Grade 6 Math Syllabus

This course covers the Common Core grade-6 math standards and about half of the grade-7 standards. The follow-up course (Pre-Algebra) covers the other half of the grade-7 standards and all of the grade-8 standards.

The course is broken up into 8 units. Each unit has a Quiz and an End Assessment.

Unit 1: Area and Surface Area

Unit 2: Introducing Ratios and Rates

Unit 3: Fractions and Decimals

Unit 4: Expressions and Equations

Unit 5: Introducing and Applying Proportional Relationships

Unit 6: Percentages

Unit 7: Rational Numbers

Unit 8: Data Sets and Distributions

Unit 1: Area and Surface Area

Section 1: Area (7 Lessons + Quiz)

- Calculate the area of parallelograms and triangles.
- Calculate the area of polygons by decomposing into rectangles and triangles, or surrounding and subtracting.

Section 2: Surface Area (4 Lessons + End Assessment)

- Connect polyhedra with nets that represent them.
- Calculate the surface area of polyhedra made up of rectangles and triangles.

Vocabulary

- area, base (of a parallelogram or triangle), base (of a pyramid or prism), edge, face, height, net
- parallelogram, polygon, polyhedron, prism, pyramid, quadrilateral, surface area, volume

Materials

- blank paper, card stock (optional), graph paper, rulers, scissors, tape (optional)

Common Core State Standards

- 6.EE.A.2.A
- 6.EE.A.2.C
- 6.G.A.1
- 6.G.A.4

Unit 2: Introducing Ratios and Rates

Section 1: Introducing Ratios (5 Lessons + Quiz)

- Students use ratio language to describe a ratio relationship between two quantities and identify equivalent ratios.
- Students use tables, double number line diagrams and unit prices to solve problems with equivalent ratios.

Section 2: Solving Problems With Ratios (6 Lessons + Quiz)

- Students develop and use strategies to compare ratios in context.
- Students use unit rates, double number lines, and tables of equivalent ratios to solve real-world and mathematical problems.

Section 3: Units and Measurement (3 Lessons)

- Use ratio reasoning to convert between units of measurement.

Section 4: Unit Rates (3 Lessons + End Assessment)

- Recognize and calculate two unit rates for the same ratio relationship.
- Use unit rates to solve problems involving tables of equivalent ratios.

Vocabulary

- double number line diagram, equivalent ratio, per, ratio, table, tape diagram, unit price, unit rate, at the same time, percent, percentage

Materials

- stopwatch or other timer, tape or glue, tools for creating a visual display

Common Core State Standards

- 6.RP.A.1
- 6.RP.A.2
- 6.RP.A.3
- 6.RP.A.3.A
- 6.RP.A.3.B
- 6.RP.A.3.C
- 6.RP.A.3.D

Unit 3: Fractions and Decimals

Section 1: Introduction to Dividing Fractions (2 Lessons)

- Interpret and create diagrams that represent dividing whole numbers by fractions.

Section 2: Dividing Fractions (6 Lessons + Quiz)

- Use a variety of strategies to calculate quotients of fractions.
- Solve problems that involve dividing fractions.

Section 3: Area and Volume With Fractions (2 Lessons)

- Use division of fractions to compare lengths.
- Solve problems about areas and volumes with fractional dimensions.

Section 4: Adding and Subtracting Decimals (2 Lessons)

- Add and subtract multi-digit decimals using a variety of strategies.

Section 5: Multiplying and Dividing Decimals (6 Lessons)

- Multiply and divide multi-digit decimals using a variety of strategies.
- Divide multi-digit numbers with and without remainders using long division.

Section 6: Solving Problems With Decimals (1 Lesson)

- Use decimal operations to solve problems in context.

Materials

- blank paper, graph paper, index cards or slips of colored paper, straightedge or ruler, tape or glue. Optional: 2-cup, ½-cup, ⅓ cup measure, unit cubes

Common Core State Standards

- 6.NS.A.1
- 6.G.A
- 6.G.A.2
- 6.RP.A.3.B
- 6.RP.A.3.C
- 6.NS.B
- 6.NS.B.2
- 6.NS.B.3
- 6.NS.B.4

Unit 4: Expressions and Equations

Section 1: Solving Equations (5 Lessons)

- Write and solve equations of the form $x+p=q$ and $px=q$.

Section 2: Equivalent Expressions (4 Lessons + Quiz)

- Use the distributive property to write equivalent expressions with variables.

Section 3: Expressions Involving Exponents (3 Lessons)

- Evaluate numerical and variable expressions with whole number exponents.

Section 4: Introduction to Representing Relationships (4 Lessons + End Assessment)

- Use tables, equations, and graphs to represent relationships.

Materials

- blank paper, graph paper, index cards or slips of colored paper, tape or glue,

Common Core State Standards

- 6.RP.A.1, 6.RP.A.2, 6.RP.A.3, 6.RP.A.3.A
- 6.NS.B.2
- 6.EE.A.1, 6.EE.A.2, 6.EE.A.2.A, 6.EE.A.2.B, 6.EE.A.2.C, 6.EE.A.3, 6.EE.A.4
- 6.EE.B.5, 6.EE.B.6, 6.EE.B.7,
- 6.EE.C.9
- 6.G.A.1
- 6.G.A.2

Vocabulary

- coefficient
- dependent variable
- equivalent expressions
- exponent
- independent variable
- product
- solution to an equation
- sum
- term
- Variable

Unit 5: Introducing and Applying Proportional Relationships

Section 1: Proportional Relationships in Tables (2 Lessons)

- Use tables to recognize proportional relationships and calculate the constant of proportionality.

Section 2: Proportional Relationships in Equations (3 Lessons + Quiz)

- Write and use equations to analyze proportional relationships.

Section 3: Proportional Relationships in Graphs (3 Lessons)

- Use graphs to recognize and analyze proportional relationships.

Section 4: Using Proportional Relationships (2 Lessons)

- Model real-world situations using representations of proportional relationships.

Section 5: Circumference of a Circle (3 Lessons)

- Use the relationships between radius, diameter, and circumference to calculate missing measurements.

Section 6: Area of a Circle (4 Lessons + End Assessment)

- Explain and use the formula for the area of a circle to solve problems.

Materials

- 1-gallon bucket or jug (optional), blank paper, scissors (optional), tools for creating a visual display, circular objects, graph paper (optional), measuring tools, scissors

Common Core State Standards

- 7.RP.A.2, 7.RP.A.2.A, 7.RP.A.2.B, 7.RP.A.2.C, 7.RP.A.2.D
- 7.G.B.4, 7.G.B.6

Vocabulary

- equivalent ratios, proportional relationship, constant of proportionality, reciprocal, origin, coordinate plane, circle, diameter, radius, circumference, pi,

Unit 6: Percentages

Section 1: Percentages (6 Lessons)

- Make connections between percentages, ratios, and rates.
- Use ratio reasoning to determine unknown parts, wholes, and perce

Section 2: Percentages as Proportional Relationships (6 Lessons + Quiz)

- Determine missing measurements in proportional relationships involving fractional quantities or percentages.
- Represent proportional relationships using tape diagrams, tables, double number lines, and equations.

Section 3: Applying Percentages (4 Lessons + End Assessment)

- Interpret and solve problems about real-world situations involving proportional relationships and percent change.

Materials

- graph paper, tools for creating a visual display

Common Core State Standards

- 7.RP.A.1
- 7.RP.A.2
- 7.RP.A.3
- 7.EE.A.2
- 7.EE.B.4

Vocabulary

- percent increase
- percent decrease
- percent error

Unit 7: Rational Numbers

Section 1: Negative Numbers and Absolute Values (5 Lessons)

- Describe locations on the number line using positive and negative numbers.
- Compare and order positive and negative numbers and absolute values.

Section 2: Adding and Subtracting (5 Lessons + Quiz)

- Add and subtract positive and negative numbers using a variety of strategies.

Section 3: Multiplying and Dividing (5 Lessons)

- Perform all four operations with positive and negative numbers using a variety of strategies.

Section 4: Applying Operations (1 Lesson)

- Apply all four operations with positive and negative numbers to analyze an issue in society.

Section 5: The Coordinate Plane (3 Lessons + End Assessment)

- Solve problems by graphing points with positive and negative coordinates.
- Draw polygons given coordinates for the vertices.

Common Core State Standards

- 6.NS.C.5,
- 6.NS.C.6, 6.NS.C.6.A
- 6.NS.C.6.B, 6.NS.C.6.C
- 6.NS.C.7, 6.NS.C.7.A, 6.NS.C.7.B, 6.NS.C.7.C, 6.NS.C.7.D
- 6.NS.C.8
- 6.G.A.3
- 7.NS.A.1, 7.NS.A.1.A, 7.NS.A.1.B, 7.NS.A.1.C, 7.NS.A.1.D
- 7.NS.A.2, 7.NS.A.2.A, 7.NS.A.2.B, 7.NS.A.2.C, 7.NS.A.2.D
- 7.NS.A.3
- 7.EE.B.3

Vocabulary

- absolute value
- coordinate plane
- negative number
- opposite
- positive number
- sign
- solution to an inequality

Unit 8: Data Sets and Distributions

Section 1: Visualizing Data (2 Lessons)

- Create dot plots and histograms to visualize data.
- Informally describe and compare data sets.

Section 2: Mean and MAD (2 Lessons)

- Calculate the mean and mean absolute deviation (MAD) of a data set.
- Use mean and MAD to describe and compare data sets.

Section 3: Median and IQR (3 Lessons + Quiz)

- Compare and contrast the mean and median as measures of center.
- Calculate the quartiles, interquartile range (IQR), and range of a data set.
- Create box plots to visualize data.
- Use median and IQR to describe and compare data sets.

Section 4: Sampling (5 Lessons)

- Explain the purpose of sampling and which methods of obtaining a sample tend to produce representative samples.
- Use measures of center and measures of variability from random samples to draw conclusions about and compare populations.

Section 5: Probability (5 Lessons + End Assessment)

- Determine the probability of unknown events, comparing the results of repeated experiments and the expected probability.

Materials

- Scientific or handheld calculators, tape or glue, tools for creating a visual display, blank paper, four-function or scientific calculators, tools for creating a visual display
- Optional: Two different types of coins (e.g., a penny and a nickel), one standard six-sided number cube, bag, bowl, or cup for paper letters, paper clip for paper spinner, card stock for paper spinner

Common Core State Standards

- 6.SP.A.1, 6.SP.A.2, 6.SP.A.3
- 6.SP.B.4, 6.SP.B.5, 6.SP.B.5.A, 6.SP.B.5.B, 6.SP.B.5.C, 6.SP.B.5.D
- 7.SP.A.1, 7.SP.A.2, 7.SP.B.3, 7.SP.B.4
- 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7.A, 7.SP.C.7.B
- 7.SP.C.8, 7.SP.C.8.A, 7.SP.C.8.B, 7.SP.C.8.C

Vocabulary

- absolute deviation, box plot, categorical data, dot plot, histogram, interquartile range (iqr), mean, mean absolute deviation (mad), measure of center, measure of spread, median, numerical data, quartile, range, statistic, statistical question, experiment, event, outcome, random, probability, sample space, simulation, population, sample, representative