

**New York State Testing Program
Next Generation Learning Standards
Mathematics Test**

Performance Level Descriptions

Grade 5

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New York State Testing Program Next Generation Mathematics Test

Performance Level Descriptions

GRADE 5

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 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students write and interpret numerical expressions. (NY-5.OA.1-2)	Apply the order of operations to evaluate numerical expressions with two or more types of groupings. These expressions could involve powers of ten.	Apply the order of operations to evaluate numerical expressions without exponents or nested grouping symbols. (5.OA.1)	Apply the order of operations to evaluate numerical expressions without exponents or nested grouping symbols and only two operations.	Apply the order of operations to evaluate numerical expressions without parentheses, exponents or nested grouping symbols and only two operations.
	Write and interpret numerical expressions that involve two or more types of groupings, but not nested grouping. These expressions could involve powers of ten.	Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them. (5.OA.2)	Write and interpret numerical expressions that involve two-steps, no grouping.	Write and interpret numerical expressions that involve two-steps, no grouping.
Students analyze patterns and relationships. (NY-5.OA.3)	Generate two numerical patterns with two rules. Identify and explain apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. Explain informally why this is so.	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. (5.OA.3)	Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.	Graph ordered pairs of a given set on the coordinate plane.

Next Generation Learning Standards Grade 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students understand the place value system. (NY-5.NBT.1-4)	Recognize, demonstrate, or explain that in any multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. (5.NBT.1)	Recognize that in any multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left with visuals.	Show that in any multi-digit whole number, a digit in one place represents ten times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left using manipulatives or visual models.
	Use whole number exponents to denote powers of 10 and evaluate numerical expressions involving whole-number exponents.	Use whole number exponents to denote powers of 10. (5.NBT.2)	Use visual models to denote powers of ten.	
	Analyze and explain patterns in the number of zeros of the product when multiplying a number by powers of 10.	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10. (5.NBT.2)	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 using visual models.	
	Use patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10 to evaluate numerical expressions.	Explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. (5.NBT.2)	Identify patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.	Identify patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10 using visual models.

Next Generation Learning Standards Grade 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students understand the place value system. (NY-5.NBT.1-4)		Read, write, and compare decimals to the thousandths using base-ten numerals, number names, expanded form, and inequality symbols ($>$, $<$, $=$). (5.NBT.3a-b)	Read and write decimals to the hundredths using base-ten numerals, number names, expanded form, and inequality symbols ($>$, $<$, $=$) using visual models.	Read and write decimals to the hundredths using base-ten numerals, number names, expanded form, and inequality symbols ($>$, $<$, $=$) using visual models or manipulatives.
		Use place value understanding to round decimals to any place. (5.NBT.4)	Round decimals to hundredths using visual models.	Round decimals to the tenths using manipulatives or visual models.
Students perform operations with multi-digit whole numbers and with decimals to hundredths. (NY-5.NBT.6-7)	Divide whole numbers with up to four-digit dividends and two-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Identify relationships between different approaches. Check reasonableness of answers using a standard algorithm for multiplication.	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.* Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.† (5.NBT.6)	Divide whole numbers with up to three-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Calculate by using equations, rectangular arrays, and/or area models.	Using visual models and/or manipulatives, divide whole numbers with up to four-digit dividends and a two-digit divisor using strategies based on place value.

* Students should be taught to use strategies based on place value, the properties of operations, and the relationship between multiplication and division; however, when solving any problem, students can choose any strategy.

† Students should be taught to use equations, rectangular arrays, and area models; however, when illustrating and explaining any calculation, students can choose any strategy.

Next Generation Learning Standards Grade 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students perform operations with multi-digit whole numbers and with decimals to hundredths. (NY-5.NBT.6-7)	Add and subtract decimals involving tenths and/or hundredths using concrete models, drawings, or strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Apply these strategies to a real-world context, relate the strategy to a written method, and explain the reasoning used.	Add and subtract decimals involving tenths and/or hundredths using concrete models, drawings, or strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Relate the strategy to a written method, and explain the reasoning used. [‡] (5.NBT.7)	Add and subtract two decimals involving tenths and/or hundredths (decimals with the same number of digits) using concrete models, drawings, or strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Relate the strategy to a written method.	Add or subtract two decimals involving tenths and/or hundredths (decimals with the same number of digits) using concrete models, drawings, or strategies based on place value.
	Multiply and divide decimals involving tenths and/or hundredths using strategies based on place value, properties of operations, and/or the relationship between operations. Apply these strategies to a real-world context, relate the strategy to a written method, and explain the reasoning used.	Multiply and divide decimals involving tenths and/or hundredths using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between operations. Relate the strategy to a written method, and explain the reasoning used. [§] (5.NBT.7)	Multiply and divide decimals involving tenths using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between multiplication and division. Relate the strategy to a written method.	Multiply and divide decimals involving tenths using concrete models or visual models and strategies based on place value.

[‡] Students should be taught to use concrete models and drawings as well as strategies based on place value, properties of operations, and the relationship between operations. When solving any problem, students can choose to use a concrete model or a drawing. Their strategy must be based on place value, properties of operations, or the relationship between operations.

[§] Division problems for this grade level are limited to those that allow for the use of concrete models or drawings, strategies based on properties of operation, and/or the relationship between operations. Problems should not be so complex as to require the use of algorithms.

Next Generation Learning Standards Grade 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
<p>Students use equivalent fractions as a strategy to add and subtract fractions. (NY-5.NF.1-2)</p>		<p>Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference with like denominators. (5.NF.1)</p>	<p>Add and subtract two fractions with unlike denominators using visual models in such a way as to produce an equivalent sum or difference with like denominators.</p>	<p>Use visual models or manipulatives to add and subtract fractions with unlike denominators by joining and separating parts.</p>
	<p>Create and solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.</p>	<p>Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. (5.NF.2)</p>	<p>Solve word problems involving addition and subtraction of fractions using benchmark fractions with unlike denominators referring to the same whole, by using visual fraction models or equations.</p>	<p>Solve word problems using visual models and/or manipulatives, compute sums and differences of fractions.</p>
	<p>Use benchmark fractions (0, $\frac{1}{2}$, 1) to estimate and assess the reasonableness of an answer.</p>	<p>Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. (5.NF.2)</p>	<p>Using number lines or other visual models, use benchmark fractions and number sense of fractions to estimate and assess the reasonableness of answers.</p>	<p>Using manipulatives, use benchmark fractions and number sense of fractions to estimate and assess the reasonableness of answers.</p>

Next Generation Learning Standards Grade 5 Mathematics Performance Level Descriptions

Cluster	Performance Level 4	Performance Level 3	Performance Level 2	Performance Level 1
Students apply and extend previous understandings of multiplication and division to multiply and divide fractions. (NY-5.NF.3-7)		Interpret a fraction as division of the numerator by the denominator $\left(\frac{a}{b} = a \div b\right)$. (5.NF.3)	Interpret a fraction as division of the numerator by the denominator using visual models.	Interpret a fraction as division of the numerator by the denominator using visual models and/or manipulatives.
		Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. (5.NF.3)	Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual models.	Solve word problems involving division of whole numbers leading to answers in the form of fractions by using visual or concrete models.
		Multiply a fraction or a whole number by a fraction by interpreting the product $\frac{a}{b} \times q$ as a parts of a partition of q into b parts. (5.NF.4a)	Multiply a fraction or a whole number by a fraction using visual fraction models.	Understand that a whole number multiplied by a fraction can be represented as repeated addition.
	Create area models to illustrate the meaning of multiplying fractions and explain the model's relationship to both factors and the product.	Find the area of a rectangle with fractional side lengths by tiling it with rectangles of the appropriate unit fraction side lengths and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fractional products as rectangular areas. (5.NF.4b)	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.	Find the area of a rectangle with fractional side lengths by using visual models.

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<p>Students apply and extend previous understandings of multiplication and division to multiply and divide fractions. (NY-5.NF.3-7)</p>		<p>Interpret and explain multiplication as scaling (resizing) by comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication where one factor is a fraction or mixed number. (5.NF.5a)</p>	<p>Interpret multiplication as scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor where one factor is a fraction by performing the indicated multiplication.</p>	<p>Interpret multiplication as scaling by comparing the size of a product to the size of one factor on the basis of the size of the second factor where one factor is a fraction by performing the indicated multiplication using visual models.</p>
		<p>Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number. Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. Relate the principle of fraction equivalence $\frac{a}{b} = \frac{a}{b} \times \frac{n}{n}$ the effect of multiplying $\frac{a}{b}$ by 1. (5.NF.5b)</p>	<p>Relate the principle of fraction equivalence $\frac{a}{b} = \frac{a}{b} \times \frac{n}{n}$ the effect of multiplying by 1.</p>	

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Students apply and extend previous understandings of multiplication and division to multiply and divide fractions. (NY-5.NF.3-7)	Create and solve real-world problems by multiplying a mixed number by a fraction, a fraction by a fraction, and a whole number by a fraction; dividing a fraction by a whole number and a whole number by a fraction using visual fraction models and creating context and equations including rectangular areas; and interpreting the product and/or quotient.	Solve real-world problems by multiplying a mixed number by a fraction, a fraction by a fraction, and a whole number by a fraction; dividing a unit fraction by a whole number and a whole number by a unit fraction using visual fraction models or equations; and interpreting the product and/or quotient. (5.NF.6, 5.NF.7c)	Solve real-world problems by multiplying a fraction by a fraction, and a whole number by a fraction; dividing a unit fraction by a whole number and a whole number by a unit fraction using visual fraction models or equations.	Solve real-world problems involving multiplying a whole number by a fraction or the division of whole numbers leading to answers in the form of fractions given a visual model or manipulatives.
	Divide a unit fraction by a whole number and a whole number by a unit fraction, and interpret the quotients to solve real-world problems.**	Divide a unit fraction by a whole number and a whole number by a unit fraction, and interpret the quotients. (5.NF.7a-b)	Divide a unit fraction by a whole number and a whole number by a unit fraction using visual fraction models.	Divide a unit fraction by a whole number and a whole number by a unit fraction using concrete models.

** Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement until grade 6.

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Students graph points on the coordinate plane to solve real-world and mathematical problems. (NY-5.G.1-2)	Create real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation. (5.G.2)	Represent mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.	
Students classify two-dimensional figures into categories based on their properties. (NY-5.G.3-4)	Compare and contrast the attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	Explain that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.** (5.G.3)	Using visual models, explain that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	Using manipulatives and/or visual models, explain that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
	Classify two-dimensional figures in a hierarchy based on properties.	Classify two-dimensional figures in a hierarchy based on properties. (5.G.4)	Classify two-dimensional figures in a hierarchy based on properties.	Classify two-dimensional figures in a hierarchy based on properties.

** The inclusive definition of a trapezoid will be utilized, which defines a trapezoid as “A quadrilateral with at least one pair of parallel sides.”