

# Mathematics 6

## Course Overview and Syllabus

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**Course Number:** MA3106 IC

**Grade Level:** 6

**Prerequisite Courses:** Mathematics 5

**Credits:** 1.0

### Course Description

This course begins by connecting ratio and rate to multiplication and division, allowing students to use ratio reasoning to solve a wide variety of problems. They further apply their understanding of multiplication and division to explain the standard procedure for dividing fractions. This course builds upon previous notions of the number system to now include the entire set of rational numbers. Students begin to understand the use of variables as they write, evaluate, and simplify expressions. They use the idea of equality and properties of operations to solve one-step equations and inequalities. In statistics, students explore different graphical ways to display data. They use data displays, measures of center, and measures of variability to summarize data sets. The course concludes with students reasoning about relationships among shapes to determine area, surface area, and volume.

### Course Objectives

Throughout the course, you will meet the following goals:

- Apply knowledge of multiplication and division while working with fractions to solve ratio and rate problems.
- Extend previous notions of the number system to include the entire set of rational numbers.
- Effectively translate between graphic, numeric, symbolic, and verbal representations.
- Develop an understanding of data distributions and statistical variability.
- Learn to select and use appropriate mathematical knowledge when investigating problems.
- Demonstrate an understanding of the meanings and uses for variables in mathematical problems.
- Work with two- and three-dimensional shapes to solve problems involving area, surface area, and volume.

### Student Expectations

This course requires the same level of commitment from you as a traditional classroom course would. Throughout the course, you are expected to spend approximately 5–7 hours per week online on the following activities:

- Interactive lessons that include a mixture of instructional videos and tasks
- Assignments in which you apply and extend learning in each lesson
- Assessments, including quizzes, tests, and cumulative exams

## Communication

Your teacher will communicate with you regularly through discussions, e-mail, chat, and system announcements. You will also communicate with classmates, either via online tools or face to face, as you collaborate on projects, ask and answer questions in your peer group, and develop your speaking and listening skills.

## Grading Policy

You will be graded on the work you do online and the work you submit electronically to your teacher. The weighting for each category of graded activity is listed below.

Grading Category	Weight
Quiz	20%
Test	30%
Exam	20%
Assignment	20%
Additional	0%
Project	10%

## Scope and Sequence

When you log into Edgenuity, you can view the entire course map—an interactive scope and sequence of all topics you will study. The units of study are summarized below:

**Unit 1:** Understanding Ratios and Rates

**Unit 2:** Applying Ratios and Rates

**Unit 3:** Multi-Digit Computation

**Unit 4:** Dividing Fractions

**Unit 5:** Percent

**Unit 6:** Extending the Number System

**Unit 7:** Relationships on the Coordinate Plane

**Unit 8:** Data Distributions and Analysis

**Unit 9:** Variables and Expressions

**Unit 10:** Equations and Inequalities

**Unit 11:** Area

**Unit 12:** Surface Area and Volume

Unit	Lesson	Lesson Objectives
<b>Understanding Ratios and Rates</b>		
		<p><b>Describing Part-to-Part Relationships</b></p> <p>Analyze how a change in a quantity affects a part-to-part relationship.</p> <p>Describe ratio relationships between two quantities using informal language.</p> <p>Use models to represent relationships between quantities.</p> <p><b>Using Ratio Notation</b></p> <p>Use the notation of ratio language to describe relationships between two quantities.</p> <p><b>Equivalent Ratios</b></p> <p>Analyze patterns in a table of equivalent ratios.</p> <p>Find missing values in a table using ratio reasoning.</p> <p><b>Equivalent Ratios in Measurement</b></p> <p>Analyze patterns of equivalent ratios in measurement.</p> <p>Identify equivalent ratios in measurements.</p> <p><b>Understanding Unit Rates</b></p> <p>Find unit rates.</p> <p><b>Comparing Ratios</b></p> <p>Compare ratios using different strategies.</p>
<b>Applying Ratios and Rates</b>		
		<p><b>Measurements in the Customary System</b></p> <p>Convert units of measurement in the customary system.</p> <p>Solve real-world problems by converting customary measurement units.</p> <p><b>Measurements in the Metric System</b></p> <p>Convert units of measurement in the metric system.</p> <p>Solve real-world problems by converting metric measurement units.</p> <p><b>Converting Measurements between Systems</b></p> <p>Convert measurement units between the customary and metric systems.</p> <p><b>Understanding Speed</b></p> <p>Convert measures of speed within a system.</p> <p>Find speed given distance and time.</p> <p><b>Solving Speed Problems</b></p> <p>Compare speeds.</p> <p>Find distance given time and speed.</p> <p>Find time given distance and speed.</p> <p><b>Unit Pricing</b></p> <p>Find unit prices.</p> <p>Solve unit rate problems involving unit pricing.</p> <p><b>Performance Task: Making Energy Drinks</b></p>

Unit	Lesson	Lesson Objectives
<b>Multi-Digit Computation</b>		
<b>Adding and Subtracting Decimals</b>		
Add decimals.		
Subtract decimals.		
Use estimation to determine reasonableness.		
<b>Prime Numbers and Prime Factorization</b>		
Identify a number as prime or composite.		
List the factors of a number.		
Represent a number as the product of its prime factors, using exponents to show repeated factors.		
<b>Factors and Multiples</b>		
Apply greatest common factors and least common multiples to solve real-world problems.		
Determine the greatest common factor of two numbers.		
Determine the least common multiple of two numbers.		
<b>The Distributive Property</b>		
Use the distributive property to generate equivalent expressions.		
<b>Estimating and Finding Decimal Products</b>		
Find decimal products and use estimation to place the decimal point in a product.		
<b>Using a Rule to Find Decimal Products</b>		
Multiply decimals and use a rule to place the decimal point in a product.		
Use estimation to determine reasonableness.		
<b>Dividing Whole Numbers</b>		
Divide whole numbers.		
Write remainders as terminating or repeating decimals.		
<b>Dividing Decimals</b>		
Divide decimals by decimals.		
Divide whole numbers by decimals.		
Use estimation to determine reasonableness.		
<b>Dividing Fractions</b>		
<b>Dividing a Fraction by a Whole Number</b>		
Divide a fraction by a whole number equal to the fraction's denominator in real-world situations.		
Divide a fraction by a whole number using an equivalent fraction in real-world situations.		
<b>Using Visual Models in Fraction Division</b>		
Use models to divide a whole number by a fraction.		
Use models to divide a whole number by a whole number.		
<b>Dividing a Fraction by a Fraction</b>		
Use models to divide a fraction by a fraction.		
<b>Finding a Rule for Dividing Fractions</b>		
Use the standard algorithm to divide fractions.		
<b>Fraction Multiplication and Division</b>		
Solve real-world problems using fraction multiplication or division.		

Unit	Lesson	Lesson Objectives
<b>Percent</b>		
<b>Understanding Percent</b>		
Compare ratios and percents of sets with different base units.		
Represent a portion of a set with a ratio.		
Translate ratios of part: whole and part/whole as percents.		
Use models to illustrate the meaning of percents.		
<b>Fraction-Decimal-Percent Equivalents</b>		
Find equivalent forms of fractions, decimals, and percents.		
<b>Finding Friendly Percentages</b>		
Find 10%, 25%, or 50% of a number by dividing by 10, 4, or 2.		
Find percentages by adding familiar parts.		
Solve single-step real-world problems using friendly percentages.		
<b>Using Multiplication to Find Percents</b>		
Find any percent of a number by multiplying by the equivalent decimal.		
Use estimation to determine whether the answers are reasonable.		
Use unit-fraction equivalents to generate additional equivalents.		
<b>Using Equivalent Ratios to Find Percents</b>		
Represent percent problems using equivalent ratios.		
Use patterns in equivalent ratios to find the percent of a whole.		
<b>Using Equivalent Ratios to Find a Whole</b>		
Represent percent problems using equivalent ratios.		
Use patterns in equivalent ratios to find the whole, given the percent.		
<b>Extending the Number System</b>		
<b>Negative Numbers in Real-World Contexts</b>		
Describe the meaning of zero in real-world contexts.		
Use positive and negative numbers to represent quantities in real-world contexts.		
<b>Integers on the Number Line</b>		
Find the opposite of an integer.		
Graph integers on number lines.		
Identify integers.		
<b>Plotting Positive and Negative Fractions</b>		
Graph negative fractions on a number line.		
Use a number line to compare and order positive and negative fractions.		
<b>Comparing Rational Numbers</b>		
Define rational numbers and classify numbers.		
Graph rational numbers on a number line.		
Use a number line to compare rational numbers in a real-world context.		
<b>Ordering Rational Numbers</b>		
Order rational numbers using a number line.		
Write and interpret statements of comparison for rational numbers in real-world contexts.		

Unit	Lesson	Lesson Objectives
	<b>Absolute Value</b>	<p>Compare and order magnitudes using absolute value.</p> <p>Define absolute value.</p> <p>Find the absolute value of an integer.</p> <p>Represent and compare real-world quantities using absolute value.</p>
<b>Relationships on the Coordinate Plane</b>		
	<b>The Coordinate Plane</b>	<p>Graph and name points in Quadrant I.</p> <p>Identify the parts of the coordinate plane.</p>
	<b>Plotting Points in the Four Quadrants</b>	<p>Describe the relationship between ordered pairs that differ only in sign.</p> <p>Graph and name points in all four quadrants.</p> <p>Identify the quadrant in which a point lies.</p>
	<b>Fractional Coordinates</b>	<p>Graph and name points that contain a decimal.</p> <p>Graph and name points that contain a fraction.</p>
	<b>Distance between Two Points</b>	<p>Use a number line to find the distance between two points in the same quadrant that have the same <math>x</math>- or <math>y</math>-coordinate.</p> <p>Use absolute value to find the distance between two points in different quadrants that have the same <math>x</math>- or <math>y</math>-coordinate.</p>
	<b>Polygons in the Coordinate Plane</b>	<p>Find lengths of sides for polygons drawn on the coordinate plane.</p> <p>Identify polygons on the coordinate plane given coordinates of the vertices.</p>
	<b>Plotting Equivalent Ratios</b>	<p>Identify patterns of plots of equivalent ratios.</p> <p>Plot tables of equivalent ratios on the coordinate plane.</p>
<b>Data Distributions and Analysis</b>		
	<b>Plotting Data on a Dot Plot</b>	<p>Display data on a dot plot.</p> <p>Distinguish between statistical and nonstatistical questions.</p>
	<b>Describing Data on Dot Plots</b>	<p>Describe a data set as shown on a dot plot, using the center, spread, and overall shape.</p>
	<b>Representing Data Sets with Histograms</b>	<p>Describe a data set as shown on a histogram, using the center, spread, and overall shape.</p> <p>Display data on a histogram.</p>
	<b>Finding the Mean</b>	<p>Calculate the mean of a set of data.</p> <p>Explain how the mean of a set of data is a balance point.</p> <p>Find a missing value in a set of data given the mean.</p>

Unit	Lesson	Lesson Objectives
		<p><b>Comparing Mean and Median</b></p> <ul style="list-style-type: none"> <li>Choose the most appropriate measure of center to describe a set of data.</li> <li>Describe the impact of outliers on the mean and median.</li> <li>Find the median of a set of data.</li> </ul> <p><b>Range and Interquartile Range</b></p> <ul style="list-style-type: none"> <li>Define and find the interquartile range of a set of data.</li> <li>Define and find the range of a set of data.</li> <li>Describe the impact of outliers on the range and interquartile range.</li> </ul> <p><b>Box Plots</b></p> <ul style="list-style-type: none"> <li>Create a box plot to represent a set of data, given the summary statistics.</li> <li>Interpret a box plot.</li> </ul> <p><b>Mean Absolute Deviation</b></p> <ul style="list-style-type: none"> <li>Calculate the mean absolute deviation for a set of data.</li> <li>Describe the impact of outliers on the mean absolute deviation.</li> <li>Interpret the mean absolute deviation of a set of data.</li> </ul> <p><b>Data Displays and Statistics</b></p> <ul style="list-style-type: none"> <li>Compare two data sets using measures of center and spread.</li> <li>Describe the impact of the number of observations on the shape of the data.</li> <li>Interpret the shape of a data set in the context of the way in which data was collected.</li> </ul> <p><b>Performance Task: Exciting Entertainment</b></p>
<b>Variables and Expressions</b>		
		<p><b>Numerical Expressions with Exponents</b></p> <ul style="list-style-type: none"> <li>Evaluate numerical expressions including expressions containing whole number exponents.</li> <li>Write numerical expressions including expressions containing whole number exponents.</li> </ul> <p><b>Expressions with Unknowns</b></p> <ul style="list-style-type: none"> <li>Read and write algebraic expressions.</li> <li>Use algebraic expressions to model real-world situations involving addition.</li> <li>Use algebraic expressions to model real-world situations involving subtraction.</li> </ul> <p><b>Expressions to Represent Multiplication and Division Problems</b></p> <ul style="list-style-type: none"> <li>Use algebraic expressions to model real-world situations involving division.</li> <li>Use algebraic expressions to model real-world situations involving multiplication.</li> </ul> <p><b>Writing and Evaluating Expressions</b></p> <ul style="list-style-type: none"> <li>Evaluate algebraic expressions containing one operation.</li> <li>Write algebraic expressions containing one operation.</li> </ul> <p><b>Expressions with More Than One Operation</b></p> <ul style="list-style-type: none"> <li>Use the order of operations to evaluate algebraic expressions containing more than one operation.</li> <li>Write algebraic expressions containing more than one operation.</li> </ul> <p><b>Expressions with and without Parentheses</b></p> <ul style="list-style-type: none"> <li>Use the order of operations to evaluate algebraic expressions containing more than one operation, with and without parentheses.</li> <li>Write algebraic expressions containing more than one operation, with and without parentheses.</li> </ul>

Unit	Lesson	Lesson Objectives
		<p><b>Working with Formulas</b> Evaluate scientific and mathematical formulas for given values.</p> <p><b>Equivalent Expressions</b> Generate equivalent expressions using the commutative and associative properties. Use substitution to determine if two expressions are equivalent.</p> <p><b>Equivalent Expressions and the Distributive Property</b> Generate equivalent expressions using the distributive property. Use substitution to determine if two expressions are equivalent.</p>
<b>Equations and Inequalities</b>		
		<p><b>Writing Equations to Find Unknowns</b> Differentiate between expressions and equations. Translate simple word problems into one-step equations. Use substitution to determine whether a given number is a solution of a one-step equation.</p> <p><b>Solving One-Step Equations: Addition and Subtraction</b> Write and solve one-step addition equations. Write and solve one-step subtraction equations.</p> <p><b>Solving One-Step Equations: Multiplication and Division</b> Write and solve one-step division equations. Write and solve one-step multiplication equations.</p> <p><b>Modeling Real-World Problems with One-Step Equations</b> Write and solve one-step variable equations modeling real-world contexts involving addition, subtraction, multiplication, and division of nonnegative rational numbers.</p> <p><b>Modeling Relationships between Real-World Quantities with Equations in Two Variables</b> Analyze a table to determine its correspondence to a real-world situation. Use a table to determine the proportional relationship between two real-world quantities.</p> <p><b>Relating Relationships Shown in Tables to Equations</b> Analyze the relationship between dependent and independent variables. Write an equation to represent two quantities in a real-world situation.</p> <p><b>Comparing Representations of Modeled Relationships</b> Compare multiple representations of the relationship between two real-world quantities. Create a graph to show a proportional relationship between two real-world quantities (using a table of values).</p> <p><b>Writing Inequalities</b> Describe the set of numbers that make the inequality true. Write an inequality to represent a constraint or condition in a real-world or mathematical problem. Write real-world scenarios given one-step inequalities.</p> <p><b>Graphing Inequalities on a Number Line</b> Graph solutions of one-step inequalities on number line diagrams. Recognize that inequalities of the form <math>x &gt; c</math> or <math>x &lt; c</math> have infinitely many solutions.</p>



Unit	Lesson	Lesson Objectives
<b>Area</b>		
	<b>Finding Area on a Coordinate Plane</b>	<ul style="list-style-type: none"> <li>Calculate the area of a rectangle drawn in the coordinate plane.</li> <li>Find lengths of sides for rectangles drawn in the coordinate plane.</li> </ul>
	<b>Area of Parallelograms</b>	<ul style="list-style-type: none"> <li>Solve real-world problems involving the area of parallelograms.</li> <li>Use the formula <math>A = bh</math> to find the area of a parallelogram.</li> </ul>
	<b>Area of Triangles</b>	<ul style="list-style-type: none"> <li>Calculate the area of triangles using the formula <math>A = \frac{1}{2}bh</math>.</li> <li>Solve real-world problems involving the area of triangles.</li> </ul>
	<b>Area of Special Quadrilaterals</b>	<ul style="list-style-type: none"> <li>Find the area of special quadrilaterals.</li> <li>Solve real-world problems involving the area of special quadrilaterals.</li> </ul>
	<b>Area of Irregular Figures</b>	<ul style="list-style-type: none"> <li>Calculate the area of irregular figures.</li> <li>Solve real-world problems involving the area of irregular figures.</li> </ul>
<b>Surface Area and Volume</b>		
	<b>Three-Dimensional Figures</b>	<ul style="list-style-type: none"> <li>Name and describe three-dimensional figures.</li> <li>Represent three-dimensional figures using nets.</li> </ul>
	<b>Surface Area of Prisms</b>	<ul style="list-style-type: none"> <li>Represent rectangular and triangular prisms using nets.</li> <li>Use nets of rectangular and triangular prisms to find surface area.</li> </ul>
	<b>Surface Area of Rectangular Pyramids</b>	<ul style="list-style-type: none"> <li>Calculate the surface area of square and rectangular pyramids using nets.</li> <li>Represent square and rectangular pyramids using nets.</li> </ul>
	<b>Exploring Volume of a Rectangular Prism</b>	<ul style="list-style-type: none"> <li>Calculate the volume of a right rectangular prism with fractional edge lengths.</li> <li>Calculate the volume of a right rectangular prism with whole number edge lengths.</li> </ul>
	<b>Finding a Formula for the Volume of a Rectangular Prism</b>	<ul style="list-style-type: none"> <li>Use the formulas <math>V = lwh</math> and <math>V = Bh</math> to find the volumes of right rectangular prisms.</li> </ul>
	<b>Solving Volume Problems with Formulas</b>	<ul style="list-style-type: none"> <li>Calculate the volume of a rectangular prism with one or more fraction or decimal side lengths using a formula.</li> <li>Find the value of an unknown dimension of a rectangular prism, given the remaining dimensions and the volume.</li> </ul>