



Kindergarten Mathematics Curriculum Guide

King George County Schools

2011

<p>Standard</p>	<p>MATH K.1 The student, given two sets, each containing 10 or fewer concrete objects, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.</p> <p>Timeframe: 7 days</p>			<p>Essential Understandings</p> <p>All students should</p> <p>Understand how quantities relate to each other, which leads to an understanding of how numbers are related to each other.</p>
<p>Strand</p>	<p>Number and Number Sense</p>			<p>Teacher Notes</p>
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Match each member of one set with each member of another set, using the concept of one-to-one correspondence to compare the number of members between sets, where each set contains 10 or fewer objects.</p> <p>b. Compare and describe two sets of 10 or fewer objects, using the terms <i>more</i>, <i>fewer</i>, and <i>the same</i>.</p> <p>c. Given a set of objects, construct a second set which has more, fewer or the same number of objects.</p>			<ul style="list-style-type: none"> • A set is a collection of distinct elements or items. • A one-to-one correspondence exists when two sets have an equal number of items. • Strategies for developing the concept of one-to-one matching involve set comparisons without counting. Hands-on experiences in matching items between two sets by moving, touching, and aligning objects, using one-to-one correspondence, enable visual as well as kinesthetic comparisons of the number of items in the two sets. • Students can also count to make comparisons between two sets without matching the sets, using one-to-one correspondence.
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	<ul style="list-style-type: none"> • Students are generally familiar with the concept of <i>more</i>, but have had little experience with the term <i>less</i>. It is important to use the terms together to build an understanding of their relationship. For example, when asking which group has more, follow with which group has less and vice versa
<p>Envision Textbook: Topic 6</p> <ul style="list-style-type: none"> • Lessons 1-5 • http://ttaconline.org/ • Kindergarten Lessons: • Counting Stations pp. 9-11 • Counting 10 Black Dots pp. 12 				

Essential New Vocabulary

- set
- more
- fewer
- same
- equal
- one-to-one correspondence

<p>Standard</p>	<p>MATH K.2</p> <p>The student, given a set containing 15 or fewer concrete objects, will</p> <p>a) tell how many are in the set by counting the number of objects orally;</p> <p>b) write the numeral to tell how many are in the set; and</p> <p>c) select the corresponding numeral from a given set of numerals.</p> <p>Timeframe: 9 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> • Read and write numerals from 0 through 15. • Understand that the total number of objects can be found by counting. • Understand that the last counted number describes the total amount in the set. • Understand that if the set is empty, it has 0 elements. • Understand that changing the spatial arrangement of a set of objects does not change the total amount of the set.
<p>Strand</p>	<p>Number and Number Sense</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Count orally the number of objects in a set containing 15 or fewer concrete objects, using one-to-one correspondence, and identify the corresponding numeral.</p> <p>b. Identify written numerals from 0 through 15 represented in random order.</p> <p>c. Select the numeral from a given set of numerals that corresponds to a set of 15 or fewer concrete objects.</p> <p>d. Write the numerals from 0 through 15.</p> <p>e. Write a numeral that corresponds to a set of 15 or fewer concrete objects.</p> <p>f. Construct a set of objects that corresponds to a given numeral, including an empty set.</p>			<p>Teacher Notes</p> <ul style="list-style-type: none"> • Counting involves two separate skills: verbalizing the list of standard number words in order (“one, two, three, ...”) and connecting this sequence with the objects in the set being counted, using one-to-one correspondence. Association of number words with collections of objects is achieved by moving, touching, or pointing to objects as the number words are spoken. Objects may be presented in random order or arranged for easy counting. • Kinesthetic involvement (e.g., tracing the numbers, using tactile materials, such as sand, sandpaper, carpeting, or finger paint) facilitates the writing of numerals. • Articulating the characteristics of each numeral when writing numbers has been found to reduce the amount of time it takes to learn to write numerals. • Zero (0) is both a number and a digit. As a number, it plays a central role in mathematics as the additive identity of the integers, real numbers, and many other algebraic
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook</p> <p>Topic 4</p> <ul style="list-style-type: none"> • Lessons 1-10 <p>Topic 5</p> <ul style="list-style-type: none"> • Lessons 1-11 			

	<p>Topic 12</p> <ul style="list-style-type: none"> • Lessons 1-2 <p>http://ttaonline.org/ Kindergarten Lessons:</p> <p>*Counting Stations pp. 9-11</p> <p>*Counting 10 Black Dots pp. 12-14</p> <p>*Musical Counting pp. 19-21</p> <p><i>*Adapt to numerals to 15</i></p>			<p>structures. As a digit, zero is used as a placeholder in systems.</p> <ul style="list-style-type: none"> • <i>Conservation of number</i> and <i>cardinality principle</i> are two important milestones in development to attaching meaning to counting. • The cardinality principle refers to the concept that the last counted number describes the total amount of the counted set. It is an extension of one-to-one correspondence. • Conservation of number is the understanding that the number of objects remains the same when they are rearranged spatially.
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Essential New Vocabulary

- zero
- one
- two
- three
- four
- five
- six
- seven
- eight
- nine
- ten
- eleven
- twelve
- thirteen
- fourteen
- fifteen

<p>Standard</p>	<p>MATH K.3</p> <p>The student, given an ordered set of ten objects and/or pictures, will indicate the ordinal position of each object, first through tenth, and the ordered position of each object.</p> <p>Timeframe: 3 days</p>			<p>Essential Understandings</p> <p>All students should</p> <p>Use ordinal numbers to describe the position of objects in a sequence.</p> <p>Teacher Notes</p> <ul style="list-style-type: none"> Understanding the cardinal and ordinal meanings of numbers are necessary to quantify, measure, and identify the order of objects. An ordinal number is a number that names the place or position of an object in a sequence or set (e.g., first, third). <i>Ordered position, ordinal position, and ordinality</i> are terms that refer to the place or position of an object in a sequence or set. The ordinal position is determined by where one starts in an ordered set of objects or sequence of objects. The ordinal meaning of numbers is developed by identifying and verbalizing the place or position of objects in a set or sequence (e.g., the student's position in line when students are lined up alphabetically by first name). <p>Essential New Vocabulary</p> <ul style="list-style-type: none"> first through tenth left-to-right right-to-left top-to-bottom bottom-to-top
<p>Strand</p>	<p>Number and Number Sense</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Identify the ordinal positions first through tenth using ordered sets of ten concrete objects and/or pictures of such sets presented from:</p> <ul style="list-style-type: none"> left-to-right right-to-left top-to-bottom bottom-to-top 			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook</p> <ul style="list-style-type: none"> Lesson 2-3 & 2-5 <p>http://ttaonline.org/</p> <p>Kindergarten Lessons</p> <ul style="list-style-type: none"> Counting on the Bus pp. 6-8 Counting Stations pp. 9-11 1st grade Lesson: Counting in Line pp. 31-33 			

<p>Standard</p>	<p>MATH K.4</p> <p>The student will</p> <p>a) count forward to 100 and backward from 10.</p> <p>b) identify one more than a number and one less than a number.</p> <p>c) count by fives and tens to 100.</p> <p>Timeframe: 13 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> • Use the correct oral counting sequence in both forward and backward counting situations. • Understand that skip counting can be used to count a collection of objects. • Describe patterns in skip counting and use those patterns to predict the next number or numbers in the skip counting sequence. • Understand that numeric relationships include one more than, one less than, two more than, two less than, etc. • Understand benchmarks of five and ten <p>Teacher Notes</p> <ul style="list-style-type: none"> • Counting skills are essential components of the development of number ideas; however, they are only one of the indicators of the understanding of numbers. • Counting forward by rote advances the child’s development of sequencing. The natural numbers are 1, 2, 3, 4.... The whole numbers are 0, 1, 2, 3, 4.... Students should count the whole numbers 0, 1, 2, 3, 4,.... • Counting backward by rote lays the foundation for subtraction. Students should count backward beginning with 10, 9, 8,... through ...3, 2, 1, 0. • Counting forward and backward leads to the development of counting on and counting back. • The patterns developed as a result of skip counting are precursors for recognizing numeric patterns, functional
<p>Strand</p>	<p>Number and Number Sense</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Count forward from 0 to 100.</p> <p>b. Count backward from 10 to 0.</p> <p>c. Recognize the relationship of one more than and one less than a number using objects (i.e., five and one more is six; and one less than ten is nine).</p> <p>d. Group 100 or fewer objects together into sets of fives or tens and then count them by fives or by tens.</p> <p>e. Investigate and recognize the pattern of counting by fives to 100, using a variety of tools.</p> <p>f. Investigate and recognize the pattern of counting by tens to 100, using a variety of tools.</p>			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Textbook</p> <p>Topic 4</p> <ul style="list-style-type: none"> • Lessons 1, 4, 8, 9 			

	<p>Topic 5</p> <ul style="list-style-type: none"> • Lessons 1, 4, 7, 10 <p>Topic 12</p> <ul style="list-style-type: none"> • Lessons 1 & 2 <p>http://ttaonline.org/</p> <p>Kindergarten Lessons</p> <ul style="list-style-type: none"> • Calendar Math pp. 3-5 • Counting Stations pp. 9-11 <p>1st grade Lessons</p> <ul style="list-style-type: none"> • Counting the Days pp. 3-6 • Numbers to 100 pp. 27-30 			<p>relationships, and concepts underlying money, time telling, and multiplication. Powerful models for developing these concepts include, but are not limited to, counters, hundred chart, and calculators.</p> <ul style="list-style-type: none"> • Skip counting by fives lays the foundation for reading a clock effectively and telling time to the nearest five minutes, counting money, and developing the multiplication facts for five. • Skip counting by tens is a precursor for use of place value, addition, counting money, and multiplying by multiples of 10. • Calculators can be used to display the numeric patterns that result from skip counting. <p>Ongoing Calendar Activities</p>
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Essential New Vocabulary

- +0 to 100
- 10 to +0
- one more than
- one less than
- fives
- tens

Standard	MATH K.5 The student will identify the parts of a set and/or region that represent fractions for halves and *fourths. Timeframe: 5 days			Essential Understandings All students should <ul style="list-style-type: none"> Understand that fractional parts are equal shares of a whole region or a whole set. Understand that the fraction name (<i>half, fourth</i>) tells the number of equal parts in the whole. Understand that the fraction name (<i>half, fourth</i>) of the set model is a subset of the whole set with equal numbers. Teacher Notes <ul style="list-style-type: none"> A fraction is a way of representing part of a whole (as in a region/area model) or part of a group (as in a set model). In each fraction model, the parts must have the same area. The fractional parts of a set model are subsets of an equal number. For example, in a set of ten cubes, each half would be a subset of five cubes. Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions furthers this development (e.g., <i>fourths</i> means “four equal parts of a whole” or $\frac{1}{4}$ represents one of four parts of equal size when a pizza is shared among four students).
Strand	Number and Number Sense			
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to a. Recognize fractions as representing parts of equal size of a whole. *b. Given a region, identify half and/or a fourth of the region. *c. Given a set, identify half and/or a fourth of the set. <i>* Denotes needing to use supplemental material in addition to math series*</i>			
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	
	Envision Math Textbook Math 8-2 <ul style="list-style-type: none"> For teaching *fourths http://ttaconline.org/ 1st Grade Lessons: <ul style="list-style-type: none"> All Aboard the Fraction Train pp. 44-45 Apples Fractions pp. 41-43 Ben Franklin’s Kite pp. 38-39 			

Essential New Vocabulary

- fraction
- whole
- part
- equal parts
- half/halves
- **a fourth of.*

Standard	MATH K.6 The student will model adding and subtracting whole numbers, using up to 10 concrete objects. Timeframe: 19 days			Essential Understandings All students should <ul style="list-style-type: none"> • Understand that addition means putting things together and that subtraction is the inverse of addition and means to separate things out.
Strand	Computation & Estimation			Teacher Notes
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to a. Combine two sets with known quantities in each set, and count the combined set using up to 10 concrete objects, to determine the sum, where the sum is not greater than 10. b. Given a set of 10 or fewer concrete objects, remove, take away, or separate part of the set and determine the result.			<ul style="list-style-type: none"> • Whole numbers are 0, 1, 2, 3, 4, 5, 6, and so on. • Addition is the process of combining or joining sets. • Subtraction can be viewed as a taking away or separating process or as comparing to find the difference between two sets. • Counting on from the larger set to determine the sum of the combined sets is a strategy for finding a sum. • Counting backward from the larger set to determine the difference between two sets is a strategy for subtraction.
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	<ul style="list-style-type: none"> • Number relationships, including the following, help students develop strategies for adding and subtracting. <ul style="list-style-type: none"> – Instant recognition of the amount in a set of objects that are arranged in a familiar pattern such as the dots on number cubes – One more than, one less than, two more than, two less than
	Envision Math Textbook Math Topic 10 <ul style="list-style-type: none"> • Lessons: 1-7 <u>http://ttaonline.org/</u> Kindergarten Lesson <ul style="list-style-type: none"> • Math Stories pp.15-18 			

Essential New Vocabulary

- whole numbers
- addition
- subtraction
- take away (taking away)
- separate (separating)
- difference
- counting
- sum

<p>Standard</p>	<p>MATH K.7</p> <p>The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.</p> <p>Timeframe: 6 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> • Develop common referents for identifying pennies, nickels, dimes, and quarters. • Understand the value of a collection of coins whose value is 10 cents or less.
<p>Strand</p>	<p>Measurement</p>			<p>Teacher Notes</p>
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Describe the properties/characteristics (e.g., color, relative size) of a penny, nickel, dime, and quarter.</p> <p>b. Identify a penny, nickel, dime, and quarter.</p> <p>c. Identify that a nickel is the same value as five pennies.</p> <p>d. Count a randomly placed collection of pennies and/or nickels (or models of pennies and/or nickels) whose value is 10 cents or less, and determine the value of the collection.</p>			<ul style="list-style-type: none"> • Involvement in varied activities such as physically manipulating coins and making comparisons about their sizes, colors, and values is prerequisite to the skills of coin recognition and valuation. • Counting money helps students gain an awareness of consumer skills and the use of money in everyday life. • A variety of classroom experiences in which students manipulate physical models of money and count forward to determine the value of a collection of coins are important activities to ensure competence with using money.
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	<ul style="list-style-type: none"> • Students need experiences to develop the concept that a nickel has a value of five cents even though it is one object. <p>Ongoing Daily Calendar Activities</p>
<p>Envision Math Textbook Math Topic 13</p> <ul style="list-style-type: none"> • Lessons 1-6 <p>http://ttaconline.org/Kindergarten Lesson</p> <ul style="list-style-type: none"> • Money Math pp. 24-26 				

Essential New Vocabulary

- money
- penny
- nickel
- dime
- quarter
- 10 cents
- cent
- cent sign

<p>Standard</p>	<p>MATH K.8</p> <p>The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).</p> <p>Timeframe: 10 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> Identify an appropriate measuring tool for a given unit of measure. <p>Teacher Notes</p> <ul style="list-style-type: none"> Many experiences in measuring physical objects, using nonstandard and standard units of measure, help to develop an intuitive understanding of measurement and will help students connect a tool with its purpose in measuring. Selecting from among various measuring instruments and determining which can be used to solve various real-life problems are introduced at this level. A precursor to connecting tools to a type of measurement is an introduction to the concepts of length, weight, time, and temperature.
<p>Strand</p>	<p>Measurement</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Identify a ruler as an instrument to measure length.</p> <p>b. Identify different types of scales as instruments to measure weight.</p> <p>c. Identify different types of clocks (analog and digital) as instruments to measure time.</p> <p>d. Identify the components of a calendar, including days, months, and seasons.</p> <p>e. Identify different types of thermometers as instruments used to measure temperature.</p>			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook Math Topics: 9,14,15 Lessons:</p> <ul style="list-style-type: none"> 9-1-9-4 9-6-9-9 14-1-14-6 15-1-15-6 			

	http://ttaonline.org/ Kindergarten Lessons <ul style="list-style-type: none"> • Calendar Math pp. 3-5 • How Long Is It? pp. 27-29 • How Heavy Is It? pp. 30-32 • Hot or Cold? pp. 33-34 • How Tall Are You? pp. 35-37 • What Time Is It? pp. 38-40 			
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Essential New Vocabulary

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| <ul style="list-style-type: none"> • ruler • length • weight (scale) • time (clock) • analog and digital • hour • calendar (day, month, and seasons) • temperature (thermometer) | <ul style="list-style-type: none"> • hot (hotter) • cold (colder) • length (shorter and longer) • height (taller and shorter) • weight (heavier and lighter) • hotness • coldness |
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Standard	MATH K.9 The student will tell time to the hour, using analog and <i>*digital clocks</i>. Timeframe: 5 days <i>*Denotes needing to use supplemental material in addition to math series*</i>			Essential Understandings All students should <ul style="list-style-type: none"> Apply an appropriate technique, depending on the type of clock, to determine time to the nearest hour.
Strand	Measurement			Teacher Notes
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to a. Tell time on an analog clock to the hour. b. Tell time on a digital clock to the hour.			<ul style="list-style-type: none"> Many experiences in relating time on the hour to daily routines and school schedules (e.g., catching the bus, lunch time, recess time, and resource time) help students develop personal referents for time. Making sense of telling time to the nearest hour is reinforced when students recognize the positions of the hands on an analog clock and identify the corresponding time to the hour.
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	Essential New Vocabulary <ul style="list-style-type: none"> time (clock) analog and digital hour
	Envision Math Textbook Math Topic 14 <ul style="list-style-type: none"> Lessons 1-7 http://ttaonline.org/ Kindergarten Lesson <ul style="list-style-type: none"> What Time Is It? pp. 38-40 The Grouch Ladybug book Judy Clocks Paperplate Clock Making 			

<p>Standard</p>	<p>MATH K.10</p> <p>The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, and block.</p> <p>Timeframe: 7 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> • Compare and order objects according to their attributes. • Develop an understanding of measuring with nonstandard and standard units of measure. • Recognize attributes (length, height, weight, temperature) that can be measured.
<p>Strand</p>	<p>Measurement</p>			<p>Teacher Notes</p>
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Compare and describe lengths of two objects (as shorter or longer), using direct comparison or nonstandard units of measure (e.g., foot length, hand span, new pencil, paper clip, block).</p> <p>b. Compare and describe heights of two objects (as taller or shorter), using direct comparison or nonstandard units of measure (e.g., book, hand span, new pencil, paper clip, block).</p> <p>c. Compare and describe weights of two objects (as heavier or lighter), using direct comparison or nonstandard units of measure (e.g., book, cubes, new pencil, paper clip, block).</p> <p>d. Compare and describe temperatures of two objects or environment (as hotter or colder), using direct comparison.</p>			<ul style="list-style-type: none"> • Length is the distance between two points. • Height is the vertical length of a perpendicular to its base. • Weight is a measure of the heaviness of an object. • Temperature is the degree of hotness or coldness of an object (e.g., a body) or environment. • Students need to identify the attribute that they are measuring (e.g., length, height, weight, temperature) before they begin to measure. • Multiple hands-on experiences are needed to gain the ability to compare the attributes of objects.
<p>Resources</p>	<p>Resource Materials</p> <p>Envision Math Textbook Math Topic 9</p> <ul style="list-style-type: none"> • Lessons 1-3, 5, 6, 8 	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	

	<p>Math Topic 15</p> <ul style="list-style-type: none"> • Lessons 6 & 7 <p>http://ttaonline.org/</p> <p>Kindergarten Lesson</p> <ul style="list-style-type: none"> • Calendar Math pp. 3-5 • How Long Is It? pp. 27-29 • How Heavy Is It? pp. 30-32 • Hot or Cold? pp. 33-34 • How Tall Are You? pp. 35-37 • What Time Is It? pp. 38-40 			
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Essential New Vocabulary

- ruler
- length
- weight (scale)
- temperature (thermometer)
- hot (hotter)
- cold (colder)
- length (shorter and longer)
- height (taller and shorter)
- weight (heavier and lighter)
- hotness
- coldness

<p>Standard</p>	<p>MATH K.11</p> <p>The student will</p> <p>a) identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle); and</p> <p>b) compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).</p> <p>Timeframe: 3 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> Use their knowledge of plane figures to help them systematically represent and describe their world. Identify the characteristics of plane geometric figures (circle, triangle, square, and rectangle). Compare the size and shape of plane geometric figures by using strategies to sort and/or group and begin to refine the vocabulary used to explain their strategies. <p>Teacher Notes</p> <ul style="list-style-type: none"> An important part of the geometry strand in grades K through 2 is the naming and describing of figures. Children move from their own vocabulary and begin to incorporate conventional terminology as the teacher uses geometric terms. A plane geometric figure is any plane, closed figure. Circles and polygons are examples of plane geometric figures. Presentation of triangles, rectangles, and squares should be made in a variety of spatial orientations so that students do not develop the common misconception that triangles, rectangles, and squares must have one side parallel to the bottom of the page on which they are printed. The van Hiele theory of geometric understanding describes how students learn geometry and provides a framework for structuring student experiences that should lead to conceptual growth and understanding.
<p>Strand</p>	<p>Geometry</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Identify a circle, triangle, square, and rectangle.</p> <p>b. Describe the characteristics of triangles, squares, and rectangles, including number of sides and number of angles.</p> <p>c. Describe a circle using terms such as round and curved.</p> <p>d. Trace a circle, triangle, square, and rectangle.</p> <p>e. Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their relative sizes (larger, smaller).</p> <p>f. Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their shapes.</p> <p>g. Distinguish between examples and nonexamples of identified geometric figures (circle, triangle, square, and rectangle).</p>			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook Math Topic 7</p> <ul style="list-style-type: none"> Lessons 1, 2, 4, 7-9 			

<http://ttaonline.org/>

Kindergarten Lessons

- Geometric Figures in Our Classroom pp. 42-45
- Geometric Games pp. 46-47
- Geometric Snacks pp. 48-50

Essential New Vocabulary

- circle
- triangle
- square
- rectangle
- size (larger and smaller)
- plane geometric figures (circle, triangle, square, and rectangle)
- figure (figures)
- closed
- side (sides)
- corner (corners)
- angle (angles)
- round
- curved

- **Level 0: Pre-recognition.** Geometric figures are not recognized. For example, students cannot differentiate between three-sided and four-sided polygons.
- **Level 1: Visualization.** Geometric figures are recognized as entities, without any awareness of parts of figures or relationships between components of a figure. Students should recognize and name figures and distinguish a given figure from others that look somewhat the same (e.g., “I know it’s a rectangle because it looks like a door, and I know that a door is a rectangle.”)
- **Level 2: Analysis.** Properties are perceived, but are isolated and unrelated. Students should recognize and name properties of geometric figures (e.g., “I know it’s a rectangle because it is closed; it has four sides and four right angles.”).

- A polygon is a geometric figure that
 - has sides that are line segments;
 - is simple (its sides do not cross);
 - is closed; and
 - is two-dimensional (lies in a plane).
- A triangle is a polygon with three angles and three sides. Children should be shown different types of triangles such as equilateral, isosceles, scalene, right, acute, and obtuse; however, they are not expected to name the various types.
- A quadrilateral is a polygon with four sides.
- A rectangle is a quadrilateral with four right angles.
- A square is a rectangle with all four sides of equal length.
- A circle is a closed curve with all points in one plane and the same distance from a fixed point (the center).

	<ul style="list-style-type: none">• polygon• line segment• closed• a triangle is• quadrilateral• equal length• the center	<ul style="list-style-type: none">• Early experiences with comparing and sorting figures assist students in analyzing the characteristics of plane geometric figures.• Attribute blocks, relational attribute blocks, and tangrams are among the manipulatives that are particularly appropriate for sorting and comparing size.• Clay, straws, and paper and scissors are several manipulatives that are appropriate for constructing geometric figures.
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<p>Standard</p>	<p>MATH K.12</p> <p>The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their positions and orientations in space.</p> <p>Timeframe: 7 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ul style="list-style-type: none"> Understand that objects can have different orientations in space. <p>Teacher Notes</p> <ul style="list-style-type: none"> Representations of circles, squares, rectangles, and triangles can be found in the students' environment at school and at home. Students should have opportunities to identify/classify things in their environment by the type of figures those things represent. Children are often confused when a figure such as a square is rotated: they frequently refer to the rotated square as a diamond. Clarification needs to be ongoing — i.e., a square is a square regardless of its location in space; there is no such geometric figure as a diamond.
<p>Strand</p>	<p>Geometry</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <p>a. Identify pictorial representations of a circle, triangle, square, and rectangle, regardless of their position and orientation in space.</p> <p>b. Describe the location of one object relative to another, using the terms <i>above</i>, <i>below</i>, and <i>next to</i>.</p>			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook Math Topic 2</p> <ul style="list-style-type: none"> Lesson 1-6 <p>Math Topic 7</p> <ul style="list-style-type: none"> Lesson 1-2 <p><u>http://ttaonline.org/</u> Kindergarten Lesson</p> <ul style="list-style-type: none"> Sorting pp. 1-3 			

	<ul style="list-style-type: none">• Geometric Figures in Our Classroom pp. 42-45• Geometric Games pp. 46-47• Geometric Snacks pp. 48-50			
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Essential New Vocabulary

- circle
- triangle
- square
- rectangle
- plane geometric figures (circle, triangle, square, and rectangle)
- the center
- above
- below
- next to

Standard	MATH K.13 The student will gather data by counting and tallying. Timeframe: 2 days			Essential Understandings All students should <ol style="list-style-type: none"> Pose questions and gather data. Understand how data are collected and presented in an organized manner by counting and tallying. Teacher Notes <ol style="list-style-type: none"> Data are pieces of information collected about people or things. The primary purpose of collecting data is to answer questions. Tallying is a method for gathering information. Tally marks are used to show how often something happens or occurs. Each tally mark represents one occurrence. Tally marks are clustered into groups of five, with four vertical marks representing the first four occurrences and the fifth mark crossing the first four on a diagonal to represent the fifth occurrence. When data are presented in an organized manner, students can describe the results of their investigation (i.e., identifying parts of the data that have special characteristics, including categories with the greatest, the least, or the same number of responses). In the process of gathering data, students make decisions about what is relevant to their investigation (e.g., when collecting data on their classmates' favorite pets, deciding to limit the categories to common pets). When students begin to collect data, they recognize the need to categorize, which helps develop the understanding of "things that go together." Categorical data are used when constructing picture graphs and bar graphs.
Strand	Probability And Statistics			
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to <ol style="list-style-type: none"> Use counting and tallying to gather data on categories identified by the teacher and/or student (e.g., favorites, number of days of various types of weather during a given month, types of pets, types of shoes). 			
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	
	Envision Math Textbook Topic 16 <ul style="list-style-type: none"> Lesson 2 http://ttaonline.org/KindergartenLessons <ul style="list-style-type: none"> Organizing Topic (Probability) p. 51 What Are The Chances? pp. 52-56 Organizing Topic (Statistics) 			

	<p>p. 57</p> <ul style="list-style-type: none">• Using Tally Marks pp. 58-62• My Favorite Things pp. 63-66			Ongoing Daily Calendar Activities
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Essential New Vocabulary

- data
- counting
- tallying

<p>Standard</p>	<p>MATH K.14</p> <p>The student will display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data.</p> <p>Timeframe: 7 days</p>			<p>Essential Understandings</p> <p>All students should</p> <ol style="list-style-type: none"> Understand that data can be represented using concrete objects, pictures, and graphs. Understand that different types of representations emphasize different things about the same data. Understand that picture graphs use pictures to show and compare information; object graphs use concrete materials to represent categorical data; and tables can be used to show an orderly arrangement of data in columns and rows. Answer questions related to the gathered data from object graphs, picture graphs, and tables. Relate their ideas about the data to concepts such as part-part-whole and number relationships. <p>Teacher Notes</p> <ol style="list-style-type: none"> At a glance, using concrete objects, pictures, and numbers to give a "picture Object graphs are graphs that use concrete materials to represent the categorical data that are collected (e.g., cubes stacked by the month, with one cube representing the birthday month of each student). Picture graphs are graphs that use pictures to show and compare information. Tables are an orderly arrangement of data in which the data are arranged in columns and rows in an essentially rectangular format. Tables may be used to display some type of numerical relationship or organized lists (e.g., input/output functions, tables showing one candy costs five cents and two candies
<p>Strand</p>	<p>Probability And Statistics</p>			
<p>Essential Knowledge and Skills</p>	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ol style="list-style-type: none"> Display data by arranging concrete objects into organized groups to form a simple object graph. Display gathered data, using pictures to form a simple picture graph (e.g., a picture graph of the types of shoes worn by students on a given day). Display gathered data in tables, either in rows or columns. Answer questions related to the gathered data displayed in object graphs, picture graphs, and tables by: <ul style="list-style-type: none"> describing the categories of data and the data as a whole (e.g., the total number of responses) and its parts. identifying parts of the data that represent numerical relationships, including categories with the greatest, the least, or the same. 			
<p>Resources</p>	<p>Resource Materials</p>	<p>Released Test Items</p>	<p>Individual Teacher Notes</p>	
	<p>Envision Math Textbook Topic 16</p> <ul style="list-style-type: none"> Lessons 3, 4, 5, 7, <p>Topic 5</p> <ul style="list-style-type: none"> Lesson 11 			

	<p>http://ttaonline.org/ Kindergarten Lessons</p> <ul style="list-style-type: none"> • Organizing Topic (Probability) p. 51 • What Are The Chances? pp. 52-56 • Organizing Topic (Statistics) p. 57 • Using Tally Marks pp. 58-62 • My Favorite Things pp. 63-66 			<p>cost 10 cents).</p> <ul style="list-style-type: none"> d. Students represent data to convey results of their investigations” of the organized data. e. When data are displayed in an organized manner, children can describe the results of their investigations. f. Graphs can be used to make connections between mathematics and social studies and/or science (e.g., job areas and the different people that work in these areas: health — doctors and nurses; education — teachers and principals). g. Statements representing an analysis and interpretation of the characteristics of the data in the graph (e.g., similarities and differences, least and greatest, the categories, and total number of responses) should be asked.
				<p>Ongoing Daily Calendar Activities</p>

Essential New Vocabulary

- data
- counting
- greatest
- tables
- least
- picture graphs
- the same
- object graphs

Standard	MATH K.15 The student will sort and classify objects according to attributes. Timeframe: 5 days			Essential Understandings All students should Understand that the same set of objects can be sorted and classified in different ways.
Strand	Patterns, Functions And Algebra			Teacher Notes
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to <ol style="list-style-type: none"> Sort objects into appropriate groups (categories) based on one attribute. Classify sets of objects into groups (categories) of one attribute. Label attributes of a set of objects that has been sorted. Name multiple ways to sort a set of objects. 			<ol style="list-style-type: none"> To classify is to arrange or organize a set of materials according to a category or attribute (a quality or characteristic). An object has many attributes such as color, size, shape, thickness, etc. General similarities and differences among objects are easily observed by children entering kindergarten, who are able to focus on any one attribute. The teacher’s task is to move students toward a more sophisticated understanding of classification in which two or more attributes connect or differentiate sets, such as those found in nature (e.g., leaves with different colors and different figures).
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	Essential New Vocabulary <ul style="list-style-type: none"> classify attributes sort categories
	Envision Math Textbook Topic 1 <ul style="list-style-type: none"> Lessons 1-5 <u>http://ttaonline.org/</u> Kindergarten Lessons <ul style="list-style-type: none"> My Favorite Things pp. 63-66 The Button Box pp. 68-70 			

Standard	MATH K.16 The student will identify, describe, and extend repeating patterns. Timeframe: 8 days			Essential Understandings All students should <ul style="list-style-type: none"> Understand that patterns are a way to recognize order and organize their world and to predict what comes next in an arrangement. Understand that the sound pattern 'snap, clap, snap, clap' is the same in form as the color pattern 'red, blue, red, blue'.
Strand	Patterns, Functions And Algebra			
Essential Knowledge and Skills	The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to <ol style="list-style-type: none"> Observe and identify the basic repeating pattern (core)_found in repeating patterns of common objects, sounds, and movements that occur in practical situations. Identify the core in a repeating pattern. Extend a repeating pattern by adding at least two repetitions to the pattern. Create a repeating pattern. Compare similarities and differences between patterns. 			
Resources	Resource Materials	Released Test Items	Individual Teacher Notes	Teacher Notes <ol style="list-style-type: none"> Pattern recognition is a fundamental cornerstone of mathematics, particularly algebra. In a repeating pattern, the core of the pattern is the string of elements that repeats. By identifying the core, students demonstrate their understanding of the pattern. Students should recognize that the sound pattern 'snap, clap, snap, clap' is the same in form as the color pattern 'red, blue, red, blue'. Pattern recognition and the extension of the pattern allow students to make predictions. The simplest types of patterns are repeating patterns. The patterns can be oral, such as the refrain in "Old MacDonald's Farm" ("e-i-e-i-o"), or physical with clapping and snapping patterns, or combinations of both, such as is found in songs like the "Hokey Pokey." In each case, students need to identify the basic unit of the pattern and repeat it. Opportunities to create, recognize, describe, and extend repeating patterns are essential to the primary school experience.
	Envision Math Textbook Topic 3 <ul style="list-style-type: none"> Lesson 1-7 http://ttaonline.org/KindergartenLessons <ul style="list-style-type: none"> Calendar Math pp. 3-5 			

	<ul style="list-style-type: none"> • My Favorite Things pp. 63-66 • The Button Box pp. 68-70 • Repeating Patterns pp. 71-73 • Daily Calendar Activities 			<p>f. Sample repeating patterns (repeating the core) are</p> <ul style="list-style-type: none"> • ABABABAB • ABCABC • AABBAABBAABB • AABAAB • AABCAABC • ABACABAC <p>Ongoing Daily Calendar Activities</p>
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Essential New Vocabulary

- pattern
- core
- repeating pattern

Additional Math Online Resources

[New York State Released Tests](#) (pdf format)

[VA DOE Training/Technical Assistance](#) (SOL related searches, King George is region 3)

[Making Connections to Content: Essential Vocabulary](#) (Dan Mulligan)

[Illuminations](#) (excellent lesson plans, interactive tools, NCTM standards)

[National Library of Virtual Manipulatives](#)

[Mathematics Activity Types](#) (technology integration with math, The College of William & Mary)

[Open Ended Assessment in Math](#)

[APEC Math Assessment Database](#)

[Math Dictionary for Kids](#)

[SOL Released Tests in Various Formats](#)

[Technology Tools for the 21st Century Classroom](#) (KGES portaportal, math tools)