New York State Testing Program
Next Generation Learning Standards
Mathematics Test

Performance Level Descriptions

Grade 7

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New York State Testing Program
Next Generation Mathematics Test

Performance Level Descriptions

GRADE 7

Performance level descriptions (PLDs) help communicate to students, families, educators, and the public the specific knowledge and skills expected of students when they demonstrate proficiency of a learning standard. The PLDs serve several purposes in classroom instruction and assessment. They are the foundation of rich discussion around what students need to do to perform at higher levels and to explain the progression of learning within a subject area. PLDs are also crucial in explaining student performance on the NYS assessments since they make a connection between the scale score, the performance level, and specific knowledge and skills typically demonstrated at that level.

Policy Definitions of Performance Levels

For each subject area, students perform along a continuum of the knowledge and skills necessary to meet the demands of the Learning Standards for English Language Arts and Mathematics. There are students who excel in standards, students who are proficient, students who are partially proficient, and students who are below proficient. New York State assessments are designed to classify student performance into one of four levels based on the knowledge and skills the student has demonstrated. These performance levels are defined as:

NYS Level 4

Students performing at this level **excel** in standards for their grade. They demonstrate knowledge, skills, and practices embodied by the Learning Standards that are considered **more than sufficient** for the expectations at this grade.

NYS Level 3

Students performing at this level are **proficient** in standards for their grade. They demonstrate knowledge, skills, and practices embodied by the Learning Standards that are considered **sufficient** for the expectations at this grade.

NYS Level 2

Students performing at this level are **partially proficient** in standards for their grade. They demonstrate knowledge, skills, and practices embodied by the Learning Standards that are considered partial but insufficient for the expectations at this grade. Students performing at Level 2 are considered on track to meet current New York high school graduation requirements but are **not yet proficient** in Learning Standards at this grade.

NYS Level 1

Students performing at this level are **below proficient** in standards for their grade. They may demonstrate **limited** knowledge, skills, and practices embodied by the Learning Standards that are considered **insufficient** for the expectations at this grade.

How were the PLDs developed?

Following best practice for the development of PLDs, the number of performance levels and their definitions were specified prior to the articulation of the full descriptions. New York State educators certified in the appropriate grade-levels and subject areas convened in separate meetings to develop the initial draft PLDs for Grades 3-8 English Language Arts and Mathematics, respectively. In developing PLDs, participants considered policy definitions of the performance level and the knowledge and skill expectations for each grade level in the Learning Standards. Once they established the appropriate knowledge and skills from a particular standard for NYS Level 3 (i.e., proficient in standards), panelists worked together to parse the knowledge and skills across the other performance levels in such a way that the progression of the knowledge and skills was clearly seen moving from Level 1 to Level 4. This process was repeated for all of the standards for each grade and subject area.

The draft PLDs were reviewed by the New York State Education Department's (NYSED's) Content Advisory Panels which consist of classroom teachers from elementary, middle and high school, school and district administrators, English Language Learners (ELLs) and students with disabilities (SWD) specialists, and higher education faculty members from across the state. The drafts then went through additional rounds of review and edits from a number of NYS-certified educators, content specialists, and assessment experts under NYSED supervision.

How can the PLDs be used by Educators and in Instruction?

The PLDs should be used as a guidance document to show the overall continuum of learning of the knowledge and skills from the Learning Standards. NYSED encourages the use of the PLDs for a variety of purposes, including differentiating instruction to maximize individual student outcomes, creating formative classroom assessments and rubrics to help identify target performance levels for individual or groups of students, and tracking student growth along the proficiency continuum as described by the PLDs. The knowledge and skills shown in the PLDs describe *typical* performance and progression, however the order in which students will demonstrate the knowledge and skills within and between performance levels may be staggered (i.e. a student who predominantly demonstrates Level 2 knowledge and skills may simultaneously demonstrate certain knowledge and skills indicative of Level 3.).

How are the PLDs used in Assessment?

PLDs are essential in setting performance standards (i.e., "cut scores") for New York State assessments. Standard setting panelists use PLDs to determine the expectations for students to demonstrate the knowledge and skills necessary to *just barely* attain a Level 2, Level 3, or Level 4 on the assessment. These knowledge and skills drive discussions that influence the panelists as they recommend the cut scores on the assessment.

PLDs are also used in question development. Question writers are assigned to write questions that draw on the specific knowledge and skills from a PLD. This ensures that each test has questions that distinguish performance all along the continuum. Teachers can use the PLDs in the same manner when developing both formative and summative classroom assessments. Tasks that require students to demonstrate knowledge and skills from the PLDs can be tied back to the performance level with which the PLD is associated, providing the teacher with feedback about the students' progress as well as a wealth of other skills that the student is likely able to demonstrate (or can aspire to in the case of the next-highest PLD).

Next Generation Learning Standards
Grade 7 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students analyze proportional relationships and use them to solve real-world and mathematical problems. (NY-7.RP.1-3)	Apply fractional ratios to describe and/or compare rates.	Compute unit rates associated with ratios of fractions.* (7.RP.1)	Given a graph, a table, or a verbal description, calculate unit rates with ratios of fractions, excluding mixed numbers associated with ratios consisting of at least one fraction measured in like or different units.	Given a table, calculate the unit rate from two whole-number quantities presented in a table. Compute unit rates in like units.
	Explain whether two quantities are in a proportional relationship using multiple representations.	Decide whether two quantities are in a proportional relationship given equations or diagrams.† (7.RP.2a)	Determine whether two quantities are in a proportional relationship given a graph, table, or verbal description.	Given a table, describe the relationship (pattern) between two quantities that are in a proportional relationship.
		Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.2b)	Given a table, graph, diagram, or equation in a real-world or mathematical relationship, identify the constant of proportionality (unit rate).	Given a table of values, identify the constant of proportionality (unit rate).

* Problems may include ratios of lengths, areas, and other quantities measured in like or different units, including across measurement systems.

† Strategies include, but are not limited to, the following: testing for equivalent ratios in a table and/or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students analyze proportional relationships and use them to solve real-world and mathematical problems. (NY-7.RP.1-3)		Represent a proportional relationship using an equation. (7.RP.2c)	Represent a verbal description of a proportional relationship using an equation.	
	Interpret the points (0, 0) and (1, *r*), where *r* is the unit rate, on the graph of a proportional relationship, and explain what any point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation.	Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate. (7.RP.2d)	Identify the points representing the initial value (0, 0) and the unit rate on the graph of a proportional relationship in terms of the situation.	Identify points on the graphs of proportional relationships.
	Analyze and use proportional relationships to solve multi-step real-world and mathematical problems requiring application of knowledge and skills involving ratio and/or percentages.	Use proportional relationships to solve multi-step ratio and percent problems.[‡] (7.RP.3)	Use proportional relationships to solve unit rate problems in a real-world context. Solve mathematical or real-world problems involving finding the whole, given a part and the percent.	Use multiplication or addition to find missing ratio values in simple mathematical problems involving ratio or percent.

[‡] Examples of percent problems include: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers. (NY-7.NS.1-3)		Describe situations in which opposite quantities combine to make zero. (7.NS.1a)	Determine the additive inverse of a given number.	Given a visual model of a number line, combine pairs of integers within -10 and 10 to make zero.
	Interpret sums of rational numbers by describing real-world contexts recognizing fractions, decimals, and percent as different representations of rational numbers.	Understand addition of rational numbers; $p + q$ is the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. (7.NS.1b)	Evaluate absolute values of integers. Recognize that $p + q$ represents a number located $\|q\|$ units from p on a number line.	
	Interpret differences of rational numbers by describing real-world contexts.[§]	Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$. Show subtraction of rational numbers as adding the additive inverse and apply this principle in real-world contexts. (7.NS.1c)	Calculate the differences of integers by describing real-world contexts.	

[§] Interpret requires students to make sense of and assign meaning to a mathematical task and explain the reasoning behind it.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers. (NY-7.NS.1-3)	Identify and apply the properties of operations used when adding and subtracting rational numbers.	Apply properties of operations as strategies to add and subtract rational numbers. (7.NS.1d)	Apply properties of operations (commutative and associative) as strategies to add rational numbers.	Add and subtract integers using properties of operations within -10 and 10 given a visual model.
		Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts (7.NS.2a)	Apply properties of operations to perform rational number multiplication, including signed numbers.	Given visual models (including a coordinate plane), multiply integers.
		Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. (7.NS.2b)	Apply properties of operations to perform rational number division, including signed numbers.	Given visual models (including a coordinate plane), divide integers.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers. (NY-7.NS.1-3)	Identify and apply the properties of operations when multiplying and dividing rational numbers.	Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.2c)	Apply properties of operations (commutative, associative, and distributive) as strategies to multiply rational numbers.	Given a visual model, multiply and divide integers using properties of operations within -10 and 10.
		Convert a fraction to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. (7.NS.2d)	Convert a fraction to a decimal using long division.	Convert a fraction to a decimal that terminates using long division.
	Create a real-world problem involving the four operations and/or justify the steps for the solution by using the properties of operations.	Solve multi-step real-world problems involving the four operations with rational numbers.** (7.NS.3)	Solve two-step real-world mathematical problems involving the four operations with rational numbers.	Given a visual model, compute simple sums and differences of integers within -10 and 10 in the context of real-world or mathematical problems.

** Computations with rational numbers extend the rules for manipulating fractions to complex fractions limited to (a/b)/(c/d), where *a*, *b*, *c*, and *d* are integers and *b*, *c*, and $d \neq 0$.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students use properties of operations to generate equivalent expressions. (NY-7.EE.1-2)	Identify and apply the properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)	Apply properties of operations used as strategies to add, subtract, and expand linear expressions with integer coefficients.	Given a visual model, add and subtract linear expressions in one variable with positive integer coefficients.
	Describe the relationship between equivalent quantities expressed algebraically in different forms in a problem context and explain their equivalence.	In mathematical or real-world contexts, rewrite an expression in different forms and explain how quantities are related. (7.EE.2)	In mathematical problems, rewrite expressions with integer coefficients (combining like terms) in different forms.	
Students solve real-life and mathematical problems using numerical and algebraic expressions, equations, and inequalities.[††] NY-7.EE.3-4)	Estimate solutions to real-world problems and check the reasonableness of answers.	Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Assess the reasonableness of answers using mental computation and estimation strategies. (7.EE.3)	Solve two-step real-world and mathematical problems with integers applying the properties of operations.	Solve two-step mathematical problems with integers, using any method.

[††] Order of operations problems in Performance Level 2 should contain integers only; Need to be consistent with level 2 from 7.NS.1-3.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students solve real-life and mathematical problems using numerical and algebraic expressions, equations, and inequalities.[‡] (NY-7.EE.3-4[§])	Explain the relationship between the steps used to solve a given equation in the form $px + q = r$ and $p(x + q) = r$ where p, q and r using an algebraic solution and an arithmetic solution.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ where p, q, and r are rational numbers. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.[**](7.EE.4a)	Use variables to represent quantities in a real-world or mathematical problem and construct simple inequalities to solve problems by reasoning about the quantities. Determine if a given rational number is the solution of an equation.	Solve linear equations of the form $px + q = r$ with integer coefficients.
	Explain the relationship between the steps used to solve a given inequality in the form $px + q > r$, $px + q \geq r$, $px + q < r$, or $px + q \leq r$ where p, q, and r are values of the real number system using an algebraic solution and an arithmetic solution. Explain whether a solution to a given problem is reasonable.	Solve word problems leading to linear inequalities of the form $px + q > r$, $px + q \geq r$, $px + q < r$, or $px + q \leq r$ where p, q, and r are rational numbers. (7.EE.4b)	Use variables to represent quantities in a real-world or mathematical problem and construct simple inequalities to solve problems by reasoning about the quantities. Determine if a given rational number is the solution of an inequality.	Solve linear inequalities of the form $px + q < r$ or $px + q < r$ with integer coefficients. Inequalities are limited to =, <, or >.

[‡] (NY-7.EE.4) Solving equations that contain variables on both sides is not an expectation in Grade 7.
[§] (NY-7.EE.4.a,b) The words "leading to" in the standard may require students to simplify or combine like terms on the same side of the equation or inequality before it is in the form stated in the standard.
[**] (NY-7.EE.4.a) This standard is a fluency expectation for Grade 7.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students solve real-life and mathematical problems using numerical and algebraic expressions, equations, and inequalities. (NY-7.EE.3-4)		Graph the solution set of the inequality on the number line and interpret it in the context of the problem. (7.EE.4b)	Graph the solution set in the form $px + q < r$ or $px + q < r$ of the inequality on a number line.	Graph the solution set for a linear inequality involving a single variable on a number line.
Students draw, construct, and describe geometrical figures and describe the relationship between them. (NY-7.G.1-3)	Recognize that a proportional relationship between two figures shows similarity. Explain the relationship between a scale factor and the volume of a three-dimensional object.	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G.1)	Solve one- and two-step problems involving scale drawings of geometric figures. Solve problems involving scale drawings of figures, including computing actual lengths.	Given visual and associated measurements of two similar shapes, calculate the scale factor.
		Determine how many unique triangles can be created, when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.[††](7.G.2)	Classify the triangle based on angle size (right, obtuse, acute).	Classify an angle of a given amount of degrees.

[††] Create triangles through the use of freehand drawings, materials (scaffolds may include: pipe cleaners, Legos®, and toothpicks), rulers, protractors, and/or technology.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students draw, construct, and describe geometrical figures and describe the relationship between them. (NY-7.G.1-3)	Describe the two-dimensional shapes that result from slicing three-dimensional solids.	Describe the two-dimensional shapes that result from slicing three-dimensional solids parallel or perpendicular to the base.*** (7.G.3)	Identify the two-dimensional shape that results from slicing three-dimensional solids parallel to the base.	Identify the two-dimensional shape that results from slicing right rectangular prisms parallel to the base.
Students solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (NY-7.G.4-6)	Given the area of a circle in terms of π, calculate the radius. Explore how technology and the square root function can be utilized to get approximations for the radius, when dealing with non-perfect squares.	Apply the formulas for the area and circumference of a circle to solve problems. Given the circumference of a circle, calculate the radius and diameter. ‡‡ (7.G.4)	Apply the formulas for the area and circumference of a circle to solve problems.	Calculate the area or circumference of a circle, given the radius or diameter.
	Write and solve multi-step equations for an unknown angle using facts about supplementary, complementary, vertical, and adjacent angles. (including equations with variables on both sides)	Write and solve simple multi-step equations for an unknown angle using facts about supplementary, complementary, vertical, and adjacent angles. (7.G.5)	Calculate the measure of an unknown angle using facts about supplementary, complementary, vertical, and adjacent angles.	Classify angle pairs using the following relationships: supplementary, complementary, vertical, and adjacent.

*** Focus of this standard is on plane sections resulting from the slicing of right rectangular prisms and right rectangular pyramids.
‡‡ Students in Grade 7 are not expected to calculate the radius of a circle given its area.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (NY-7.G.4-6)		Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids. (7.G.6)	Solve real-world and mathematical problems involving the areas of two-dimensional objects composed of only triangles and/or rectangles.	Calculate the areas of triangles and/or rectangles in a mathematical problem.
		Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids. (7.G.6)	Solve real-world surface area problems involving right prisms and/or pyramids composed of only triangles and rectangles.	Calculate surface area problems involving right prisms and/or pyramids composed of triangles and/or rectangles.
	Explain the derivation of the formula for the volume of a cylinder and use the formula to solve real-world and/or mathematical problems.	Solve the volume of right triangular prisms and solve volume problems involving three-dimensional objects composed of right rectangular prisms. (7.G.6)	Solve real-world volume problems involving right triangular prism and/or right rectangular prisms.	Calculate the volumes of right rectangular prisms in a mathematical problem.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students draw informal comparative inferences about two populations. (NY-7.SP.1,3,4)	Explain how an outlier affects a set of data.	Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier. (7.SP.1)	Identify a box-plot given the median, upper and lower extremes, and upper and lower quartiles of a given data set and identify the interquartile range of the given data set.	Determine the median, upper and lower extremes, and upper and lower quartiles of a given data set. Identify a box-plot given the median, upper and lower extremes, and upper and lower quartiles of a given data set.
	Assess the degree of visual overlap of two quantitative data distributions, including how an outlier affects the data set.	Informally assess the degree of visual overlap of two quantitative data distributions. (7.SP.3)	Distinguish the similarities and differences between two data sets.	Given two graphs of a data set, recognize and justify which graph is more appropriate. (histogram, dot plot, box-whisker) to display the data.
	Use measures of center and measures of variability for quantitative data from random samples for populations to draw comparative inferences about the populations, including how an outlier affects the data set.	Use measures of center and measures of variability for quantitative data from random samples or populations to draw informal comparative inferences about the populations. [§§] (7.SP.4)	Apply the differences between the measures of center (mean, median, mode) and the measures of variability (range, IQR) to make informal inferences about a given set of data.	Identify the difference between a measure of center (mean, median, mode) and a measure of variation (range, IQR) for given sets of data.

[§§] Measures of center are mean, median, and mode. The measures of variation include range and the interquartile range.

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students investigate chance processes and develop, use, and evaluate probability models. (NY-7.SP.8)		Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP.8a)	Given the sample space, recognize that a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	Recognize that a simple event is the fraction of outcomes in the sample space for which the simple event occurs.
		Represent sample spaces for compound events using methods such as organized lists, sample space tables, and tree diagrams. For an event described in everyday language, identify the outcomes in the sample space which compose the event. (7.SP.8b)	Represent a sample space for a compound event. Use sample space to calculate probabilities of compound events.	Represent a sample space for a simple event. Identify the outcomes of a simple event.
	Design and use a simulation to generate frequencies for compound events and draw inferences based on results of the simulation.	Design and use a simulation to generate frequencies for compound events. (7.SP.8c)	Approximate the probability of a chance compound event (predict the approximate frequencies) when given the probability or by observing frequencies in data generated from a simulation.	Use a given simulation to generate frequencies for simple events.