

Mathematics Scope and Sequence - Elementary School Kindergarten

NCTM Curriculum Focal Points

The National Council of Teachers of Mathematics (NCTM) created its *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics* (2006) to provide descriptions of the most significant mathematical concepts and skills at each grade level. These focal points were chosen according to three criteria: they are mathematically important, both for further study in mathematics and for use in applications in and outside of school; they conform to what is known about learning mathematics; they connect logically with the mathematics in earlier and later grade levels. According to the NCTM, “these curriculum focal points should be considered as major instructional goals and desirable learning expectations, not as a list of objectives for students to master.” It is important that none of the focal points be omitted; it is less important whether they are addressed a year earlier or later, or over a period of two years, compared with the suggested sequence in the document.

On this page, each of the NCTM focal points is followed (in parentheses) by the corresponding New York State performance indicators.

Focal Points

Number Sense and Operations: Representing, comparing, and ordering whole numbers and joining and separating sets

Children use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set, creating a set with a given number of objects, comparing and ordering sets or numerals by using both cardinal and ordinal meanings, and modeling simple joining and separating situations with objects. They choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the number in a small set, counting and producing sets of given sizes, counting the number in combined sets, and counting backward. (K.N. 1-11)

Geometry: Describing shapes and space

Children interpret the physical world with geometric ideas (e.g., shape, orientation, spatial relations) and describe it with corresponding vocabulary. They identify, name, and describe a variety of shapes, such as squares, triangles, circles, rectangles, (regular) hexagons, and (isosceles) trapezoids presented in a variety of ways (e.g., with different sizes or orientations), as well as such three-dimensional shapes as spheres, cubes, and cylinders. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes. (K.G.1, K.G.4-5)

Measurement: Ordering objects by measurable attributes

Children use measurable attributes, such as length or weight, to solve problems by comparing and ordering objects. They compare the lengths of two objects both directly (by comparing them with each other) and indirectly (by comparing both with a third object), and they order several objects according to length. (K.G.2, K.M.1, K.S.3)

Connections to the Focal Points

Data Analysis: Children sort objects and use one or more attributes to solve problems. For example, they might sort solids that roll easily from those that do not. Or they might collect data and use counting to answer such questions as, “What is our favorite snack?” They re-sort objects by using new attributes (e.g., after sorting solids according to which ones roll, they might re-sort the solids according to which ones stack easily).

Geometry: Children integrate their understandings of geometry, measurement, and number. For example, they understand, discuss, and create simple navigational directions (e.g., “Walk forward 10 steps, turn right, and walk forward 5 steps”).

Algebra: Children identify, duplicate, and extend simple number patterns and sequential and growing patterns (e.g., patterns made with shapes) as preparation for creating rules that describe relationships.

Academic Language

PreK-8 Glossary of Mathematical Terms

Definitions of mathematical terms used in elementary and middle school: <http://www.emsc.nysed.gov/3-8/pk-8glossary.doc>

Note:

This document is organized by content strands. The process strands (Problem Solving, Reasoning and Proof, Communications, Connections and Representation) highlight ways of acquiring and using content knowledge. Student engagement in mathematical content is accomplished through these strands, which are integrated throughout the scope of the curriculum. For more details on both content and process strands, visit: <http://www.emsc.nysed.gov/3-8/MathCore.pdf>

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Lesson Planning

Daily planning guide keyed to the standard curriculum for this grade: <http://schools.nycenet.edu/offices/teachlearn/mathematics/EMNYCGK.pdf>

Development of Content Topics and Concepts

For each content strand these documents trace the development year by year of every band (i.e., sub-skill) from elementary school through high school. As such they provide insight into the foundational work done in previous grades and map the subsequent elaboration of the topics in later courses.

Band Traces:

Number Sense and Operations: <http://schools.nyc.gov/NR/ronlyres/4C837772-3E02-4552-A02E-AE7E9AE769C1/47718/StrandTraceNumberSenseandOperations.pdf>

Algebra: <http://schools.nyc.gov/NR/ronlyres/4C837772-3E02-4552-A02E-AE7E9AE769C1/47719/StrandTraceAlgebra.pdf>

Geometry: <http://schools.nyc.gov/NR/ronlyres/4C837772-3E02-4552-A02E-AE7E9AE769C1/47720/StrandTraceGeometry.pdf>

Measurement: <http://schools.nyc.gov/NR/ronlyres/4C837772-3E02-4552-A02E-AE7E9AE769C1/47721/StrandTraceMeasurement.pdf>

Statistics and Probability: <http://schools.nyc.gov/NR/ronlyres/4C837772-3E02-4552-A02E-AE7E9AE769C1/47722/StrandTraceStatisticsandProbability.pdf>

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Development of Content Topics and Concepts (continued)

The chart below depicts the number of performance indicators for the content strands by grade level. The emphasis in grades Pre-Kindergarten-4 is on Number Sense and Operations. Algebra builds slowly beginning with patterns in the early elementary grades and leads up to relations and functions in grade 8. Geometry builds as well with a heavy emphasis in the grades 5-8. Measurement increases significantly across the grades with the exception of grade 8. Statistics includes the collection and display of data in the early elementary grades and probability is introduced in grade 5.

Number of Content Performance Indicators by Grade Level											
Content Strand	Pre-K	K	1	2	3	4	5	6	7	8	TOTAL
Number Sense and Operations	9	13	30	22	27	27	27	27	19	6	207
Algebra	1	2	1	2	2	5	8	6	10	19	56
Geometry	2	5	5	6	5	8	14	11	10	21	87
Measurement	2	3	11	10	10	10	11	9	13	1	80
Statistics and Probability	4	5	9	5	8	6	7	11	12	0	67
TOTAL	18	28	56	45	52	56	67	64	64	47	497

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Selected Internet Websites - Kindergarten

These on-line resources can serve to reinforce student mathematical skills and concepts, and to help teachers differentiate their mathematics instruction.

STRAND	TOPIC	WEBSITE
Number Sense and Operations	Kindergarten Lessons – Compare and Order Numbers	http://www.kindergarten-lessons.com/learning_numbers.html http://www.aaamath.com/cmpk1a-morefewer.html
Geometry	Geometric Shapes	http://www.k12math.com/kindergarten-math/shapes.htm
Algebra	Number Patterns	http://infusion.allconet.org/infusionResource/Mathematics/kindergarten.htm http://www.ixl.com/math/practice/kindergarten-similar-patterns

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	September – October	November – December	January – March	April – June
Number Sense and Operations Strand	<p><i>Number Systems</i></p> <p>K.N.4 Verbally count by 1’s to 20</p>	<p><i>Number Systems</i></p> <p>K.N.3 Numerically label a data set of 1 to 5</p> <p>K.N.10 Visually determine how many more or less, and then using verbal counting sequence, match and count 1-10</p>	<p><i>Number Systems</i></p> <p>K.N.1 Count the items in a collection and know the last counting work tells how many items are in the collection (1 to 10)</p> <p>K.N.2 Count out (produce) a collection of a specified size 1 to 10</p> <p>K.N.5 Verbally count backwards from 10</p> <p>K.N.6 Represent collections with a finger pattern up to 10</p> <p>K.N.9 Write numbers 1-10 to represent a collection</p> <p>K.N.11 Use and understand verbal ordinal terms, first to tenth</p> <p style="text-align: center;"><i>Operations</i></p> <p>K.N.12 Solve and create addition and subtraction verbal word problems (use counting-based strategies, such as counting on and to ten)</p> <p>K.N.13 Determine sums and differences by various means</p>	<p><i>Number Systems</i></p> <p>K.N.7 Draw pictures or other informal symbols to represent a spoken number up to 20</p> <p>K.N.8 Draw pictures or other informal symbols to represent how many in a collection up to 10</p>
Algebra Strand	<p><i>Patterns, Relations, and Functions</i></p> <p>K.A.1 Use a variety of manipulatives to create patterns using attributes of color, size, or shape</p>	<p><i>Patterns, Relations, and Functions</i></p> <p>K.A.2 Recognize, describe, extend, and create patterns that repeat (e.g., ABABAB or ABAABAAAB)</p>		

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Geometry Strand	<p style="text-align: center;"><i>Geometric Relationships</i></p> <p>K.G.2 Sort groups of objects by size and size order (increasing and decreasing)</p>	<p style="text-align: center;"><i>Transformational Geometry</i></p> <p>K.G.4 Manipulate two- and three-dimensional shapes to explore symmetry</p>	<p style="text-align: center;"><i>Shapes</i></p> <p>K.G.1 Describe characteristics and relationships of geometric objects</p> <p style="text-align: center;"><i>Coordinate Geometry</i></p> <p>K.G.5 Understand and use ideas such as over, under, above, below, on, beside, next to, and between</p>	<p style="text-align: center;"><i>Transformational Geometry</i></p> <p>K.G.3 Explore vertical and horizontal orientation of objects</p>
Measurement Strand			<p style="text-align: center;"><i>Units of Measurement</i></p> <p>K.M.1 Name, discuss, and compare attributes of length (longer than, shorter than)</p> <p>K.M.2 Compare length of two objects by representing each length with string or a paper strip</p>	<p style="text-align: center;"><i>Units of Measurement</i></p> <p>K.M.3 Relate specific times such as morning, noon, afternoon, and evening to activities and absence or presence of daylight</p>

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Statistics and Probability Strand	<p><i>Organization and Display of Data</i> K.S.3 Sort and organize objects by two attributes (e.g., color, size, or shape)</p>	<p><i>Organization and Display of Data</i> K.S.2 Help to make simple pictographs for quantities up to 10, where one picture represents 1 K.S.4 Represent data using manipulatives</p>	<p><i>Collection of Data</i> K.S.1 Gather data in response to questions posed by the teacher and students</p> <p><i>Organization and Display of Data</i> K.S.5 Identify more, less, and same amounts from pictographs or concrete models</p>	
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