ILLINOIS STATE BOARD OF EDUCATION

MATHEMATICS GRADE 6

Theory of Action: Academic standards represent a collective commitment around what students should learn each year. The state assessment asks students to demonstrate their knowledge, skills, and understanding related to these standards using a common measure. The resulting data allows us to see patterns in performance that should guide school and district improvement, helping identify areas of strength and opportunity.

Role of Performance Level Descriptors in Defining Proficiency: Performance level descriptors bridge the state assessment to classroom instruction and the systems of formative assessments that guide local instruction and choices about individual students. *Academic proficiency represents a range of observable student performance characteristics*. There are multiple pathways to proficiency, and students rely upon their strengths differently within that range of performance.

Proficiency and Difficulty: A student's ability to demonstrate proficiency is influenced by the complexity of the texts or stimuli presented, tasks they're asked to complete, and the contexts in which they are engaged. As student performance improves, students are typically able to handle more challenging texts/stimuli, tasks, and contexts, and are able to demonstrate their skills and knowledge more accurately and consistently.

Ratios and Proportional Relationships *Student performance indicates the ability to…*

Claim 1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.RP.1	Write a ratio in the form $a:b$.	Identify a ratio relationship between two quantities using ratio language in multiple ways.	Describe a ratio relationship between two quantities using ratio language in multiple ways.	Describe ratio relationships between two quantities using ratio language in multiple ways in complex scenarios.
6.RP.2	Recognize that a unit rate $\frac{a}{b}$ is equivalent to a ratio a:b with b ≠ 0.	Identify that a unit rate $\frac{a}{b}$ is equivalent to a ratio a:b with b ≠ 0 and describe the relationship.	Determine a unit rate $\frac{a}{b}$ that is equivalent to a ratio a:b with b ≠ 0 and describe the relationship with rate language.	Create a unit rate $\frac{a}{b}$ that is equivalent to a ratio a:b with b ≠ 0 and describe the relationship with rate language.
6.RP.3a	Identify ratios and rates in mathematical problems using whole-number measurements	Identify and describe ratios and rates when analyzing tables in real-world and mathematical problems using whole-number measurements.	Solve real-world and mathematical problems by identifying ratios and using rate reasoning to make tables, find missing values in the tables, and plot the pairs of values on the coordinate plane using whole-number measurements.	Analyze diagrams and tables to represent and compare ratios in real-world and mathematical problems, find missing values in tables, and plot the ordered pairs on the coordinate plane using whole-number measurements.
6.RP.3b	Recognize the unit rate when given the ratio involving unit pricing or constant speed.	Solve unit rate problems given the ratios and proportions involving unit rates and constant speed.	Solve unit rate problems, including those using unit pricing and constant speed, using ratios and rate reasoning.	Solve unit rate problems involving those using unit pricing and constant speed and compare and contrast unit rates in real-world and mathematical problems, including those using unit pricing and constant speed.

Claim 2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.RP.3c	Recognize that a percentage is part of 100. Recognize that a percent ratio consists of a part and a whole.	Calculate the percentage of a quantity in basic contexts.	Find a percentage of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole given a part and the percent.	Use the rate per 100 to model proportional relationships in order to solve real-world and mathematical problems.
6.RP.3d	Use given conversions to create ratios.	Identify appropriate conversion ratios needed to convert measurement units.	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	Use converted measurements to compare ratios and draw conclusions.

The Number System *Student performance indicates the ability to…*

Claim 2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.NS.1	Solve basic word problems involving division of benchmark fractions by fractions.	Solve word problems involving division of benchmark fractions by fractions.	Solve word problems involving division of fractions by fractions.	Solve word problems involving division of fractions by fractions. Explain the reasonableness of the quotient.
6.NS.2	Multiply multi-digit numbers using any method.	Divide multi-digit numbers using any method.	Divide multi-digit numbers using the standard algorithm.	Divide multi-digit numbers with a remainder using the standard algorithm, rounding to two decimal places.
6.NS.3	Add, subtract, multiply, or divide numbers with tenths place.	Add, subtract, multiply, or divide multi-digit decimals using any method.	Add, subtract, multiply, and divide multi-digit decimals using the standard algorithm.	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm in a word problem.
6.NS.4	Determine the greatest common factor of two whole numbers less than or equal to 50 or the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–50 with a common factor as a multiple of a sum of two whole numbers.	Determine the greatest common factor of two whole numbers less than or equal to 100 or the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–50 with a common factor as a multiple of a sum of two whole numbers with no common factor.	Determine the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.	Determine the greatest common factor of two whole numbers less than or equal to 500 and the least common multiple of two whole numbers less than or equal to 60. Use the distributive property to express a sum of two whole numbers 1–500 with a common factor as a multiple of a sum of two whole numbers with no common factor.

Claim 2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.NS.5	Use positive whole numbers to represent quantities in real-world contexts.	Use positive whole numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	Use positive and negative integers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	Use positive and negative rational numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.6a	Recognize opposite signs of positive numbers.	Recognize opposite signs of positive numbers by determining locations on opposite sides of 0 on the number line.	Recognize opposite signs of integers by determining locations on opposite sides of 0 on the number line.	Recognize opposite signs of rational numbers by determining locations on opposite sides of 0 on the number line.
	Identify the opposite of a number or that 0 is its own opposite.	Identify that the opposite of the opposite of a number is the number itself or that 0 is its own opposite.	Identify that the opposite of the opposite of a number is the number itself and that 0 is its own opposite.	Identify that the opposite of the opposite of a fraction or decimal number is the number itself and that 0 is its own opposite.
6.NS.6b	Use signs of numbers in ordered pairs to indicate locations in Quadrant I.	Given a labeled coordinate plane, use signs of numbers in ordered pairs to indicate locations in quadrants.	Use signs of numbers in ordered pairs to indicate locations in quadrants of the coordinate plane.	Use signs of numbers and 0 in ordered pairs to indicate locations in quadrants of the coordinate plane.
	Recognize that when two numbers differ only by signs, the locations of the points are related by reflections across 0.	Recognize that when two ordered pairs differ only by signs on corresponding coordinates, the locations of the points are related by reflections across an axis.	Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes and state them.
6.NS.6c	Identify whole numbers on a horizontal or vertical number line diagram.	Identify and position integers on a horizontal or vertical number line diagram.	Identify and position integers and other rational numbers on a horizontal or vertical number line diagram.	Create a horizontal or vertical number line diagram containing integers and other rational numbers.
	Identify pairs of positive numbers in Quadrant I.	Identify and position pairs of integers in Quadrant I.	Identify and position pairs of integers and other rational numbers on a coordinate plane.	Approximate pairs of integers and other rational numbers when the point is not located on the gridlines.
6.NS.7a	Recognize statements of inequality as statements about the relative position of two positive numbers on a number line diagram.	Interpret statements of inequality as statements about the relative position of two numbers with the same sign on a number line diagram.	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	Interpret statements of inequality as statements about the relative position of two rational numbers on a number line diagram.

Claim 2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.NS.7b	Write statements of order for rational numbers in real-world contexts.	Write, interpret, or explain statements of order for rational numbers in real-world contexts.	Write, interpret, and explain statements of order for rational numbers in real-world contexts.	Compare and contrast statements of order for rational numbers in real-world context.
6.NS.7c	Determine the absolute value of a whole number as its distance from 0 on the number line. Interpret absolute value as magnitude for a positive integer.	Determine the absolute value of a positive integer as its distance from 0 on the number line. Interpret absolute value as magnitude for a positive or negative integer.	Determine the absolute value of a positive rational number as its distance from 0 on the number line. Interpret absolute value as magnitude for a positive or negative integer in a real-world situation.	Determine the absolute value of a negative mixed number as its distance from 0 on the number line. Write a statement interpreting absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.7d	Determine the absolute value from statements.	Compare absolute values from statements about order. (e.g., recognize that an account balance –30 dollars has a greater debt than an account balance of -10 dollars.)	Distinguish comparisons of absolute value from statements about order. (e.g., recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.)	Given a rational number, write a statement comparing the order of its absolute value.
6.NS.8	Solve real-world and mathematical problems by graphing points in Quadrant I of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Solve real-world and mathematical problems by graphing points in Quadrants I and II or I and IV of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of non-integer coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate

Expressions and Equations

Claim 3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.EE.1	Read numerical expressions.	Read numerical expressions including those that contain whole-number exponents.	Write, read, and evaluate numerical expressions including those that contain whole-number exponents.	Write, read, and evaluate numerical expressions including those that contain whole-number exponents as they apply to real-world situations.
6.EE.2	Read algebraic expressions that contain variables that represent numbers without exponents.	Read and use variables to represent numbers to write algebraic expressions without exponents.	Write, read, and evaluate expressions in which letters stand for numbers (algebraic expressions).	Write, read, and evaluate algebraic expressions that contain whole number exponents as they apply to real-world situations.
6.EE.2a	Write a variable to represent a number.	Write expressions that record one operation with numbers and with letters standing for numbers.	Write expressions that record multiple operations with numbers and with letters standing for numbers.	Write expressions that are more complex (exponents) and with letters standing for numbers.
6.EE.2b	Match some part of an expression to its mathematical term if given a word bank.	Identify some parts of an expression using mathematical terms.	Identify all parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient).	Create expressions given mathematical terms and explain how one part of an expression relates to the other parts of the expression.
6.EE.2c	Identify the value of an expression with one variable given the specific value of the variable. Identify the formula needed to solve a real-world problem.	Identify the value of an expression given specific values of their variables. Evaluate expressions from formulas to solve real-world problems.	Evaluate expressions at specific values for their variables, including in real-world problems.	Evaluate expressions at specific values of their variables. Include multi-variable expressions that arise from formulas used in real-world problems.
	Perform arithmetic operations in the conventional order when there are no parentheses to specify a particular order.	Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.	Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.	Perform multi-step arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.
6.EE.3	Apply the Associative and Commutative properties to generate equivalent expressions involving whole numbers.	Apply the properties of operations to generate equivalent expressions involving whole numbers.	Apply the properties of operations to generate equivalent expressions.	Apply the properties of operations to generate equivalent expressions involving rational numbers and whole-number exponents.
6.EE.4	Identify two equivalent expressions from a given set of expressions.	Identify when two expressions are equivalent when the resulting expression has only one term.	Identify when two expressions are equivalent.	Create expressions that are equivalent.

Claim 3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
6.EE.5	Use substitution to determine whether a given whole number less than 20 that makes an equation or inequality true.	Use substitution to determine whether a given whole number in a specified set makes an equation or inequality true.	Use substitution to determine whether any given rational number makes an equation or inequality true.	Use substitution to identify a number that makes an equation or inequality true.
6.EE.6	Define a variable in a real-world context. For example, let x be defined as the number of apples.	Use variables to represent numbers and write expressions (without exponents) and single-step equations to solve mathematical problems.	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.	Use variables to represent numbers, write expressions, and create single step equations to solve real-world and mathematical problems.
6.EE.7	Solve mathematical problems in the form of $x + p = q$ and $p \times x = q$ for cases in which p, q, and x are all nonnegative numbers.	Solve real-world and mathematical problems by writing and solving equations in the form $x + p = q$ and $p \times x = q$ for cases in which p, q, and x are all nonnegative whole numbers.	Solve real-world and mathematical problems by writing and solving equations in the form $x + p = q$ and $p \times x = q$ for cases in which p, q, and x are all nonnegative numbers.	Create mathematical problems and problems in real-world context that can be solved using equations of the form $x + p = q$, $x - p = q$, $p \times x = q$, and $\frac{x}{p} = q$ for cases in which p, q, and x are all nonnegative rational numbers.
6.EE.8	Identify an inequality of the form x > c or x < c to represent a constraint or condition in a mathematical problem.	Identify an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem.	Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem.	Write constraints or conditions in real-world problems to represent inequalities.
	Identify a constraint or condition in a mathematical problem using an inequality symbol.	Recognize that inequalities of the x > c or x < c to represent a constraint or condition in a mathematical problem.	Recognize that inequalities of the form x > c or x < c have infinitely many solutions.	
	Identify solutions to inequalities of mathematical problems in the form x > c or x < c on number line diagrams.	Identify solutions to inequalities in real-world or mathematical problems in the form x > c or x < c on number line diagrams.	Represent solutions to inequalities in real-world or mathematical problems in the form x > c or x < c on number line diagrams.	Represent solutions to compound inequalities in real-world or mathematical problems in the form b < x < c on number line diagrams.
6.EE.9	Identify independent and dependent variables.	Express one quantity in terms of another quantity by using variables in a real-world problem.	Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.	Using the relationship between the dependent and independent variables, make predictions about unknown quantities.
		Represent relationships between independent and dependent variables by writing equations based on graphs or tables.	Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation.	Using the relationship between the dependent and independent variables, make predictions about unknown quantities.

Statistics and Probability *Student performance indicates the ability to…*				
Claim 4	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
6.SP.1	Recognize basic questions that produce numerical data.	Identify statistical questions and acknowledge that variability in data may exist.	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	Consistently and independently identify complex statistical questions that anticipate significant variability in the data.
6.SP.2	Display collected data in a line plot.	Identify a distribution for a set of data collected to answer a statistical question.	Describe the aspects of distribution (center, spread, and overall shape) for a set of data collected to answer a statistical question.	Use the center, spread, and overall shape to draw conclusions about the data.
6.SP.3	Identify the measure of center of a set of data.	Determine the measure of center and measure of variation of a set of data.	Recognize that a measure of center for a numerical data set summarizes all its values with a single number, while a measure of variation describes how its values vary with a single number.	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
6.SP.4	Recognize number lines, dot plots, histograms, and box plots.	Select an accurate display (number line, dot plot, histogram, or box plot) given a numerical data set.	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Determine which method of displaying numerical data in plots on a number line, including dot plots, histograms, and box plots, is best for a particular set of data.
6.SP.5	Identify numerical data sets.	Summarize numerical data sets without context.	Summarize numerical data sets in relation to their context.	Use summaries of numerical data sets to make predictions.

Geometry *Student performance indicates the ability to…*				
Claim 5	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
6.G.1	Identify the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.	Identify the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. Apply these techniques to solve mathematical problems and problems in real-world context.	Calculate the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. Apply these techniques to solve mathematical problems and problems in real-world context.	Explain how to find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. Apply these techniques to solve mathematical problems and problems in real-world context.
6.G.2	Use the formula $V = Bh$, where B is the area of the base ($B = lw$) to find volumes of right rectangular prisms with whole number edge length in mathematical and real-world problems.	Use the formula $V = Bh$, where B is the area of the base ($B = lw$) to find volumes of right rectangular prisms with one fractional edge length in mathematical and real-world problems.	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths and show that the volume is the same as multiplying the edge lengths of the prism. Apply the formula $V = Bh$, where B is the area of the base ($B = lw$) to find volumes of right rectangular prisms with fractional edge lengths in mathematical and real-world problems.	Explain the volume of a right rectangular prism with fractional edge lengths found by multiplying the edge lengths of the prism. Apply the formula $V = Bh$, where B is the area of the base ($B = lw$). Given the volume, use the formula to find edge lengths of right rectangular prisms with fractional edge lengths in mathematical and real-world problems.
6.G.3	Draw a polygon in the coordinate plane given coordinates for the vertices.	Use coordinates to find the length of a side joining points with the same first coordinate or the same coordinate.	Draw polygons in a coordinate plane given coordinates for the vertices; use coordinates to find the length of a side by joining points with the same first coordinate or the same second coordinate. Apply these techniques to solve mathematical problems and real-world problems.	Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate and apply these techniques to solve mathematical problems and real-world problems. Find a missing vertex of a polygon given other vertices.
6.G.4	Represent three-dimensional figures using nets made up of rectangles and triangles.	Use the nets representing three-dimensional figures to find the surface area of these figures.	Represent three-dimensional figures using nets made up of rectangles and triangles and use the nets to find the surface area of the figure. Apply these techniques to solve mathematical problems and real-world problems.	Represent three-dimensional figures with fractional edges using nets made up of rectangles and triangles and use the nets to find the surface area of the figure. Apply these techniques to solve mathematical problems and real-world problems.