Next Generation Mathematics Learning Standards: Suggested Breakdown of Instructional Time

New York State
EDUCATION DEPARTMENT
Knowledge > Skill > Opportunity

Contents

Introduction:

The *NYS Next Generation Mathematics Learning Standards (2017) (NGMLS)* define what students in each grade should know and be able to do as a result of their study of mathematics. The NGMLS, collectively, are focused, cohesive, and designed to support student access to the knowledge and understanding of the mathematical concepts necessary to function in a world dependent upon the application of mathematics, while providing educators the opportunity to devise innovative programs to support this endeavor.

Curriculum and instruction that support the content of the learning standards and the unique learning needs of students are locally determined by each individual district in New York State. Teacher preference and flexibility in planning units of study continue to play vital roles to both meet the needs of the students and align with the purpose/expectations of the learning standards. Teachers are encouraged to individualize mathematics instruction, meeting students where they currently are and aiding students in their attainment of grade-level skills, fluency, and understanding. This includes planning lessons with embedded supports and scaffolds to assist students who need additional support to meet learning expectations.

Purpose of this document:

This guidance document is an optional resource intended to provide support and guidance for districts and teachers, assisting with classroom instructional planning for the implementation of the Next Generation Mathematics Learning Standards (NGMLS). Grades PreK-8 will fully transition to the NGMLS in school year 2022 – 2023. The high school courses of Algebra I, Geometry, and Algebra II will transition each year thereafter respectively; Algebra I in 2023 – 2024, Geometry in 2024 – 2025, and Algebra II in 2025 – 2026.

It is recommended that educators work together to create a standards-based curriculum that meets the needs of all students, including students with disabilities, English language learners (ELLs), students who need extra supports to meet grade-level content, and upholds culturally responsive-sustaining teaching practices. Students are most successful in supportive and nurturing classrooms that are inclusive, student-centered, and capitalize on diverse cultures, languages, and backgrounds.

Curriculum often includes units of study that blend standards from different domains/conceptual categories to aid students in gaining the understanding, fluencies, and problem-solving skills necessary to fully achieve the expectations of the NGMLS. *The NGMLS were designed with the understanding that not all standards require equal instructional time in a classroom*. As educators create units of study that blend the clusters and individual standards from the NGMLS, adjustments to instructional time are encouraged to be made in consideration of the needs of their students in the local districts. To aid educators in their efforts to build upon students' strengths as well as allowing them

to target those areas in need of more support, planning and incorporating appropriate time for multiple forms of ongoing formative assessment throughout these units of study will be essential. Professional collaboration with local and/or regional educational agencies during this process is always suggested.

This document was created through a collaborative effort with NYS teachers and provides educators with suggested percentage ranges of instructional time at the domain level for grades PreK – 8 and Geometry and at the conceptual category level for Algebra I and Algebra II. The suggested percentage of instructional time ranges in this document provide one optional consideration when planning for classroom instruction aligned to the NGMLS. Knowledge of the needs and diversity of the students in a classroom at any grade-level should always be the primary consideration. The suggested percentage range of instructional time for certain domains/conceptual categories in some grade levels/courses may appear relatively small; however, many of these domains/conceptual categories relate to a larger progression of standards across grade levels/courses and may take more investigation and development than is implied by the suggested percentage range alone.

Please note: Some concepts take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on an assessment or Regents Examination. For example, in the high school course Geometry, the suggested instructional time percentage ranges may lead an educator to think the **Congruence** domain is the focus domain of the course, but this is **not** the case. Many fundamental concepts begin within the **Congruence** domain, however, these concepts are expanded upon and applied throughout the other domains found in the Geometry course. The suggested percentage of instructional time ranges in this document do not necessarily reflect the blueprints of the associated grade-level assessment or Regents Examination. It is recommended that this document, *Suggested Breakdown of Instructional Time*, be used in conjunction with the Educator Guides when planning units of study rather than using one document in isolation. **Information about how the learning standards are measured on the assessments will be available in the Educator Guides released prior to the first administration of each test.**

Structure of this document:

The layout of this document is intended to be educator friendly. Each grade level/course starts with introductory language from the NGMLS document regarding the foci for the associated grade level or high school course followed by a table listing the suggested instructional time percentage ranges by domain or conceptual category level.

The content shown within the tables represents an optional division of instructional time by domain (PreK – 8, Geometry) or conceptual category (Algebra I and Algebra II). Below the table in each grade level/course are notes and considerations regarding some of the suggested instructional time percentage ranges. These suggested instructional time percentage ranges and notes/considerations may be utilized to guide local decision-

making as educators transition their instruction to support the learning expectations reflected in the NGMLS document.

For additional information regarding the NYS Next Generation Mathematics Learning Standards, please see the *NYS Next Generation Mathematics Learning Standards* document. Additional resources pertaining to the Next Generation Mathematics Learning Standards can be found on our website, including the Snapshot and Crosswalk documents as well as the *Guide for Aligning Local Curricula to the Next Generation Mathematics Learning Standards*.

For additional information regarding the post-test standards designation for NGMLS, please see the *NYS Next Generation Mathematics Learning Standards for Grades 3-8: Post-Test Standards Designations Applicable to Test Administrations Beginning Spring 2023* webpage.

Additional information regarding the Next Generation Mathematics Learning Standards Performance Level Descriptions can also be found on the website.

Prekindergarten:

In Pre-Kindergarten, instructional time should focus on two areas:

(1) developing a good sense of numbers using concrete objects, including concepts of correspondence, counting, cardinality, and comparison;
(2) describing shapes in their everyday environment.

More learning time in Pre-Kindergarten should be devoted to exploring* and developing the sense of numbers than on any other topic.

*<u>Note</u>: *Explore* indicates that the topic is an important concept that builds the foundation for progression toward mastery in later grades. Repeated experiences with these concepts, with immersion in the concrete, are vital.

Suggested Instructional Time Percentages for Pre-Kindergarten by Domain:

Counting & Cardinality	Operations and Algebraic Thinking	Measurement and Data	Geometry
55% - 65%	10% - 20%	10% - 20%	5% - 15%

Notes/Considerations:
The suggested instructional time percentage range for **Geometry** may seem relatively small; however, this domain works cohesively with the other domains to allow students to achieve deep understanding. It allows students to attain the second focus of the grade level, describing shapes in their everyday environment. This domain also supports **Counting and Cardinality** by providing concrete objects for counting.

Kindergarten:

In Kindergarten, instructional time should focus on two areas:
> (1) developing a sound sense of numbers by representing and comparing numbers, initially using sets of objects;
> (2) recognizing and describing shapes and using spatial relations.

More learning time in kindergarten should be devoted to number than to any other topic.

Suggested Instructional Time Percentages for Kindergarten by Domain:

Counting & Cardinality	Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
35% - 45%	25% - 35%	5% - 15%	5% - 10%	10% - 15%

Notes/Considerations:
The suggested instructional time percentage ranges for **Number and Operations in Base Ten**, **Measurement and Data**, and **Geometry** domains do not indicate that the standards in these domains are less important. The standard in the **Number and Operations in Base Ten** domain assists in tying together the domains of **Counting & Cardinality** and **Operations and Algebraic Thinking**. The **Measurement and Data**, and **Geometry** domains work together cohesively to allow students to achieve deep understanding for the grade-level. They allow students to attain the second focus of the grade level; recognizing and describing shapes and using spatial relations, while also supporting **Counting & Cardinality** by providing concrete objects for counting. These two domains provide support for students to achieve strong foundational knowledge and conceptual understanding when units of study combine standards from the **Counting and Cardinality** and **Operations and Algebraic Thinking** domains. In addition, the **Operations and Algebraic Thinking** and **Measurement and Data** domains each have an added standard that will require additional instructional time.

Grade 1:

In Grade 1, instructional time should focus on three areas:

(1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20;

(2) developing understanding of whole number relationships and place value, including grouping in tens and ones; and

(3) developing understanding of linear measurement and measuring lengths as iterating length units.

Suggested Instructional Time Percentages for Grade 1 by Domain:

Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
35% - 45%	35% - 45%	10% - 15%	5% - 10%

Notes/Considerations:

The suggested instructional time percentage ranges for the **Measurement and Data** and **Geometry** domains may seem relatively small; however, these domains aid students in achieving deep understanding with standards in the **Number and Operations in Base Ten** domain. In addition, these domains continue the progressions started in earlier grade-levels in each respective domain. The **Measurement and Data** domain contains added standards that will require additional instructional time.

Grade 2:

In Grade 2, instructional time should focus on four areas:

(1) extending understanding of base-ten notation;

(2) building fluency with addition and subtraction;

(3) using standard units of measure; and

(4) analyzing and classifying two-dimensional shapes as polygons or non-polygons.

Suggested Instructional Time Percentages for Grade 2 by Domain:

Operations and Algebraic Thinking	Number and Operations in Base Ten	Measurement and Data	Geometry
30% - 40%	25% - 35%	25% - 30%	5% - 10%

Notes/Considerations:

The suggested instructional time percentage range in the **Geometry** domain does not indicate that the standards in this domain are less important. These standards lay the foundation for cohesive work (such as understanding area) in future grade levels in multiple domains: **Number and Operations – Fractions**, **Measurement and Data**, and **Geometry**.

Grade 3:

In Grade 3, instructional time should focus on four areas:

(1) developing understanding of multiplication and division and strategies for multiplication and division within 100;

(2) developing understanding of fractions, especially unit fractions (fractions with numerator 1);

(3) developing understanding of the structure of rectangular arrays and of area; and

(4) describing and analyzing polygons based on the number of sides and vertices.

Suggested Instructional Time Percentages for Grade 3 by Domain:

Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations – Fractions	Measurement and Data	Geometry
35% - 45%	10% - 15%	15% - 20%	20% - 25%	5% - 10%

Notes/Considerations:
The suggested instructional time percentage ranges in the **Number and Operations in Base Ten** and **Geometry** domains do not indicate that the standards in these domains are less important. Student work in the **Number and Operations in Base Ten** domain in Grade 3 continues work from previous grade levels with place value while preparing students for the foci in grade 4 with the addition of standards NY-3.NBT.4a and NY-3.NBT.4b. The grade 3 **Geometry** standards continue a focus on polygons while also connecting and supporting student work in the **Number and Operations – Fractions** domain.

Please Note:
The Grade 3 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 3 assessment blueprint.* Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Grade 4:

In Grade 4, instructional time should focus on three areas:

(1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends;

(2) developing an understanding of fraction equivalence, addition, and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and

(3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Suggested Instructional Time Percentages for Grade 4 by Domain:

Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations – Fractions	Measurement and Data	Geometry
15% - 25%	20% - 30%	20% - 25%	15% - 25%	10% - 15%

Notes/Considerations:
The instructional time percentage range in the **Geometry** domain does not indicate that the standards are less important. The grade 4 **Geometry** standards, which involve working with lines and angles and classifying shapes, cohesively connect the **Geometry** standards from Grade 3 and supports student work along the progression into Grade 5 and through the high school course of Geometry.

Please Note:
The Grade 4 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 4 assessment blueprint.* Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Grade 5:

In Grade 5, instructional time should focus on three areas:

(1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions);

(2) extending division to 2-digit divisors, integrating decimals into the place value system, and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and

(3) developing understanding of volume.

Suggested Instructional Time Percentages for Grade 5 by Domain:

Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations – Fractions	Measurement and Data	Geometry
10% - 15%	25% - 30%	25% - 35%	15% - 20%	10% - 15%

Notes/Considerations:
The instructional time percentage ranges in the **Operations and Algebraic Thinking** and **Geometry** domains do not indicate that these standards are less important. The grade 5 **Geometry** standards cohesively extend the work done in previous grades with number lines, lines, angles and classifying two-dimensional shapes. These standards continue student work along the progression into Grade 6 and beyond. In addition, the smaller number of standards and the smaller suggested instructional time percentage range in the **Operations and Algebraic Thinking** domain should not be misinterpreted as less important or unnecessary. On the contrary, these standards, recommended as post-test standards, provide a vital foundation for the work done in middle school in the **Expressions, Equations and Inequalities** domain, as well as the **Ratios and Proportional Relationships** domain.

Please Note:
The Grade 5 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 5 assessment blueprint.* Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Grade 6:

In Grade 6, instructional time should focus on five areas:

(1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems;

(2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers;

(3) writing, interpreting, and using expressions and equations;

(4) deepening understanding of area, surface area and volume; and

(5) developing understanding of simple probabilities and statistical thinking.

Suggested Instructional Time Percentages for Grade 6 by Domain:

Ratios & Proportional Relationships	The Number System	Expressions, Equations, and Inequalities	Geometry	Statistics & Probability
10% - 20%	20% - 25%	25% - 35%	10% - 15%	15% - 25%

Notes/Considerations:

The standards in the **Geometry** domain should not be overlooked as they continue to expand the progression started in earlier grades with area and as students begin working with volume. This work is also supported by the new added standard pertaining to area and volume models which in turn supports the **Expressions, Equations, and Inequalities** and **The Number System** domains. Additionally, there have been several added standards in the **Statistics & Probability** domain that will require additional instructional time.

Please Note:

The Grade 6 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 6 assessment blueprint.* Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Grade 7:

In Grade 7, instructional time should focus on three areas:
(1) developing understanding of and applying proportional relationships;
(2) developing understanding of operations with rational numbers and working with expressions and linear equations; and
(3) drawing inferences about populations based on samples.

Suggested Instructional Time Percentages for Grade 7 by Domain:

Ratios & Proportional Relationships	The Number System	Expressions, Equations, and Inequalities	Geometry	Statistics & Probability
20% - 30%	10% - 20%	20% - 30%	15% - 20%	15% - 20%

Notes/Considerations:
The standards in the **Statistics & Probability** domain, which include a new added standard, should not be overlooked. The progression with data, started in the elementary grades, continues to intensify with data distributions. The concepts with probability also continue to evolve as students delve into learning about compound events. This progression continues into the high school course of Algebra II. The standards in this domain provide a context to connect to the major work of the grade level with proportional relationships and reasoning. The standards in **The Number System** domain should also not be misinterpreted as unnecessary as these standards provide support to the **Expressions, Equations, and Inequalities** and **Ratio and Proportional Relationships** domains.

Please Note:
The Grade 7 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 7 assessment blueprint*. Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Grade 8:

In Grade 8, instructional time should focus on three areas:

(1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations;

(2) grasping the concept of a function and using functions to describe quantitative relationships;

(3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

Suggested Instructional Time Percentages for Grade 8 by Domain:

The Number System	Expressions, Equations, and Inequalities	Functions	Geometry	Statistics & Probability
5% - 10%	25% - 35%	15% - 20%	30% - 40%	5% - 15%

Notes/Considerations:
The standards in **Statistics & Probability** tie into one of the main foci for this grade level and work in conjunction with and provide a context for the standards in the **Expressions, Equations, and Inequalities** and **Functions** domains. Therefore, these standards should not be overlooked or considered less important. The standards in **The Number System** domain work to support concepts in both the **Expressions, Equations, and Inequalities** and **Geometry** domains as well as the three high school courses (Algebra I, Geometry, and Algebra II).

Please Note:
The Grade 8 Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Grade 8 assessment blueprint.* Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Algebra I:

For the high school course of Algebra I, the suggested instructional time percentage ranges are provided at the conceptual category level. The two focal conceptual categories for the course are **Functions** and **Algebra**.

Suggested Instructional Time Percentages for High School Algebra I by Conceptual Category:

Algebra	Number and Quantity	Functions	Statistics & Probability
45% - 55%	5% - 15%	25% - 35%	5% - 15%

Notes/Considerations:
The two focal conceptual categories are supported through vital work done in the **Number and Quantity** and **Statistics & Probability** conceptual categories. The **Number and Quantity** conceptual category contains new standards that expand students' understanding with rational numbers and square roots and thus may require additional instructional time. In the **Statistics & Probability** conceptual category, students continue along the progression towards a deeper understanding of statistical data.

Three of the four conceptual categories, **Algebra**, **Functions**, and **Number and Quantity** contain standards specified as ideal for modeling, one of the eight Standards for Mathematical Practice. These modeling standards may be blended in instruction in relation to the other standards in these three conceptual categories.

Please Note:
The Algebra I Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Regents Examination in Algebra I blueprint*. Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Geometry:

For the high school course of Geometry, the suggested instructional time percentage ranges are provided at the domain level, as all the standards are contained within the conceptual category of **Geometry**. The suggested instructional time percentage ranges below may lead an educator to think the **Congruence** domain is the focus domain of the course, but this is **not** the case. Although many fundamental concepts begin within the **Congruence** domain, these concepts are expanded upon and applied throughout the other domains found in the Geometry course. All the domains work together cohesively to develop a student's geometric knowledge, allowing them to function in a world dependent upon the application of mathematics, specifically, geometry.

Suggested Instructional Time Percentages for High School Geometry by Domain:

Congruence	Similarity, Right Triangles and Trigonometry	Circles	Expressing Geometric Properties with Equations	Geometric Measurement & Dimensions	Modeling with Geometry
30% - 40%	20% - 25%	10% - 20%	10% - 15%	5% - 10%	5% - 10%

Notes/Considerations:
The foundation of knowledge built in elementary and middle school is expanded in the **Congruence; Similarity, Right Triangles, and Trigonometry**; **Circles**; and **Expressing Geometric Properties with Equations** domains. Two of these domains, **Similarity, Right Triangles, and Trigonometry** and **Expressing Geometric Properties with Equations**, have an added standard that may require additional instructional time for students to master. In addition to the work in the domains listed above, students continue their study of the attributes of two- and three-dimensional geometric shapes from elementary and middle school in the **Geometric Measurement & Dimensions** domain throughout the course.

Modeling in mathematics is woven throughout the Geometry course, not only within the **Modeling with Geometry** domain but also with standards contained in the **Similarity, Right Triangles, and Trigonometry; Expressing Geometric Properties with Equations;** and **Geometric Measurement & Dimensions** domains. The suggested percentage ranges for instructional time should not be the only consideration for modeling. Modeling plays a much larger role within this course as well as the Algebra I and Algebra II courses.

Please Note:
The Geometry Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of*

Instructional Time Ranges do not necessarily reflect the Regents Examination in Geometry blueprint. Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.

Algebra II:

For the high school course of Algebra II, the suggested instructional time percentage ranges are provided at the conceptual category level. The two focal conceptual categories for the course are **Functions** and **Algebra**.

Suggested Instructional Time Percentages for High School Algebra II by Conceptual Category:

Algebra	Number and Quantity	Functions	Statistics & Probability
30% - 40%	5% - 15%	35% - 45%	10% - 20%

Notes/Considerations:
As in Algebra I, the two focal conceptual categories in Algebra II are supported through vital work done in the **Number and Quantity** and **Statistics & Probability** conceptual categories. Certain standards in the conceptual category of **Number and Quantity** may require more time as the number system is expanded to the complex number system. When planning for instructional time, it is recommended that educators consider the new standards that were added to Algebra II. The **Algebra** conceptual category contains one new standard, while the **Functions** conceptual category contains five new standards.

The **Algebra**, **Functions**, and **Statistics & Probability** conceptual categories contain standards specified as ideal for modeling, which is one of the eight Standards for Mathematical Practice. These modeling standards may be blended in instruction in relation to the other standards in these three conceptual categories. All the standards in the **Statistics & Probability** conceptual category are designated as modeling standards.

Please Note:
The Algebra II Suggested Percentage of Instructional Time Ranges consider instruction for a complete school year from September – June. *These Suggested Percentage of Instructional Time Ranges do not necessarily reflect the Regents Examination in Algebra II blueprint*. Certain concepts may take more instructional time to develop within a classroom to achieve the expectation of the standards than may be evidenced on a grade-level State assessment.