# 6th Grade Mathematics — Performance Level Descriptors

| Reporting Categories | Needs Support | Close | Ready | Exceeding |
|---|---|---|---|---|
| **Ratios and Proportional Relationships**<br>Focus is on the concept of ratio and rate and the beginnings of developing proportional reasoning. | *A student performing at the Needs Support level:*<br>• uses a ratio of the form *a:b* to describe relationships between quantities.<br>• makes sense of ratios in order to describe relationships. | *A student performing at the Close level:*<br>• determines unit rates to solve problems.<br>• makes sense of a given problem to determine the unit rate. | *A student performing at the Ready level:*<br>• rewrites ratios representing rates in equivalent forms in order to understand a real-world problem, including converting rates to unit rates or converting the units of measure for a given rate.<br>• makes sense of a real-world problems using ratios and unit rates. | *A student performing at the Exceeding level:*<br>• solves problems involving percentages.<br>• determines a rate relationship in a real-world problem and uses it to compare rates and to solve rate problems.<br>• makes sense and determines a rate relationship to solve a problem. |
| **The Number System**<br>Focus is on seeing the rational numbers as a coherent number system. Students increase their fluency with calculations. | *A student performing at the Needs Support level:*<br>• recognizes when a given number is a factor or multiple of another number.<br>• makes sense of problems in order to recognize a number as a factor or multiply by using knowledge of multiplication and division. | *A student performing at the Close level:*<br>• adds, subtracts and multiplies multi-digit decimals in order to solve problems.<br>• determines absolute value when given a number line.<br>• graphs points in the third quadrant of the coordinate plane. | *A student performing at the Ready level:*<br>• divides multi-digit decimals as well as non-unit fractions in order to solve problems.<br>• recognizes common factors of numbers and uses them to determine when expressions are equivalent.<br>• explains how the properties of numbers extend to negative whole numbers.<br>• determines the absolute value of an integer.<br>• graphs points in all four quadrants of the coordinate plane.<br>• uses negative numbers to describe quantities.<br>• recognizes integers to represent real life situations.<br>• uses a number line to model positive and negative numbers and absolute value. | *A student performing at the Exceeding level:*<br>• compares absolute values of rational numbers.<br>• determines the common factors or multiples of two whole numbers.<br>• graphs points in all four quadrants of the coordinate plane and uses the relationship between points with the same first or second coordinate to draw conclusions.<br>• reasons abstractly using positive and negative numbers to solve a problem. |
| **Expressions and Equations**<br>Focus is on understanding algebraic expressions as analogous to numeric expressions. Students continue to develop function ideas by analyzing pairs of independent and dependent variables. | *A student performing at the Needs Support level:*<br>• writes and evaluates numerical expressions involving whole number exponents.<br>• uses repeated reasoning to solve expressions using whole number exponents. | *A student performing at the Close level:*<br>• identifies when two expressions are equivalent.<br>• makes sense of equivalent expressions. | *A student performing at the Ready level:*<br>• applies the distributive property to create equivalent expressions involving whole number coefficients.<br>• recognizes independent and dependent variables in an equation that represents a real-life situation.<br>• makes use of structure by using the distributive property to make equivalent expressions. | *A student performing at the Exceeding level:*<br>• represents linear relationships between two quantities with equations or inequalities, evaluates linear expressions, and solves problems involving one-variable linear equations of the form $x + p = q$.<br>• graphs the solution set to inequalities of the form $x > c$ or $x < c$ on a number line and determines if a given value is a solution of the inequality.<br>• uses the language of operations to describe the structure of expressions.<br>• describes the structure of expressions using operational language. |
| **Geometry**<br>Focus is on composing and decomposing shapes, and working with shapes in 3 dimensions. | *A student performing at the Needs Support level:*<br>• finds the area of a right triangle when the lengths of the legs are given.<br>• makes sense of a problem involving right triangles when given the lengths of the legs by using the area formula. | *A student performing at the Close level:*<br>• finds the volume of a right rectangular prism that is packed with unit cubes.<br>• models using unit cubes to find the volume of right rectangular prisms. | *A student performing at the Ready level:*<br>• solves real-world problems involving the area of triangles and quadrilaterals, including simple figures that are compositions of both.<br>• calculates surface area if given a net.<br>• reasons abstractly to decompose the given figure in order to find total area. | *A student performing at the Exceeding level:*<br>• determines the area of trapezoids by composition of rectangles and triangles in order to solve problems.<br>• determines the volume of rectangular prisms in order to solve problems.<br>• makes sense of a 3-dimensional figure in order to find the surface area of that figure. |
| **Statistics and Probability**<br>Focus is on the concept of statistical variability and the notion that there is some order in the apparent chaos, seen through distributions. Students develop more ways of representing data. | *A student performing at the Needs Support level:*<br>• finds the range of a univariate data set.<br>• makes sense of a data set by finding the mean. | *A student performing at the Close level:*<br>• recognizes histograms and box plots that represent distributions.<br>• makes sense of a model, such as histogram or box plot, that represents a set of data. | *A student performing at the Ready level:*<br>• determines the mean, median, and mode of a set of data.<br>• constructs histograms to represent distributions.<br>• creates a model of a histogram using a set of data. | *A student performing at the Exceeding level:*<br>• interprets and compares the mean and media of a univariate distribution.<br>• explains how additional data points would affect the center and spread of a distribution.<br>• analyzes and creates box plots to represent a univariate data set.<br>• represents and analyzes sets of data using various model representations. |
| **Modeling**<br>Producing, interpreting, understanding, evaluating, and improving mathematical models. | *A student performing at the Needs Support level:*<br>• uses manipulatives to represent a problem or concept. | *A student performing at the Close level:*<br>• uses manipulatives to interpret a problem or concept. | *A student performing at the Ready level:*<br>• evaluates a manipulative model to solve a problem or concept. | *A student performing at the Exceeding level:*<br>• uses a manipulative to improve a model of a problem or concept. |
| **Justification and Explanation**<br>Giving reasons, explaining "Why?" | *A student performing at the Needs Support level:*<br>• explains a pattern using words, algebraic expressions, number operations.<br>• generates a sequence from a rule.<br>• identifies an error in reasoning.<br>• uses two or more specific statements to draw a conclusion. | *A student performing at the Close level:*<br>• uses conditional statements.<br>• draws and labels relevant visual representations.<br>• explains steps of a procedure.<br>• provides a counterexample.<br>• uses a pattern or sequence to draw a conclusion.<br>• draws conclusions using both a specific and general evidentiary statement.<br>• provides general support for a claim in order to reach a conclusion. | *A student performing at the Ready level:*<br>• uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.<br>• justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion. | *A student performing at the Exceeding level:*<br>• provides a coherent, logical argument or solution pathway by providing evidence to support claims.<br>• provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion. |

# 6th Grade Mathematics — Performance Level Descriptors (Continued)

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|---|---|---|---|---|
| **Foundation**<br>Integrate and continue to grow with topics from prior grades. | *A student performing at the Needs Support level:*<br>• multiplies whole numbers using a model.<br>• adds and subtracts fractions and mixed numbers with like denominators.<br>• multiplies fractions with whole numbers<br>• understands the properties of geometric figures by using sides and angles.<br>• finds areas of rectangles.<br>• graphs ordered pairs in the first quadrant of the coordinate plane. | *A student performing at the Close level:*<br>• multiplies multi-digit whole numbers fluently.<br>• adds and subtracts fractions and mixed number with unlike denominators.<br>• multiplies and divides fractions by whole numbers. | *A student performing at the Ready level:*<br>• multiplies fractions and/or mixed numbers with unlike denominators.<br>• classifies geometric figures by their properties.<br>• writes and evaluates simple expressions without variables. | *A student performing at the Exceeding level:*<br>• adds, subtracts, and multiplies fractions and/or mixed numbers with unlike denominators in multi-step problems.<br>• explains classifications of geometric figures by using sides and angles.<br>• writes and evaluates complex expressions without variables. |
| **Mathematical Practices**<br>Collected PLDs that focus on mathematical practices. | *A student performing at the Needs Support level:*<br>• makes sense of ratios in order to describe relationships.<br>• makes sense of problems in order to recognize a number as a factor or multiply by using knowledge of multiplication and division.<br>• uses repeated reasoning to solve expressions using whole number exponents.<br>• makes sense of a problem involving right triangles when given the lengths of the legs by using the area formula.<br>• makes sense of a data set by finding the mean.<br>• uses manipulatives to represent a problem or concept.<br>• explains a pattern using words, algebraic expressions, number operations.<br>• generates a sequence from a rule.<br>• identifies an error in reasoning.<br>• uses two or more specific statements to draw a conclusion. | *A student performing at the Close level:*<br>• makes sense of a given problem to determine the unit rate.<br>• makes sense of equivalent expressions.<br>• models using unit cubes to find the volume of rectangular prisms.<br>• makes sense of a model, such as histogram or box plot, that represents a set of data.<br>• uses manipulatives to interpret a problem or concept.<br>• uses conditional statements.<br>• draws and labels relevant visual representations.<br>• explains steps of a procedure.<br>• provides a counterexample.<br>• uses a pattern or sequence to draw a conclusion.<br>• draws conclusions using both a specific and general evidentiary statement.<br>• provides general support for a claim in order to reach a conclusion. | *A student performing at the Ready level:*<br>• makes sense of a real-world problems using ratios and unit rates.<br>• uses a number line to model positive and negative numbers and absolute value.<br>• makes use of structure by using the distributive property to make equivalent expressions.<br>• reasons abstractly to decompose the given figure in order to find total area.<br>• creates a model of a histogram using a set of data.<br>• evaluates a manipulative model to solve a problem or concept.<br>• uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.<br>• justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion. | *A student performing at the Exceeding level:*<br>• makes sense and determines a rate relationship to solve a problem.<br>• reasons abstractly using positive and negative numbers to solve a problem.<br>• describes the structure of expressions using operational language.<br>• makes sense of a figure in order to find the surface area of that figure.<br>• represents and analyzes sets of data using various model representations.<br>• uses a manipulative to improve a model of a problem or concept.<br>• provides a coherent, logical argument or solution pathway by providing evidence to support claims.<br>• provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion. |