two-step equations.
Assessment: problems from lesson 6.4, pages 195-196

Learning Targets linked to Priority Standard = ✣

Topic: Inequalities
Duration: 10 Day(s)

Topic Description (short)
The students will write inequalities from a real life situation. They will also learn how to solve one- and two-step inequalities and graph on a number line.

Learning Targets
algebraic expression, coefficient, constant, equation, greater than, inequality, integers, less than operations, solution, variable

Learning Targets
Students will write and solve one-step inequalities.
Assessment: problems from lesson 7.1, pages 209-210
Students will write a two-step inequality.
Assessment: problems from lesson 7.2, pages 215-216
Students will solve two-step equations.
Assessment: problems from lesson 7.3, pages 221-222

Learning Targets linked to Priority Standard = ✣

Unit: Ratios and Proportional Relationships
Duration: 4 Week(s)

Unit Description
In this unit, students will learn about rates and proportionality. They will also learn relationships between proportions and percent.

Enduring Understandings (Knowledge & Skills)
How can you use rates and proportionality to solve real-world problems?

How can you use proportions and percent to solve real-world problems?

Materials and Resources (optional)

module quizzes
unit test

test and quizzes attached

Topic: Rates and porportionality **Duration:** 10 Day(s)

Topic Description (short)

The students will solve problems involving rates and unit rates. They will use graphs, tables and equations to determine if a relationship is proportional and to make predictions.

Learning Targets

Review words - constant, conversion factor, equivalent ratio, percent, rate, ratio
New words - complex fraction, constant of proportionality, proportion, proportional relationship, rate of change, unit rates

Learning Targets

Students will find and use unit rates.
Assessment: problems from lesson 4.1, pages 121-122
Students will identify and represent proportional relationships.
Assessment: problems from lesson 4.2, pages 127-128
Students will use graphs to represent and analyze proportional relationships.
Assessment: problems from lesson 4.3, pages 133-134

Learning Targets linked to Priority Standard = ✣

Topic: Proportions and percent **Duration:** 10 Day(s)

Topic Description (short)

Students will find and use percent to solve different types of problems including percent of increase and decrease. They will also apply the concept of percent to solve problems involving sales tax, discounts, tips and simple interest.

Learning Targets

Review words - proportion, percent, rate, ratio, unit rate
New words - percent decrease, percent increase, principal, simple interest

Learning Targets

Students will use percents to describe change.
Assessment: problems from lesson 5.1, pages 145-146
Students will rewrite expressions to help solve markup and markdown problems.
Assessment: problems from lesson 5.2, pages 151-152
Students will rewrite expressions to help solve markup and markdown problems.
Assessment: problems from lesson 5.2, pages 151-152
Students will use percents to solve problems.
Assessment: problems from lesson 5.3, pages 157-158
Students will use percents to solve problems
Assessment: problems from lesson 5.3, pages 157-158

Learning Targets linked to Priority Standard = ✣

Unit: Statistics

Duration: 5 Week(s)

Unit Description

Students will learn ways to analyze data about a population and make inferences from random samples. They will learn different ways to compare two sets of data.

Enduring Understandings (Knowledge & Skills)

How can you use random samples and populations to solve real-world problems?
How can you solve real-world problems by analyzing and comparing data?

Materials and Resources (optional)

module quizzes
unit test

Topic: Statistics **Duration:** 1 Day(s)

Learning Targets

Review words - box plot, data, dot plot, interquartile range, lower quartile, median, spread, survey, upper quartile
New words - biased sample, population, random sample, sample

Formative Assessment

bell work

exit slip
fist of 5
teacher observation

Learning Targets
Students will identify samples as random or not-random.

Students decide if questions are biased and correct if they are.

Students will use information from a sample to make inferences about a population.

Students will use different types of displays to compare data.

Learning Targets linked to Priority Standard = ✙

Topic: Random samples and populations **Duration:** 12 Day(s)

Topic Description (short)
The students will use surveys to gain information about a sample. The information gained will be used to make predictions/inferences about the population.

Learning Targets
Review words - box plot, data, dot plot, interquartile range, lower quartile, median, spread, survey, upper quartile
New words - biased sample, population, random sample, sample

Learning Targets
Students will use a sample to gain information about a population.
Assessment: problems from lesson 10.1, pages 315-316
Students will use a sample to gain information about a population.
Assessment: problems from lesson 10.2, pages 321-322
Students will use a sample to gain information about a population.
Assessment: problems from lesson 10.2, pages 321-322
Students will generate and use random samples to represent a population.
Assessment: problems from lesson 10.3, pages 327-328

Learning Targets linked to Priority Standard = ✙

Topic: Analyzing and comparing data **Duration:** 13 Day(s)

Topic Description (short)
The students will compare date displayed in the dot plots and box plots. They will also use statistical measures to compare populations.

Learning Targets
Review words - data, interquartile range, mean, measure of center, measure of spread, median, survey, box plot, dot plot
New word - mean absolute deviation (MAD)

Learning Targets
Students will compare two sets of data displayed in dot plots.
Assessment: problems from lesson 11.1, pages 339-340
Students will compare two sets of data displayed in box plots.
Assessment: problems from lesson 11.2, pages 345-346
Students will use statistical measures to compare populations.
Assessment: problems from lesson 11.3, pages 351-352
Students will use statistical measures to compare populations.
Assessment: problems from lesson 11.3, pages 351-352

Learning Targets linked to Priority Standard = ✙

Unit: Probability **Duration:** 6 Week(s)

Unit Description
Students will learn about experimental and theoretical probability. This knowledge will be used to make predictions.

Enduring Understandings (Knowledge & Skills)
How can you use experimental probability to solve real-world problems?
How can you use theoretical probability to solve real-world problems/

Materials and Resources (optional)
module quizzes
unit test

Topic: Probability **Duration:** 1 Day(s)

Formative Assessment

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teacher observation

Learning Targets

Students will determined the probability of chance events.
Students will determined the probability of chance events.

Learning Targets linked to Priority Standard = ✙

Topic: Experimental probability

Duration: 14 Day(s)

Topic Description (short)

The students will find experimental probability of simple and compound events. They will then use that information to make predictions.

Learning Targets

Review words - data, observation, percent, ratio
New words - complement, compound event, event, experiment, experimental probability, outcome, probability, simple event, simulation, trial

Learning Targets

Students will describe the likelihood of an event.
Assessment: problems from lesson 12.1, pages 373-374
Students will describe the likelihood of an event.
Assessment: problems from lesson 12.1, pages 373-374
Students will find the experimental probability of a simple event.
Assessment: problems from lesson 12.2, pages 379-380
Students will find the experimental probability of a compound event.
Assessment: problems from lesson 12.3, pages 385-386
Students will make predictions using experimental probability.
Assessment: problems from lesson 12.4, pages 391-392

Learning Targets linked to Priority Standard = ✙

Topic: Theoretical probability and simulations

Duration: 15 Day(s)

Topic Description (short)

The students will find theoretical probability of simple and compound events. They will then use that information to make predictions. Students will also use technology to make predictions.

Learning Targets

Review words - complement, compound event, event, experiment, outcome, simple event, probability
New words - theoretical probability

Learning Targets

Students will find the theoretical probability of a simple event.
Assessment: problems from lesson 13.1, pages 403-404
Students will find the theoretical probability of a simple event.
Assessment: problems from lesson 13.1, pages 403-404
Students will find the probability of a compound event.
Assessment: problems from lesson 13.2, pages 409-410
Students will make predictions using theoretical probability.
Assessment: problems from lesson 13.3, pages 415-416
Students will make predictions using theoretical probability.
Assessment: problems from lesson 13.3, pages 415-416
Students will use technology simulations to estimate probabilities.
Assessment: problems from lesson 13.4, pages 421-422

Learning Targets linked to Priority Standard = ✙

Unit: Geometry

Duration: 7 Week(s)

Unit Description

In this unit, students will learn angle pair relationships. They will also learn to use formulas to find circumference of a circle, area of composite figures and volume and surface area of prisms and pyramids.

Enduring Understandings (Knowledge & Skills)

How can you use proportions to solve real-world geometry problems?
How can you apply geometry concepts to solve real-world problems?

Academic Vocabulary

angle

circumference
circle
composite figures
volume
prisms
pyramids

Summative Assessment

module quizzes
unit test

Topic: Geometry

Duration: 1 Day(s)

Formative Assessment

bell work
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fist of 5
teacher observation

Learning Targets

Use floor plans to find actual dimensions and area of rooms.

Use protractor to draw triangles with specific dimensions.

Use GeoGebra program to determine if line segments can create a triangle.

Use 3-dimensional shapes to find cross sections of prisms and pyramids.

Use protractors to measure vertical, complementary and supplementary angle to prove that rules are correct.

Using tape measure and circles, find radius, diameter and circumference of circle. With that data, students will come up with approximate formula for finding circumference.

Explore area of a circle by cutting in half over and over to create 8 equal parts. Use that and formula of parallelogram to find area of circle.

Use nets to find surface area of prism and pyramid.

Have students predict which container will hold more. Fill one container with rice and then transfer to other to show which is bigger.

Use boxes and cylinders to find dimensions and volume of everyday items.

Learning Targets linked to Priority Standard = ✣

Topic: Modeling geometric figures

Duration: 15 Day(s)

Topic Description (short)

The students will learn to use scale drawings and angle relationships to solve real world problems. They will be able to draw shapes that satisfy given conditions and identify cross sections of three-dimensional shapes.

Learning Targets

Review words - angle, degree, dimension, length, proportion, polygon, ratio, width
New words - adjacent angles, complementary angles, congruent angles, cross section, intersection, scale, scale drawing, supplementary angles, vertical angles

Learning Targets

Students will use scale drawings to solve problems.
Assessment: problems from lesson 8.1, pages 241-242
Students will draw shapes that satisfy given conditions.
Assessment: problems from lesson 8.2, pages 245-246
Students will identify cross sections of three-dimensional figures.
Assessment: problems from lesson 8.3, pages 249-250
Students will use angle relationships to solve problems.
Assessment: problems from lesson 8.4, pages 257-258

Learning Targets linked to Priority Standard = ✣

Topic: Circumference, area and volume

Duration: 16 Day(s)

Topic Description (short)

The students will find and use circumference and area of a circle. They will apply all area knowledge to help find the area of composite

shapes. They fill find surface and area of cubes and prisms.

Learning Targets

Review words - area, parallelogram, perimeter, prism, rectangle, square, trapezoid, triangle, volume
New words - circumference, composite figure, diameter, radius

Learning Targets

Students will find and use the circumference of a circle.
Assessment: problems from lesson 9.1, pages 269-270
Students will find the area of a circle.
Assessment: problems from lesson 9.2, pages 275-276
Students will find the area of composite figures.
Assessment: problems from lesson 9.3, pages 2381-282
Students will find the surface area of a figure made up of cubes and prisms.
Assessment: problems from lesson 9.4, pages 287-288
Students will find the volume of a figure made of cubes and prisms.
Assessment: problems from lesson 9.5, pages 293-294

Learning Targets linked to Priority Standard = ✙