

Mathematics Standards of Learning for Virginia Public Schools 2009	Boardworks Middle School Math Presentations
Grade 6	
Number and Number Sense	
6.1 The student will describe and compare data, using ratios, and will use appropriate notations.	Ratio and rate Dividing in a given ratio Direct proportion Ratio and proportion problems Using scale factors
6.2 The student will	
a) investigate and describe fractions, decimals, and percents as ratios;	Ratio and rate
b) identify a given fraction, decimal, or percent from a representation;	Fractions of shapes Introducing percentages
c) demonstrate equivalent relationships among fractions, decimals, and percents; and	Fractions and decimals Equivalent fractions, decimals and percentages Equivalent fractions Introducing percentages
d) compare and order fractions, decimals, and percents.	Fractions and decimals Equivalent fractions, decimals and percentages Equivalent fractions Ordering integers Ordering decimals Ordering fractions Introducing percentages
6.3 The student will	
a) identify and represent integers;	Ordering integers
b) order and compare integers; and	Ordering integers Using negative numbers in context
c) identify and describe absolute value of integers.	Absolute value
6.4 The student will demonstrate multiple representations of multiplication and division of fractions.	Multiplying fractions Dividing by fractions

6.5 The student will investigate and describe concepts of positive exponents and perfect squares.	Powers Square and triangular numbers
Computation and Estimation	
6.6 The student will	
a) multiply and divide fractions and mixed numbers; and	Multiplying fractions Dividing by fractions One number as a fraction of another
b) estimate solutions and then solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions.	Estimation and approximation Multiplying fractions Dividing by fractions Adding and subtracting simple fractions Methods of adding and subtracting fractions
6.7 The student will solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of decimals.	Mental addition and subtraction Mental multiplication Mental division Written methods for addition and subtraction Written methods for multiplication Written methods for division Multiplying by numbers between 0 and 1 Multiplying and dividing by 0.1 and 0.01
6.8 The student will evaluate whole number numerical expressions, using the order of operations	Order of operations and PEMDAS
Measurement	
6.9 The student will make ballpark comparisons between measurements in the U.S. Customary System of measurement and measurements in the metric system.	Converting metric units Customary unit conversions
6.10 The student will	
a) define pi as the ratio of the circumference of a circle to its diameter;	Circumference of a circle
b) solve practical problems involving circumference and area of a circle, given the diameter or radius;	Circumference of a circle Area of a circle
c) solve practical problems involving area and perimeter; and	Area Perimeter Area problems Area of a circle Circumference of a circle Area of irregular shapes
d) describe and determine the volume and surface area of a rectangular prism.	Volume Surface area

Geometry	
6.11 The student will	
a) identify the coordinates of a point in a coordinate plane; and	Introducing coordinates
b) graph ordered pairs in a coordinate plane.	Introducing coordinates Reading and plotting graphs
6.12 The student will determine congruence of segments, angles, and polygons.	Congruence Calculating angles
6.13 The student will describe and identify properties of quadrilaterals.	Quadrilaterals
Probability and Statistics	
6.14 The student, given a problem situation, will	
a) construct circle graphs;	Circle graphs
b) draw conclusions and make predictions, using circle graphs; and	Circle graphs
c) compare and contrast graphs that present information from the same data set.	-
6.15 The student will	
a) describe mean as balance point; and	Calculating the mean
b) decide which measure of center is appropriate for a given purpose.	Calculating statistics
6.16 The student will	
a) compare and contrast dependent and independent events; and	-
b) determine probabilities for dependent and independent events.	Calculating probability part 1 Calculating probability part 2
Patterns, Functions, and Algebra	
6.17 The student will identify and extend geometric and arithmetic sequences.	Introducing sequences Describing and continuing sequences Sequences from geometrical patterns
6.18 The student will solve one-step linear equations in one variable involving whole number coefficients and positive rational solutions.	Solving simple equations
6.19 The student will investigate and recognize	
a) the identity properties for addition and multiplication;	Properties of numbers
b) the multiplicative property of zero; and	Properties of numbers
c) the inverse property for multiplication.	Properties of numbers
6.20 The student will graph inequalities on a number line.	Inequalities on a number line
Grade 7	
Number and Number Sense	
7.1 The student will	
a) investigate and describe the concept of negative exponents for powers of ten;	Scientific notation
b) determine scientific notation for numbers greater than zero;	Scientific notation

	Scientific notation Ordering fractions Ordering decimals Equivalent fractions, decimals and percentages Fractions and decimals Equivalent fractions Introducing percentages
c) compare and order fractions, decimals, percents, and numbers written in scientific notation;	
d) determine square roots; and	Square roots
e) identify and describe absolute value for rational numbers.	Absolute value
	Introducing sequences Describing and continuing sequences Sequences from geometrical patterns Generating sequences from flow charts Generating sequences and rules
7.2 The student will describe and represent arithmetic and geometric sequences, using variable expressions.	
Computation and Estimation	
7.3 The student will	
	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers
a) model addition, subtraction, multiplication, and division of integers; and	
	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers
b) add, subtract, multiply, and divide integers.	
	Ratio and rate Dividing in a given ratio Ratio and proportion problems Direct variations Direct proportion
7.4 The student will solve single-step and multistep practical problems, using proportional reasoning.	
Measurement	
7.5 The student will	
a) describe volume and surface area of cylinders;	Cylinders, cones and spheres
	Volume Surface area Using formulas
b) solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and	Cylinders, cones and spheres

c) describe how changing one measured attribute of a rectangular prism affects its volume and surface area.	-
7.6 The student will determine whether plane figures—quadrilaterals and triangles—are similar and write proportions to express the relationships between corresponding sides of similar figures.	Congruence Finding missing lengths
Geometry	
7.7 The student will compare and contrast the following quadrilaterals based on properties: parallelogram, rectangle, square, rhombus, and trapezoid.	Quadrilaterals
7.8 The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.	Reflection Rotation Dilation Translation Combining transformations
Probability and Statistics	
7.9 The student will investigate and describe the difference between the experimental probability and theoretical probability of an event.	Experimental probability
7.10 The student will determine the probability of compound events, using the Fundamental (Basic) Counting Principle.	Probability diagrams
7.11 The student, given data for a practical situation, will	
a) construct and analyze histograms; and	Histograms
b) compare and contrast histograms with other types of graphs presenting information from the same data set.	-
Patterns, Functions, and Algebra	
7.12 The student will represent relationships with tables, graphs, rules, and words.	Writing expressions Introducing formulas The equation of a straight line Graphs of functions Reading and plotting graphs Sequences from practical contexts Distance-time graphs Interpreting graphs Conversion graphs Nonlinear equations Graphs of nonlinear equations Function machines Mapping functions Generating sequences and rules

7.13 The student will	
a) write verbal expressions as algebraic expressions and sentences as equations and vice versa; and	Writing expressions Introducing formulas
b) evaluate algebraic expressions for given replacement values of the variables.	Substitution
7.14 The student will	
a) solve one- and two-step linear equations in one variable; and	Solving simple equations Writing expressions
b) solve practical problems requiring the solution of one- and two-step linear equations.	Writing expressions Introducing formulas
7.15 The student will	
a) solve one-step inequalities in one variable; and	Solving linear inequalities Integers solutions for inequalities
b) graph solutions to inequalities on the number line.	Inequalities on a number line
7.16 The student will apply the following properties of operations with real numbers:	
a) the commutative and associative properties for addition and multiplication;	Properties of numbers
b) the distributive property;	Properties of numbers
c) the additive and multiplicative identity properties;	Properties of numbers
d) the additive and multiplicative inverse properties; and	Properties of numbers
e) the multiplicative property of zero.	Properties of numbers
Grade 8	
Number and Number Sense	
8.1 The student will	
a) simplify numerical expressions involving positive exponents, using rational numbers, order of operations, and properties of operations with real numbers; and	Powers Order of operations and PEMDAS Properties of numbers
b) compare and order decimals, fractions, percents, and numbers written in scientific notation.	Ordering decimals Ordering fractions Equivalent fractions, decimals and percentages Fractions and decimals Equivalent fractions Scientific notation
8.2 The student will describe orally and in writing the relationships between the subsets of the real number system.	-

Computation and Estimation	
8.3 The student will	
	Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Percentage change Percentages and inverse operations Ratio and proportion problems Dividing in a given ratio Direct variations Direct proportion
a) solve practical problems involving rational numbers, percents, ratios, and proportions; and	
b) determine the percent increase or decrease for a given situation.	Percentage change
8.4 The student will apply the order of operations to evaluate algebraic expressions for given replacement values of the variables.	Order of operations and PEMDAS Substitution
8.5 The student will	
a) determine whether a given number is a perfect square; and	Square roots Square and triangular numbers
b) find the two consecutive whole numbers between which a square root lies.	Estimation and approximation Square roots
Measurement	
8.6 The student will	
a) verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles; and	Calculating angles
b) measure angles of less than 360° .	Measuring angles
8.7 The student will	
a) investigate and solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids; and	Volume Surface area Cylinders, cones and spheres Using formulas
b) describe how changing one measured attribute of a figure affects the volume and surface area.	-

Geometry	
8.8 The student will	
a) apply transformations to plane figures; and b) identify applications of transformations.	Combining transformations Reflection Rotation Dilation Translation
8.9 The student will construct a three-dimensional model, given the top or bottom, side, and front views.	-
8.10 The student will	Views of 3-D shapes
a) verify the Pythagorean Theorem; and b) apply the Pythagorean Theorem.	Pythagorean Theorem Pythagorean triples Calculating sides of right triangles Identifying right triangles
8.11 The student will solve practical area and perimeter problems involving composite plane figures.	Area of irregular shapes Perimeter Area problems
Probability and Statistics	
8.12 The student will determine the probability of independent and dependent events with and without replacement.	Calculating probability part 1 Calculating probability part 2
8.13 The student will	
a) make comparisons, predictions, and inferences, using information displayed in graphs; and b) construct and analyze scatterplots.	Appropriate graphs Interpreting graphs Distance-time graphs Reading and plotting graphs Scatter plots

Patterns, Functions, and Algebra	
	Reading and plotting graphs Writing expressions Introducing formulas Transforming formulas Graphs of functions Graphs of nonlinear functions Mapping functions Inverse functions The equation of a straight line Exploring nonlinear graphs
8.14 The student will make connections between any two representations (tables, graphs, words, and rules) of a given relationship.	
8.15 The student will	
	Solving simple equations Equations with variables on both sides Multiplying algebraic terms Dividing algebraic terms Equations involving parentheses and division Combining like terms Factoring expressions
a) solve multistep linear equations in one variable with the variable on one and two sides of the equation;	
b) solve two-step linear inequalities and graph the results on a number line; and	Combined linear inequalities Inequalities on a number line
c) identify properties of operations used to solve an equation.	-
8.16 The student will graph a linear equation in two variables.	The equation of a straight line Graphs of functions
8.17 The student will identify the domain, range, independent variable, or dependent variable in a given situation.	Function notation and relations