

Indiana's Academic Standards for Mathematics	Boardworks Middle School Math Presentations
Grade 6	
Standard 1 - Number Sense	
6.1.1 Understand and apply the basic concept of negative numbers (e.g., on a number line, in counting, in temperature, in 'owing').	Using negative numbers in context Ordering integers
6.1.2 Interpret the absolute value of a number as the distance from zero on a number line and find the absolute value of real numbers.	Absolute value
6.1.3 Compare and represent on a number line positive and negative integers, fractions, decimals (to hundredths), and mixed numbers.	Ordering integers Ordering decimals Ordering fractions Using negative numbers in context
6.1.4 Convert between any two representations of numbers (fractions, decimals, and percents) without the use of a calculator.	Fractions and decimals Equivalent fractions, decimals and percentages Introducing percentages
6.1.5 Recognize decimal equivalents for commonly used fractions without the use of a calculator.	Fractions and decimals Equivalent fractions, decimals and percentages
6.1.6 Use models to represent ratios.	Ratio and rate Direct proportion Ratio and proportion problems
6.1.7 Find the least common multiple and the greatest common factor of whole numbers. Use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).	GCF and LCM Methods for adding and subtracting fractions
Standard 2 - Computation	

6.2.1 Add and subtract positive and negative integers.	Adding and subtracting integers Adding and subtracting integers activities Using negative numbers in context Mental addition and subtraction Written methods for addition and subtraction
6.2.2 Multiply and divide positive and negative integers.	Multiplying and dividing integers Mental multiplication Mental division Written methods for multiplication Written methods for division
6.2.3 Multiply and divide decimals.	Mental multiplication Mental division Written methods for multiplication Written methods for division
6.2.4 Explain how to multiply and divide positive fractions and perform the calculations.	Multiplying fractions Dividing by fractions
6.2.5 Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation.	Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions One number as a fraction of another
6.2.6 Interpret and use ratios to show the relative sizes of two quantities. Use the notations: a/b , a to b , $a:b$.	Fractions of shapes One number as a fraction of another Ratio and rate
6.2.7 Understand proportions and use them to solve problems.	Direct proportion Ratio and proportion problems Comparing proportions
6.2.8 Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips.	Percentage change Comparing proportions Percentages and inverse operations Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Introducing percentages

6.2.9 Use estimation to decide whether answers are reasonable in decimal problems.	Estimation and approximation Checking results Using a calculator
6.2.10 Use mental arithmetic to add or subtract simple fractions and decimals.	Mental addition and subtraction Adding and subtracting simple fractions Methods for adding and subtracting fractions
Standard 3 - Algebra and Functions	
6.3.1 Write and solve one-step linear equations and inequalities in one variable and check the answers.	Inequalities Solving simple equations Solving linear inequalities Integer solutions for inequalities
6.3.2 Write and use formulas with up to three variables to solve problems.	Introducing formulas Using formulas Transforming formulas Deriving formulas
6.3.3 Interpret and evaluate expressions that use grouping symbols such as parentheses.	Equations involving parentheses and division
6.3.4 Use parentheses to indicate which operation to perform first when writing expressions containing more than two terms and different operations.	Equations involving parentheses and division Order of operations and PEMDAS
6.3.5 Use variables in expressions describing geometric quantities.	Deriving formulas Sequences from practical contexts
6.3.6 Apply the correct order of operations and the properties of real numbers (e.g., identity, inverse, commutative, associative, and distributive properties) to evaluate numerical expressions. Justify each step in the process.	Order of operations and PEMDAS Properties of numbers
6.3.7 Identify and graph ordered pairs in the four quadrants of the coordinate plane.	Introducing coordinates
6.3.8 Solve problems involving linear functions with integer values. Write the equation and graph the resulting ordered pairs of integers on a grid.	The equation of a straight line Graphs of functions
6.3.9 Investigate how a change in one variable relates to a change in a second variable.	The equation of a straight line Graphs of functions
Standard 4 - Geometry	

6.4.1 Identify and draw vertical, adjacent, complementary, and supplementary angles and describe these angle relationships.	Calculating angles Angles made with parallel lines
6.4.2 Use the properties of complementary, supplementary, and vertical angles to solve problems involving an unknown angle. Justify solutions.	Calculating angles
6.4.3 Draw quadrilaterals and triangles from given information about them.	Quadrilaterals Triangles Angles in a triangle Constructing triangles Quadrilaterals on a coordinate grid
6.4.4 Understand that the sum of the interior angles of any triangle is 180° and that the sum of the interior angles of any quadrilateral is 360° . Use this information to solve problems.	Quadrilaterals Triangles Angles in a triangle The sum of interior and exterior angles
6.4.5 Identify and draw two-dimensional shapes that are similar.	Congruence
6.4.6 Draw the translation (slide) and reflection (flip) of shapes.	Translations Reflection
6.4.7 Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.	2-D representations of 3-D shapes
Standard 5 - Measurement	
6.5.1 Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles.	Estimating measurements Area Volume Converting metric units Customary unit conversions Measuring angles
6.5.2 Understand and use larger units for measuring length by comparing miles to yards and kilometers to meters.	Converting metric units Customary unit conversions
6.5.3 Understand and use larger units for measuring area by comparing acres and square miles to square yards and square kilometers to square meters.	Converting metric units Customary unit conversions
6.5.4 Understand the concept of the constant π as the ratio of the circumference to the diameter of a circle. Develop and use the formulas for the circumference and area of a circle.	Circumference of a circle Area of a circle
6.5.5 Know common estimates of π (3.14, $\frac{22}{7}$) and use these values to estimate and calculate the circumference and the area of circles. Compare with actual measurements.	Circumference of a circle Area of a circle Circles

6.5.6 Understand the concept of significant figures and round answers to an appropriate number of significant figures.	Rounding
6.5.7 Construct a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area of these objects.	Surface area Nets Constructing nets
6.5.8 Use strategies to find the surface area and volume of right prisms and cylinders using appropriate units.	Surface area Volume Cylinders, cones and spheres Formulas for shapes
6.5.9 Use a formula to convert temperatures between Celsius and Fahrenheit.	-
6.5.10 Add, subtract, multiply, and divide with money in decimal notation.	Mental addition and subtraction Mental multiplication Mental division
Standard 6 - Data Analysis and Probability	
6.6.1 Organize and display single-variable data in appropriate graphs and stem-and-leaf plots, and explain which types of graphs are appropriate for various data sets.	Appropriate graphs Bar graphs Line graphs Circle graphs Scatter plots Histograms Quartiles and box plots Venn diagrams
6.6.2 Make frequency tables for numerical data, grouping the data in different ways to investigate how different groupings describe the data. Understand and find relative and cumulative frequency for a data set. Use histograms of the data and of the relative frequency distribution, and a broken line graph for cumulative frequency, to interpret the data.	Organizing data Histograms Line graphs
6.6.3 Compare the mean, median, and mode for a set of data and explain which measure is most appropriate in a given context.	Calculating the mean Finding the median Finding the mode Calculating statistics

6.6.4 Show all possible outcomes for compound events in an organized way and find the theoretical probability of each outcome.	Probability diagrams Calculating probability part 1
6.6.5 Use data to estimate the probability of future events.	Experimental probability
6.6.6 Understand and represent probabilities as ratios, measures of relative frequency, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable.	The probability scale Calculating probability part 1 Calculating probability part 2
Grade 7	
Standard 1 - Number Sense	
7.1.1 Read, write, compare, and solve problems using whole numbers in scientific notation.	Scientific notation
7.1.2 Compare and order rational and common irrational numbers and place them on a number line.	Rational and irrational numbers Ordering integers Ordering decimals Ordering fractions
7.1.3 Identify rational and common irrational numbers from a list.	Rational and irrational numbers
7.1.4 Understand and compute whole number powers of whole numbers.	Powers
7.1.5 Find the prime factorization of whole numbers and write the results using exponents.	Prime factorization Powers
7.1.6 Understand and apply the concept of square root.	Square roots
7.1.7 Convert terminating decimals into reduced fractions.	Fractions and decimals

Standard 2 - Computation	
7.2.1 Solve addition, subtraction, multiplication, and division problems that use integers, fractions, decimals, and combinations of the four operations.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Mental addition and subtraction Mental multiplication Mental division Multiplying by numbers between 0 and 1 Written methods for addition and subtraction Written methods for multiplication Written methods for division
7.2.2 Calculate the percentage increase and decrease of a quantity.	Percentage change
7.2.3 Solve problems that involve discounts, markups, and commissions.	Percentage change Comparing proportions Percentages and inverse operations Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator
7.2.4 Use estimation to decide whether answers are reasonable in problems involving fractions and decimals.	Checking results Estimation and approximation Using a calculator
7.2.5 Use mental arithmetic to compute with simple fractions, decimals, and powers.	Mental addition and subtraction Mental multiplication Mental division Mental math puzzles Mental math and place value

Standard 3 - Algebra and Functions	
7.3.1 Use variables and appropriate operations to write an expression, a formula, an equation, or an inequality that represents a verbal description.	Writing expressions Deriving formulas Inequalities Solving linear inequalities Introducing formulas
7.3.2 Write and solve two-step linear equations and inequalities in one variable and check the answers.	Solving simple equations Solving linear inequalities Integer solutions for inequalities
7.3.3 Use correct algebraic terminology, such as variable, equation, term, coefficient, inequality, expression, and constant.	Writing expressions Inequalities
7.3.4 Evaluate numerical expressions and simplify algebraic expressions by applying the correct order of operations and the properties of rational numbers (e.g., identity, inverse, commutative, associative, distributive properties). Justify each step in the process.	Properties of numbers Order of operations and PEMDAS
7.3.5 Solve an equation or formula with two variables for a particular variable.	Transforming formulas
7.3.6 Define slope as vertical change per unit of horizontal change and recognize that a straight line has constant slope or rate of change.	The equation of a straight line
7.3.7 Find the slope of a line from its graph.	The equation of a straight line
7.3.8 Draw the graph of a line given the slope and one point on the line, or two points on the line.	The equation of a straight line
7.3.9 Identify functions as linear or nonlinear and examine their characteristics in tables, graphs, and equations.	The equation of a straight line Graphs of functions Reading and plotting graphs Nonlinear equations Graphs of nonlinear functions Exploring nonlinear graphs Conversion graphs
7.3.10 Identify and describe situations with constant or varying rates of change and know that a constant rate of change describes a linear function.	Distance-time graphs Conversion graphs

Standard 4 - Geometry	
7.4.1 Understand coordinate graphs and use them to plot simple shapes, find lengths and areas related to the shapes, and find images under translations (slides), rotations (turns), and reflections (flips).	Introducing coordinates Reading and plotting graphs Translation Rotation Reflection Quadrilaterals on a coordinate grid Finding the midpoint of a line segment Combining transformations
7.4.2 Understand that transformations such as slides, turns, and flips preserve the length of segments, and that figures resulting from slides, turns, and flips are congruent to the original figures.	Translation Reflection Rotation Congruence Combining transformations
7.4.3 Know and understand the Pythagorean Theorem and use it to find the length of the missing side of a right triangle and the lengths of other line segments. Use direct measurement to test conjectures about triangles.	Pythagorean Theorem Calculating sides of right triangles Pythagorean triples
7.4.4 Construct two-dimensional patterns (nets) for three-dimensional objects, such as right prisms, pyramids, cylinders, and cones.	Nets Constructing nets
Standard 5 - Measurement	
7.5.1 Compare lengths, areas, volumes, weights, capacities, times, and temperatures within measurement systems.	Converting metric units Customary unit conversions
7.5.2 Use experimentation and modeling to visualize similarity problems. Solve problems using similarity.	Congruence Dilation Finding missing lengths
7.5.3 Read and create drawings made to scale, construct scale models, and solve problems related to scale.	Scale drawings Dilation Finding missing lengths Using scale factors

7.5.4 Use formulas for finding the perimeter and area of basic two-dimensional shapes and the surface area and volume of basic three-dimensional shapes, including rectangles, parallelograms, trapezoids, triangles, circles, right prisms, and cylinders.	Perimeter Area Area problems Area of a circle Circumference of a circle Surface area Cylinders, cones and spheres
7.5.5 Estimate and compute the area of more complex or irregular two-dimensional shapes by dividing them into more basic shapes.	Area of irregular shapes
7.5.6 Use objects and geometry modeling tools to compute the surface area of the faces and the volume of a three-dimensional object built from rectangular solids.	Surface area Volume
Standard 6 - Data Analysis and Probability	
7.6.1 Analyze, interpret, and display data in appropriate bar, line, and circle graphs and stem-and-leaf plots and justify the choice of display.	Appropriate graphs Bar graphs Circle graphs Line graphs Calculating statistics
7.6.2 Make predictions from statistical data.	Writing a statistical report
7.6.3 Describe how additional data, particularly outliers, added to a data set may affect the mean, median, and mode.	Calculating the mean Finding the median Finding the mode Calculating statistics
7.6.4 Analyze data displays, including ways that they can be misleading. Analyze ways in which the wording of questions can influence survey results.	Misleading graphs Collecting data
7.6.5 Know that if P is the probability of an event occurring, then $1 - P$ is the probability of that event not occurring.	Calculating probability part 2

7.6.6 Understand that the probability of either one or the other of two disjoint events* occurring is the sum of the two individual probabilities.	Calculating probability part 2
7.6.7 Find the number of possible arrangements of several objects using a tree diagram.	Probability diagrams
Grade 8	
Standard 1 - Number Sense	
8.1.1 Read, write, compare, and solve problems using decimals in scientific notation.	Scientific notation
8.1.2 Know that every rational number is either a terminating or repeating decimal and that every irrational number is a nonrepeating decimal.	Rational and irrational numbers
8.1.3 Understand that computations with an irrational number and a rational number (other than zero) produce an irrational number.	-
8.1.4 Understand and evaluate negative integer exponents.	Powers
8.1.5 Use the laws of exponents for integer exponents.	Powers
8.1.6 Use the inverse relationship between squaring and finding the square root of a perfect square integer.	Square roots
8.1.7 Calculate and find approximations of square roots.	Square roots Estimation and approximation
Standard 2 - Computation	
8.2.1 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) in multi-step problems.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Mental addition and subtraction Mental multiplication Mental division Multiplying by numbers between 0 and 1 Written methods for addition and subtraction Written methods for multiplication Written methods for division

8.2.2 Solve problems by computing simple and compound interest.	-
8.2.3 Use estimation techniques to decide whether answers to computations on a calculator are reasonable.	Estimation and approximation Checking results Using a calculator
8.2.4 Use mental arithmetic to compute with common fractions, decimals, powers, and percents.	Calculating percentages mentally Mental addition and subtraction Mental multiplication Mental division Mental math puzzles Mental math and place value
Standard 3 - Algebra and Functions	
8.3.1 Write and solve linear equations and inequalities in one variable, interpret the solution or solutions in their context, and verify the reasonableness of the results.	Solving simple equations Solving linear inequalities Integer solutions for inequalities
8.3.2 Solve systems of two linear equations using the substitution method and identify approximate solutions graphically.	Systems of linear equations
8.3.3 Interpret positive integer powers as repeated multiplication and negative integer powers as repeated division or multiplication by the multiplicative inverse.	Powers Multiplying algebraic terms
8.3.4 Use the correct order of operations to find the values of algebraic expressions involving powers.	Order of operations and PEMDAS Nonlinear equations Nonlinear equations and spreadsheets
8.3.5 Identify and graph linear functions and identify lines with positive and negative slope.	Graphs of functions The equation of a straight line

8.3.6 Find the slope of a linear function given the equation and write the equation of a line given the slope and any point on the line.	The equation of a straight line
8.3.7 Demonstrate an understanding of rate as a measure of one quantity with respect to another quantity.	Ratio and rate
8.3.8 Demonstrate an understanding of the relationships among tables, equations, verbal expressions, and graphs of linear functions.	Interpreting graphs Graphs of functions The equation of a straight line Mapping functions Function machines
8.3.9 Represent simple quadratic functions using verbal descriptions, tables, graphs, and formulas and translate among these representations.	Graphs of nonlinear functions Exploring nonlinear graphs
8.3.10 Graph functions of the form $y = nx^2$ and $y = nx^3$ and describe the similarities and differences in the graphs.	Graphs of nonlinear functions Exploring nonlinear graphs
Standard 4 - Geometry	
8.4.1 Identify and describe basic properties of geometric shapes: altitudes, diagonals, angle and perpendicular bisectors, central angles, radii, diameters, and chords.	Circles Quadrilaterals Polygons Triangles Constructing lines and angles
8.4.2 Perform simple constructions, such as bisectors of segments and angles, copies of segments and angles, and perpendicular segments. Describe and justify the constructions.	Constructing lines and angles Drawing lines and angles
8.4.3 Identify properties of three-dimensional geometric objects (e.g., diagonals of rectangular solids) and describe how two or more figures intersect in a plane or in space.	-
8.4.4 Draw the translation (slide), rotation (turn), reflection (flip), and dilation (stretches and shrinks) of shapes.	Translation Rotation Reflection Dilation Combining transformations

8.4.5 Use the Pythagorean Theorem and its converse to solve problems in two and three dimensions.	Pythagorean Theorem Calculating sides of right triangles Pythagorean triples
Standard 5 - Measurement	
8.5.1 Convert common measurements for length, area, volume, weight, capacity, and time to equivalent measurements within the same system.	Customary unit conversions Converting metric units
8.5.2 Solve simple problems involving rates and derived measurements for attributes such as velocity and density.	Ratio and rate
8.5.3 Solve problems involving scale factors, area, and volume using ratio and proportion.	Using scale factors Area Area problems Volume Ratio and proportion problems
8.5.4 Use formulas for finding the perimeter and area of basic two-dimensional shapes and the surface area and volume of basic three-dimensional shapes, including rectangles, parallelograms, trapezoids, triangles, circles, prisms, cylinders, spheres, cones, and pyramids.	Perimeter Area Area problems Area of a circle Surface area Volume Cylinders, cones and spheres Formulas for shapes
8.5.5 Estimate and compute the area of irregular two-dimensional shapes and the volume of irregular three-dimensional objects by breaking them down into more basic geometric objects.	Area of irregular shapes Volume

Standard 6 - Data Analysis and Probability	
8.6.1 Identify claims based on statistical data and, in simple cases, evaluate the reasonableness of the claims. Design a study to investigate the claim.	Population and sampling Collecting data Organizing data Writing a statistical report Misleading graphs
8.6.2 Identify different methods of selecting samples, analyzing the strengths and weaknesses of each method, and the possible bias in a sample or display.	Population and sampling Misleading graphs
8.6.3 Understand the meaning of, and be able to identify or compute the minimum value, the lower quartile, the median, the upper quartile, the interquartile range, and the maximum value of a data set.	Finding the median Interquartile range Quartiles and box plots
8.6.4 Analyze, interpret, and display single- and two-variable data in appropriate bar, line, and circle graphs; stem-and-leaf plots; and box-and-whisker plots and explain which types of display are appropriate for various data sets.	Appropriate graphs Bar graphs Circle graphs Line graphs Calculating statistics
8.6.5 Represent two-variable data with a scatterplot on the coordinate plane and describe how the data points are distributed. If the pattern appears to be linear, draw a line that appears to best fit the data and write the equation of that line.	Scatter plots
8.6.6 Understand and recognize equally likely events.	The probability scale Calculating probability part 1
8.6.7 Find the number of possible arrangements of several objects by using the Basic Counting Principle.	Probability diagrams