

North Carolina Mathematics Grade-Level Competencies	Boardworks Middle School Math Presentations
Grade 6	
Number and Operations	
COMPETENCY GOAL 1: The learner will understand and compute with rational numbers. Objectives:	
1.01 Develop number sense for negative rational numbers.	
a) Connect the model, number word, and number using a variety of representations, including the number line.	Ordering integers Ordering decimals Using negative numbers in context
b) Compare and order.	Ordering integers Ordering decimals Using negative numbers in context
c) Make estimates in appropriate situations.	Estimation and approximation Reading scales Checking results
1.02 Develop meaning for percents.	
a) Connect the model, number word, and number using a variety of representations.	Equivalent fractions, decimals and percentages Introducing percentages
b) Make estimates in appropriate situations.	Equivalent fractions, decimals and percentages Calculating percentages with a calculator Calculating percentages mentally
1.03 Compare and order rational numbers.	Equivalent fractions, decimals and percentages Introducing percentages
1.04 Develop fluency in addition, subtraction, multiplication, and division of nonnegative rational numbers.	

	Written methods for addition and subtraction Written methods for multiplication Written methods for division Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Mental addition and subtraction Mental multiplication Mental division Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions
a) Analyze computational strategies.	Adding and subtracting integers Multiplying and dividing integers
b) Describe the effect of operations on size.	Estimation and approximation Using a calculator
c) Estimate the results of computations.	Checking results Using a calculator
d) Judge the reasonableness of solutions.	Multiples and factors Scientific notation Powers Prime factorization GCF and LCM
1.05 Develop fluency in the use of factors, multiples, exponential notation, and prime factorization.	Scientific notation Powers
1.06 Use exponential, scientific, and calculator notation to write very large and very small numbers.	

<p>1.07 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.</p>	<p>Mental addition and subtraction Mental multiplication Mental division Mental math puzzles Written methods for addition and subtraction Written methods for multiplication Written methods for division Estimation and approximation Using a calculator Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers</p>
<p>Measurement</p>	<p></p>
<p>COMPETENCY GOAL 2: The learner will select and use appropriate tools to measure two- and three-dimensional figures. Objectives:</p>	<p></p>
<p>2.01 Estimate and measure length, perimeter, area, angles, weight, and mass of two- and three-dimensional figures, using appropriate tools.</p>	<p>Perimeter Area Area of irregular shapes Area problems Area of a circle Surface area Estimating measurements Calculating angles Measuring angles Circle graphs</p>

	Perimeter Area Circumference of a circle Area of a circle Area of irregular shapes Area problems
2.02 Solve problems involving perimeter/circumference and area of plane figures.	
Geometry	
COMPETENCY GOAL 3: The learner will understand and use properties and relationships of geometric figures in the coordinate plane. Objectives:	
	Parallel and perpendicular lines Calculating angles Labeling lines and angles Angles made with parallel lines Area problems Angles in polygons Angles in a triangle Measuring angles
3.01 Identify and describe the intersection of figures in a plane.	
3.02 Identify the radius, diameter, chord, center, and circumference of a circle; determine the relationships among them.	Circles Circumference of a circle Area of a circle
	Translation Reflection Dilation Rotation Combining transformations
3.03 Transform figures in the coordinate plane and describe the transformation.	
3.04 Solve problems involving geometric figures in the coordinate plane.	Translation Reflection Dilation Rotation Combining transformations
Data Analysis and Probability	
COMPETENCY GOAL 4: The learner will understand and determine probabilities. Objectives:	
4.01 Develop fluency with counting strategies to determine the sample space for an event. Include lists, tree diagrams, frequency distribution tables, permutations, combinations, and the Fundamental Counting Principle.	Probability diagrams Organizing data
4.02 Use a sample space to determine the probability of an event.	Probability diagrams

4.03 Conduct experiments involving simple and compound events.	Experimental probability Probability diagrams Calculating probability part 1
4.04 Determine and compare experimental and theoretical probabilities for simple and compound events.	Calculating probability part 1 Experimental probability
4.05 Determine and compare experimental and theoretical probabilities for independent and dependent events.	Calculating probability part 2 Experimental probability
4.06 Design and conduct experiments or surveys to solve problems; report and analyze results.	Population and sampling Collecting data Organizing data Writing a statistical report
Algebra	
COMPETENCY GOAL 5: The learner will demonstrate an understanding of simple algebraic expressions.	
Objectives:	
5.01 Simplify algebraic expressions and verify the results using the basic properties of rational numbers.	
a) Identity.	Solving simple equations Properties of numbers
b) Commutative.	Solving simple equations Properties of numbers
c) Associative.	Solving simple equations Properties of numbers
d) Distributive.	Solving simple equations Properties of numbers Factoring expressions
e) Order of operations.	Order of operations and PEMDAS
5.02 Use and evaluate algebraic expressions.	Writing expressions Substitution
5.03 Solve simple (one- and two-step) equations or inequalities.	Solving simple equations Inequalities Inequalities on a number line Integer solutions for inequalities Solving linear inequalities Multiplying algebraic terms Dividing algebraic terms Factoring expressions Substitution

5.04 Use graphs, tables, and symbols to model and solve problems involving rates of change and ratios.	Introducing sequences Sequences from geometrical patterns Describing and continuing sequences Direct variations Reading and plotting graphs Ratio and rate
Grade 7	
Number and Operations	
COMPETENCY GOAL 1: The learner will understand and compute with rational numbers. Objectives:	
1.01 Develop and use ratios, proportions, and percents to solve problems.	Ratio and rate Dividing in a given ratio Direct variations Ratio and proportion problems Comparing proportions Percentage change Calculating percentages mentally Percentages and inverse operations Calculating percentages on paper Calculating percentages with a calculator Customary unit conversions
1.02 Develop fluency in addition, subtraction, multiplication, and division of rational numbers.	

a) Analyze computational strategies.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Written methods for addition and subtraction Written methods for multiplication Written methods for division Mental addition and subtraction Mental multiplication Mental division Mental math puzzles Percentages and inverse operations Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Multiplying and dividing by 0.1 and 0.01 Multiplying by numbers between 0 and 1
b) Describe the effect of operations on size.	Absolute value Adding and subtracting integers Multiplying and dividing integers Methods for adding and subtracting fractions Adding and subtracting simple fractions
c) Estimate the results of computations.	Estimation and approximation Using a calculator
d) Judge the reasonableness of solutions.	Checking results Using a calculator

<p>1.03 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.</p>	<p>Mental addition and subtraction Mental multiplication Mental division Mental math puzzles Estimation and approximation Using a calculator Calculating the mean Written methods for addition and subtraction Written methods for multiplication Written methods for division Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Adding and subtracting integers activities Multiplying and dividing by 0.1 and 0.01 Multiplying by numbers between 0 and 1 Methods for adding and subtracting fractions</p>
<p>Measurement</p>	
<p>COMPETENCY GOAL 2: The learner will understand and use measurement involving two- and three-dimensional figures. Objectives:</p>	
<p>2.01 Draw objects to scale and use scale drawings to solve problems.</p>	<p>Using scale factors Scale drawings</p>
<p>2.02 Solve problems involving volume and surface area of cylinders, prisms, and composite shapes.</p>	<p>Surface area Volume Cylinders, cones and spheres Using formulas</p>
<p>Geometry</p>	
<p>COMPETENCY GOAL 3: The learner will understand and use properties and relationships in geometry. Objectives:</p>	
<p>3.01 Using three-dimensional figures:</p>	
<p>a) Identify, describe, and draw from various views (top, side, front, corner).</p>	<p>Views of 3D shapes 2D representations of 3D shapes Solid shapes</p>
<p>b) Build from various views.</p>	<p>Views of 3D shapes 2D representations of 3D shapes Solid shapes</p>

c) Describe cross-sectional views.	Cross sections
3.02 Identify, define, and describe similar and congruent polygons with respect to angle measures, length of sides, and proportionality of sides.	Congruence Calculating angles Angles made with parallel lines
3.03 Use scaling and proportional reasoning to solve problems related to similar and congruent polygons.	Dilation Finding missing lengths Scale drawings
Data Analysis and Probability	
COMPETENCY GOAL 4: The learner will understand and use graphs and data analysis. Objectives:	
4.01 Collect, organize, analyze, and display data (including box plots and histograms) to solve problems.	Collecting data Organizing data Histograms Quartiles and box plots Appropriate graphs Calculating statistics Line graphs Bar graphs Circle graphs
4.02 Calculate, use, and interpret the mean, median, mode, range, frequency distribution, and inter-quartile range for a set of data.	Calculating the mean Finding the median Finding the mode Finding the range Calculating statistics Interquartile range Comparing data Histograms
4.03 Describe how the mean, median, mode, range, frequency distribution, and inter-quartile range of a set of data affect its graph.	Calculating statistics
4.04 Identify outliers and determine their effect on the mean, median, mode, and range of a set of data.	Calculating statistics
4.05 Solve problems involving two or more sets of data using appropriate statistical measures.	-

Algebra	
COMPETENCY GOAL 5: The learner will demonstrate an understanding of linear relations and fundamental algebraic concepts. Objectives:	
5.01 Identify, analyze, and create linear relations, sequences, and functions using symbols, graphs, tables, diagrams, and written descriptions.	<ul style="list-style-type: none"> Introducing sequences Sequences from geometrical patterns Describing and continuing sequences Generating sequences from flow charts Generating sequences and rules Function machines Mapping functions Finding the nth term Sequences from practical contexts Graphs of functions Direct variations Reading and plotting graphs Writing expressions Ratio and rate Ratio and proportion problems Deriving formulas
5.02 Translate among different representations of algebraic expressions, equations and inequalities.	<ul style="list-style-type: none"> Writing expressions Combining like terms Factoring expressions Solving simple equations Properties of numbers Multiplying algebraic terms Inequalities Inequalities on a number line Solving linear inequalities
5.03 Use and evaluate algebraic expressions, linear equations or inequalities to solve problems.	<ul style="list-style-type: none"> Substitution Solving simple equations Solving linear inequalities Combining like terms Factoring expressions Properties of numbers Integer solutions for inequalities Inequalities on a number line

5.04 Develop fluency in the use of formulas to solve problems.	Introducing formulas Using formulas Transforming formulas
Grade 8	
Number and Operations	
COMPETENCY GOAL 1: The learner will understand and compute with real numbers. Objectives:	
1.01 Develop number sense for the real numbers.	
a) Define and use irrational numbers.	Rational and irrational numbers Circumference of a circle Area of a circle
b) Compare and order.	Estimation and approximation Square roots
c) Use estimates of irrational numbers in appropriate situations.	Circumference of a circle Area of a circle Square roots Estimation and approximation
1.02 Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.	Calculating percentages mentally Mental addition and subtraction Mental multiplication Mental division Mental math and place value Multiplying by numbers between 0 and 1 Mental math puzzles Estimation and approximation Using a calculator Nonlinear equations and spreadsheets Calculating percentages with a calculator Written methods for addition and subtraction Written methods for multiplication Written methods for division Calculating percentages on paper
Measurement	
COMPETENCY GOAL 2: The learner will understand and use measurement concepts. Objectives:	
2.01 Determine the effect on perimeter, area or volume when one or more dimensions of two- and three-dimensional figures are changed.	Finding missing lengths

2.02 Apply and use concepts of indirect measurement.	Finding missing lengths Ratio and rate Congruence Pythagorean Theorem Calculating sides of right triangles
Geometry	
COMPETENCY GOAL 3: The learner will understand and use properties and relationships in geometry.	
Objectives	
3.01 Represent problem situations with geometric models.	-
3.02 Apply geometric properties and relationships, including the Pythagorean theorem, to solve problems.	Finding missing lengths Pythagorean Theorem Area Perimeter Volume Circumference of a circle Area of a circle Area of irregular shapes Area problems Calculating sides of right triangles Square roots Cubes and cube roots Quadrilaterals Square and triangular numbers Identifying right triangles Pythagorean triples The sum of interior and exterior angles
3.03 Identify, predict, and describe dilations in the coordinate plane.	Dilation Combining transformations
Data Analysis and Probability	
COMPETENCY GOAL 4: The learner will understand and use graphs and data analysis. Objectives:	
4.01 Collect, organize, analyze, and display data (including scatterplots) to solve problems.	Collecting data Organizing data Scatter plots

4.02 Approximate a line of best fit for a given scatterplot; explain the meaning of the line as it relates to the problem and make predictions.	Scatter plots Interpreting graphs Distance-time graphs
4.03 Identify misuses of statistical and numerical data.	Misleading graphs Population and sampling Collecting data
Algebra	
COMPETENCY GOAL 5: The learner will understand and use linear relations and functions. Objectives:	
5.01 Develop an understanding of function.	
a) Translate among verbal, tabular, graphic, and algebraic representations of functions.	Function machines Mapping functions Inverse functions Graphs of functions Function notation and relations
b) Identify relations and functions as linear or nonlinear.	Graphs of functions Graphs of nonlinear functions Direct variations
c) Find, identify, and interpret the slope (rate of change) and intercepts of a linear relation.	Direct variations The equation of a straight line Systems of linear equations Graphs of functions
d) Interpret and compare properties of linear functions from tables, graphs, or equations.	Systems of linear equations Graphs of functions
5.02 Write an equation of a linear relationship given: two points, the slope and one point on the line, or the slope and y-intercept.	The equation of a straight line Systems of linear equations
5.03 Solve problems using linear equations and inequalities; justify symbolically and graphically.	Direct Variations Inequalities and regions
5.04 Solve equations using the inverse relationships of addition and subtraction, multiplication and division, squares and square roots, and cubes and cube roots.	Equations with variables on both sides Equations involving parentheses and division Combining like terms Factoring expressions Nonlinear equations Nonlinear equations and spreadsheets Square roots Cubes and cube roots