

Texas Essential Knowledge and Skills for Mathematics	Boardworks Middle School Math Presentations
Grade 6	
(1) Number, operation, and quantitative reasoning. The student represents and uses rational numbers in a variety of equivalent forms. The student is expected to:	
(A) compare and order non-negative rational numbers;	Ordering decimals Ordering fractions Ordering integers
(B) generate equivalent forms of rational numbers including whole numbers, fractions, and decimals;	Fractions and decimals Equivalent fractions Equivalent fractions, decimals and percentages
(C) use integers to represent real-life situations;	Using negative numbers in context One number as a fraction of another
(D) write prime factorizations using exponents;	Prime factorization
(E) identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers; and	Prime factorization GCF and LCM Multiples and factors
(F) identify multiples of a positive integer and common multiples and the least common multiple of a set of positive integers.	GCF and LCM Multiples and factors
(2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, and divides to solve problems and justify solutions. The student is expected to:	
(A) model addition and subtraction situations involving fractions with objects, pictures, words, and numbers;	Adding and subtracting simple fractions Methods for adding and subtracting fractions
(B) use addition and subtraction to solve problems involving fractions and decimals;	Adding and subtracting simple fractions Methods for adding and subtracting fractions Mental addition and subtraction Mental math puzzles
(C) use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates;	Multiplying and dividing integers Ratio and rate Dividing in a given ratio Ratio and proportion problems

(D) estimate and round to approximate reasonable results and to solve problems where exact answers are not required; and	Rounding Estimation and approximation
(E) use order of operations to simplify whole number expressions (without exponents) in problem solving situations.	Order of operations and PEMDAS
(3) Patterns, relationships, and algebraic thinking. The student solves problems involving direct proportional relationships. The student is expected to:	
(A) use ratios to describe proportional situations;	Ratio and rate
(B) represent ratios and percents with concrete models, fractions, and decimals; and	Ratio and rate Ratio and proportion problems Calculating percentages mentally Calculating percentages on paper Equivalent fractions, decimals and percentages Introducing percentages
(C) use ratios to make predictions in proportional situations.	Ratio and rates Dividing in a given ratio Ratio and proportion problems Comparing proportions Direct variations
(4) Patterns, relationships, and algebraic thinking. The student uses letters as variables in mathematical expressions to describe how one quantity changes when a related quantity changes. The student is expected to:	
(A) use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter and area; and	Area Area of a circle Perimeter
(B) use tables of data to generate formulas representing relationships involving perimeter, area, volume of a rectangular prism, etc.	-
(5) Patterns, relationships, and algebraic thinking. The student uses letters to represent an unknown in an equation. The student is expected to formulate equations from problem situations described by linear relationships.	Writing expressions Introducing formulas
(6) Geometry and spatial reasoning. The student uses geometric vocabulary to describe angles, polygons, and circles. The student is expected to:	
(A) use angle measurements to classify angles as acute, obtuse, or right;	Calculating angles Measuring angles

(B) identify relationships involving angles in triangles and quadrilaterals; and	Angles in a triangle Angles made with parallel lines Triangles Quadrilaterals
(C) describe the relationship between radius, diameter, and circumference of a circle.	Circles Circumference of a circle Area of a circle
(7) Geometry and spatial reasoning. The student uses coordinate geometry to identify location in two dimensions. The student is expected to locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers.	Introducing coordinates Quadrilaterals on a coordinate grid
(8) Measurement. The student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles. The student is expected to:	
(A) estimate measurements (including circumference) and evaluate reasonableness of results;	Estimating measurements Circumference of a circle
(B) select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight;	Perimeter Area Area problems Surface area Volume Using negative numbers in context Using a calculator Converting metric units Customary unit conversions
(C) measure angles; and	Measuring angles
(D) convert measures within the same measurement system (customary and metric) based on relationships between units.	Converting metric units Customary unit conversions
(9) Probability and statistics. The student uses experimental and theoretical probability to make predictions. The student is expected to:	
(A) construct sample spaces using lists and tree diagrams; and	Probability diagrams
(B) find the probabilities of a simple event and its complement and describe the relationship between the two.	The language of probability Calculating probability part 1 Calculating probability part 2

(10) Probability and statistics. The student uses statistical representations to analyze data. The student is expected to:	
(A) select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot;	Bar graphs Line graphs Calculating statistics Circle graphs Appropriate graphs
(B) identify mean (using concrete objects and pictorial models), median, mode, and range of a set of data;	Calculating the mean Finding the mode Finding the median Finding the range
(C) sketch circle graphs to display data; and	Circle graphs Appropriate graphs
(D) solve problems by collecting, organizing, displaying, and interpreting data.	Population and sampling Collecting data Organizing data Writing a statistical report
Grade 7	
(1) Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to:	
(A) compare and order integers and positive rational numbers;	Ordering fractions Ordering integers Ordering decimals
(B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator; and	Fractions and decimals Equivalent fractions Equivalent fractions, decimals and percentages Introducing percentages
(C) represent squares and square roots using geometric models.	Square and triangular numbers Square roots

(2) Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to:	
(A) represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words, and numbers;	<ul style="list-style-type: none"> Finding a fraction of an amount Multiplying fractions Dividing by fractions Multiplying and dividing by 0.1 and 0.01 Multiplying by numbers between 0 and 1 Mental math and place value
(B) use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals;	<ul style="list-style-type: none"> Adding and subtracting fractions Finding a fraction of an amount Multiplying fractions Dividing by fractions Multiplying and dividing by 0.1 and 0.01 Multiplying by numbers between 0 and 1 Mental math and place value Written methods for addition and subtraction Written methods for multiplication and division Mental addition and subtraction Mental multiplication Mental division Mental math puzzles
(C) use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms;	<ul style="list-style-type: none"> Prime factorization Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Mental addition and subtraction Mental multiplication Mental division Written methods for multiplication Written methods for addition and subtractions Written methods for division
(D) use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio;	<ul style="list-style-type: none"> Dividing in a given ratio Ratio and proportion problems Ratio and rate

(E) simplify numerical expressions involving order of operations and exponents;	Order of operations and PEMDAS
(F) select and use appropriate operations to solve problems and justify the selections; and	Mental math puzzles
(G) determine the reasonableness of a solution to a problem.	Checking results
(3) Patterns, relationships, and algebraic thinking. The student solves problems involving direct proportional relationships. The student is expected to:	
(A) estimate and find solutions to application problems involving percent; and	Comparing proportions Percentage change Introducing percentages Calculating percentages mentally
(B) estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.	Direct variations Direct proportion Converting metric units Customary unit conversions
(4) Patterns, relationships, and algebraic thinking. The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to:	
(A) generate formulas involving unit conversions within the same system (customary and metric), perimeter, area, circumference, volume, and scaling;	Converting metric units Customary unit conversions Perimeter Area Area problems Circumference of a circle Volume Using scale factors Cylinders, cones and spheres Using formulas
(B) graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling; and	Conversion graphs
(C) use words and symbols to describe the relationship between the terms in an arithmetic sequence (with a constant rate of change) and their positions in the sequence.	Introducing sequences Describing and continuing sequences Generating sequences and rules
(5) Patterns, relationships, and algebraic thinking. The student uses equations to solve problems. The student is expected to:	
(A) use concrete and pictorial models to solve equations and use symbols to record the actions; and	Direct variations Writing expressions
(B) formulate problem situations when given a simple equation and formulate an equation when given a problem situation.	Writing expressions Introducing formulas

(6) Geometry and spatial reasoning. The student compares and classifies two- and three-dimensional figures using geometric vocabulary and properties. The student is expected to:	
(A) use angle measurements to classify pairs of angles as complementary or supplementary;	Calculating angles
(B) use properties to classify triangles and quadrilaterals;	Triangles Quadrilaterals
(C) use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders; and	Solid shapes Cylinders, cones and spheres
(D) use critical attributes to define similarity.	Congruence Dilation
(7) Geometry and spatial reasoning. The student uses coordinate geometry to describe location on a plane. The student is expected to:	
(A) locate and name points on a coordinate plane using ordered pairs of integers; and	Introducing coordinates
(B) graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane.	Reflection Translation
(8) Geometry and spatial reasoning. The student uses geometry to model and describe the physical world. The student is expected to:	
(A) sketch three-dimensional figures when given the top, side, and front views;	Views of 3-D shapes
(B) make a net (two-dimensional model) of the surface area of a three-dimensional figure; and	Nets
(C) use geometric concepts and properties to solve problems in fields such as art and architecture.	-
(9) Measurement. The student solves application problems involving estimation and measurement. The student is expected to:	
(A) estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes;	Estimating measurements Perimeter Circumference of a circle Area Area problems Area of a circle Area of irregular shapes
(B) connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders; and	Volume Cylinders, cones and spheres Formulas for shapes
(C) estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders.	Estimating measurements Volume Cylinders, cones and spheres

(10) Probability and statistics. The student recognizes that a physical or mathematical model (including geometric) can be used to describe the experimental and theoretical probability of real-life events. The student is expected to:	
(A) construct sample spaces for simple or composite experiments; and	Probability diagrams
(B) find the probability of independent events.	Calculating probability part 1
(11) Probability and statistics. The student understands that the way a set of data is displayed influences its interpretation. The student is expected to:	
(A) select and use an appropriate representation for presenting and displaying relationships among collected data, including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn diagrams, and justify the selection; and	Bar graphs Line graphs Calculating statistics Circle graphs Venn diagrams Appropriate graphs
(B) make inferences and convincing arguments based on an analysis of given or collected data.	Writing a statistical report
(12) Probability and statistics. The student uses measures of central tendency and variability to describe a set of data. The student is expected to:	
(A) describe a set of data using mean, median, mode, and range; and	Finding the mode Finding the median Finding the range Calculating the mean Calculating statistics
(B) choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.	Calculating statistics
Grade 8	
(1) Number, operation, and quantitative reasoning. The student understands that different forms of numbers are appropriate for different situations. The student is expected to:	
(A) compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals;	Ordering fractions Ordering decimals Ordering integers Equivalent fractions, decimals and percentages Using negative numbers in context
(B) select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships;	Ratio and proportion problems

(C) approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (such as π , $\sqrt{2}$);	Circumference of a circle Square roots Rational and irrational numbers Estimation and approximation
(D) express numbers in scientific notation, including negative exponents, in appropriate problem situations; and	Scientific notation
(E) compare and order real numbers with a calculator.	Using a calculator
(2) Number, operation, and quantitative reasoning. The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to:	
(A) select appropriate operations to solve problems involving rational numbers and justify the selections;	Mental math puzzles
(B) use appropriate operations to solve problems involving rational numbers in problem situations;	Mental math puzzles
(C) evaluate a solution for reasonableness; and	Checking results Estimation and approximation
(D) use multiplication by a given constant factor (including unit rate) to represent and solve problems involving proportional relationships including conversions between measurement systems.	Using scale factors Ratio and rate Ratio and proportion problems Direct proportion Customary unit conversions Converting metric units
(3) Patterns, relationships, and algebraic thinking. The student identifies proportional or non-proportional linear relationships in problem situations and solves problems. The student is expected to:	
(A) compare and contrast proportional and non-proportional linear relationships; and	Direct proportion Direct variations
(B) estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates.	Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Dividing in a given ratio Direct variations
(4) Patterns, relationships, and algebraic thinking. The student makes connections among various representations of a numerical relationship. The student is expected to generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).	Writing expressions Graphs of functions The equation of a straight line Function machines Mapping functions

(5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to:	
(A) predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations; and	Equations with variables on both sides Direct variations Nonlinear equations Graphs of functions Sequences from practical contexts Deriving formulas
(B) find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change).	Generating sequences and rules Finding the nth term Sequences from practical contexts
(6) Geometry and spatial reasoning. The student uses transformational geometry to develop spatial sense. The student is expected to:	
(A) generate similar figures using dilations including enlargements and reductions; and	Finding missing lengths Dilation Scale drawings
(B) graph dilations, reflections, and translations on a coordinate plane.	Dilation Translation Reflection Combining transformations
(7) Geometry and spatial reasoning. The student uses geometry to model and describe the physical world. The student is expected to:	
(A) draw three-dimensional figures from different perspectives;	Views of 3-D shapes Cross sections 2-D representations of 3-D shapes
(B) use geometric concepts and properties to solve problems in fields such as art and architecture;	-
(C) use pictures or models to demonstrate the Pythagorean Theorem; and	Pythagorean theorem
(D) locate and name points on a coordinate plane using ordered pairs of rational numbers.	Introducing coordinates Reading and plotting graphs
(8) Measurement. The student uses procedures to determine measures of three-dimensional figures. The student is expected to:	
(A) find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models);	Surface area Cylinders, cones and spheres
(B) connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects; and	Volume Cylinders, cones and spheres Formulas for shapes

(C) estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume.	Estimating measurements Surface area Volume
(9) Measurement. The student uses indirect measurement to solve problems. The student is expected to:	
(A) use the Pythagorean Theorem to solve real-life problems; and	Pythagorean theorem Calculating sides of right triangles Pythagorean triples
(B) use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.	Congruence Finding missing lengths Constructing triangles
(10) Measurement. The student describes how changes in dimensions affect linear, area, and volume measures. The student is expected to:	
(A) describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally; and	Finding missing lengths Dilation Scale drawings
(B) describe the resulting effect on volume when dimensions of a solid are changed proportionally.	-
(11) Probability and statistics. The student applies concepts of theoretical and experimental probability to make predictions. The student is expected to:	
(A) find the probabilities of dependent and independent events;	-
(B) use theoretical probabilities and experimental results to make predictions and decisions; and	Calculating probability part 1 Calculating probability part 2 Experimental probability
(C) select and use different models to simulate an event.	Probability diagrams
(12) Probability and statistics. The student uses statistical procedures to describe data. The student is expected to:	
(A) use variability (range, including interquartile range (IQR)) and select the appropriate measure of central tendency to describe a set of data and justify the choice for a particular situation;	Finding the range Calculating statistics Interquartile range
(B) draw conclusions and make predictions by analyzing trends in scatterplots; and	Scatter plots

<p>(C) select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology.</p>	<p>Bar graphs Line graphs Calculating statistics Circle graphs Venn diagrams Quartiles and box plots Appropriate graphs</p>
<p>(13) Probability and statistics. The student evaluates predictions and conclusions based on statistical data. The student is expected to:</p>	<p style="background-color: #cccccc;"></p>
<p>(A) evaluate methods of sampling to determine validity of an inference made from a set of data; and</p>	<p>Population and sampling</p>
<p>(B) recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.</p>	<p>Writing a statistical report Misleading graphs</p>