

Richmond Public Schools
Department of Curriculum and Instruction
Curriculum Pacing and Resource Guide



Course Title/ Course #: Grade K Mathematics

Start day: 1

Meetings: 180 days

Course Description

Prerequisite: Students must meet the requirements to enroll in this course.

This course focuses on kindergarten math concepts which include number sense, geometry, patterns, computation, measurement, and probability concepts. The vertical progression of skills is outlined on the K-3 Mathematics Achievement Record.

Pacing Resources Assessments MP1

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
8 days	K.15	Patterns Functions, Algebra: Sort/Classify	<p><i>K.15 The student will sort and classify objects according to attributes.</i></p> <p>Text <u>EnVision Math</u>: Lesson 1-1 thru 1-5 <u>EnVision Math</u>: Differentiated Center Activities 1-1 thru 1-5 <u>EnVision Math</u>: Reteaching Set A–D <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 1-1 thru 1-5 <u>Envision Math</u>: Problem of the Day – Lessons 1-1 thru 1-5</p> <p>Other Print Resources Sorting by Attributes – Activity Plan</p>	<p><u>EnVision Math</u>: Topic Test <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p>Virginia Department of Education The Button Box – Lesson Plan</p> <p>Other Sites Sorting and Classifying Objects - Interactive Skill Practice Shapes (sort by shape/color) - Interactive Skill Practice (needs Flash) Sorting Box - Interactive Skill Practice</p> <p>Manipulatives Attribute Blocks Counting and Sorting Set</p>	
8 days	K.16	Patterns Functions, Algebra: Patterns	<p><i>K.16 The student will identify, describe, and extend repeating patterns.</i></p> <p>Text <u>EnVision Math</u>: Lesson 3-1 thru 3-7 <u>EnVision Math</u>: Differentiated Center Activities 3-1 thru 3-7 <u>EnVision Math</u>: Reteaching Set A–B and Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 3-1 thru 3-7 <u>Envision Math</u>: Problem of the Day – Lessons 3-1 thru 3-7</p> <p>Other Print Resources Patterns - Activity Plan</p> <p>Virginia Department of Education Repeating Patterns – Lesson Plan</p> <p>Other Sites Pattern Maze (Starfall)- Interactive Skill Practice Fuzz Bug Patterns - Interactive Skill Practice</p>	<p><u>EnVision Math</u>: Topic Test <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p>Manipulatives Square Tiles Linking Cubes Pattern Blocks</p>	
13 days	<p>K.2 a,b,c (PParameter) 15 to 20 Objects 2016</p>	<p>Number Sense: Counting Objects</p>	<p><i>K.2 Given a set containing 15 (20) or fewer concrete objects, will</i> <i>a) tell how many are in the set by counting the number of objects orally;</i></p> <p>Text <u>EnVision Math</u>: Lesson 4-1, 4-3, 5-1, 5-4, 5-7, 12-1, 12-2, 12-3 and 12-4 <u>EnVision Math</u>: Differentiated Center Activities Lesson 4-1, 4-3, 5-1, 5-4, 5-7, 12-1, 12-2, 12-3 and 12-4 <u>EnVision Math</u>: Lesson 4 Reteaching Set A–B and Technology Going Digital, Lesson 5 Reteaching Set A–D and Lesson 12 Set A-B <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 4-1, 4-3, 5-1, 5-4, 5-7, 12-1, 12-2, 12-3 and 12-4 <u>Envision Math</u>: Problem of the Day – Lessons 4-1, 4-3, 5-1, 5-4, 5-7, 12-1, 12-2, 12-3 and 12-4</p> <p><i>b) write the numeral to tell how many are in the set;</i></p> <p>Text <u>EnVision Math</u>: Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4 <u>EnVision Math</u>: Differentiated Center Activities Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4 <u>EnVision Math</u>: Lesson 4 Reteaching Set A–B and Technology Going Digital, Lesson 5 Reteaching Set A–D and Lesson 12 Set A-B <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & <u>Enrichment Master Lessons</u>: Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4. <u>Envision Math</u>: Problem of the Day – Lessons 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4</p>	<p><u>EnVision Math</u>: Topic Test Lesson 4 Questions #1-3, 5; and Lesson 5 Questions # 1, 3, 5 <u>EnVision Math</u>: Alternate Assessments Lesson 4 Questions #1-5; Lesson 5 Questions #1-6 <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p><i>c) select the corresponding numeral from a given set of numerals.</i></p> <p>Text <u>EnVision Math</u> : Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4 <u>EnVision Math</u>: Differentiated Center Activities Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4 <u>EnVision Math</u>: Lesson 4 Reteaching Set A–B and Technology Going Digital, Lesson 5 Reteaching Set A–D and Lesson 12 Set A-B <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons: Lesson 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4. <u>Envision Math</u>: Problem of the Day – Lessons 4-2, 4-4, 5-3, 5-6, 5-9, 12-1 and 12-4</p> <p>Virginia Department of Education Counting Centers - Lesson Plan Number Boards; Garbage!; How Many?; Quick Images; Spill the Beans; AND Splash! - Lesson Plans (Modules)</p> <p>Other Sites Counting Objects - Interactive Skill Practice Count Us In - Interactive Skill Practice (requires adobe Flash)</p> <p>Manipulatives Square Tiles Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Foam 2- Color Counters</p>	
5 days/ ongoing	K.8 (Calendar)	Measurement: Calendar	<p><i>K.8 Identify the instruments used to measure time (calendar: day, month, and season).</i> <i>(2016- K.8) Investigate the passage of time by reading and</i></p>	<p><u>EnVision Math</u>: Topic Test Questions #1-4 <u>EnVision Math</u>: Alternate</p>

	K.8 (2016)		<p><i>interpreting a calendar.</i></p> <ul style="list-style-type: none"> ● <i>Name the twelve months in a year.</i> ● <i>Name the seven days in a week.</i> ● <i>Determine day before and after a given day (e.g. yesterday, today, tomorrow).</i> <p>Text Envision Math: <u>EnVision Math</u>: Lesson 15-1 thru 15-2, 15-5, VA-7 (Virginia Handbook T138), Lesson 15-1 thru 15-5 <u>EnVision Math</u>: Differentiated Center Activities Lesson 15-1 thru 15-2, 15-5, Lesson 15-1 thru 15-5 <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lesson 15-1 thru 15-2, Lesson 15-1 thru 15-5 <u>EnVision Math</u>: Problem of the Day – Lesson 15-2 thru 15-3, Lesson 15-2 thru 15-6</p> <p>Technology Calendar and Dates – Interactive Skill Practice</p> <p>Virginia Department of Education Calendar Math Instruments – Lesson Plan</p> <p>Other Sites Daily Kindergarten Calendar – Smartboard Lesson</p>	<p>Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>
5 days/ ongoing	<u>K. 4a,b</u> (2016)	Number Sense: Part-Whole Relationships	<p><i>(2016- K.4a,b)</i></p> <ul style="list-style-type: none"> <i>a) recognize and describe with fluency part-whole relationships for numbers up to 5 (in a variety of configurations); and</i> <i>b) investigate and describe part-whole relationships for numbers up to 10 (in a variety of configurations).</i> <p>Text</p>	

			<p>Envision Math: Topic 4 Math Background for Teachers Envision Math: Lesson 4-6</p> <p>Virginia Department of Education Quick Images -Lesson Plan (Modules) Pg. 18</p> <p>Other Sites Quick Images: Visualizing Number Combinations - Activity Plan Number Brackets to teach Number Sense -Activity Plan Subitizing: Instantly Recognizing Quantities- Introduction Subitize-Introduction Subitizing Video- Activity Video What is Subitizing?- Introduction Brilliant Beadstring- Online Tool Using Dot Cards to Build Number Sense- Activity Plan</p> <p>Manipulatives Square Tiles Base Ten magnetic kits/ foam base tens Ten Frames Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Foam 2-Color Counters</p>	
6 days	Portfolio Review	1 st Nine Weeks Objectives	<p>Text EnVision Math: Daily Spiral Review - Lessons 1-1 thru 1-5; 3-1 thru 3-5; 4-1 thru 4-5; 5-1, 5-3, 5-4, 5-6, 5-7, 5-9; 15-1 thru 15-5.</p>	

Pacing Resources Assessments MP2

Time Frame	Standards of	Units/ Topics/ Concepts	Resources	Assessments
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	Learning			
Ongoing	K.15 K.4a,b (2016) K.16 K.2 a,b,c K.8 K.8 (2016)	PFA: Sort/Classify NS: Part-Whole Relationships PFA: Patterns NS: Counting Objects Measurement: Calendar	See MP1	
10 days/ ongoing	K.1	Number Sense: One to one	<p><i>K.1 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.</i></p> <p>Text <u>EnVision Math</u> : Lesson 4-7, 6-1 thru 6-5, 16-1 <u>EnVision Math</u>: Differentiated Center Activities 4-7, 6-1 thru 6-5, 16-1 <u>EnVision Math</u>: Reteaching Set A–B and Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 4-7, 6-1 thru 6-5, 16-1 <u>Envision Math</u>: Problem of the Day – Lessons 6-2 thru 6-5</p> <p>Other Print Resources One to One - Activity Plans **One to One Correspondence - Activity Plan. Counting Cups - Activity Plan</p> <p>Technology Bunny Count – Interactive Skill Practice</p> <p>Virginia Department of Education Build & Compare– Lesson Plan (Modules) Pg. 2-3 How Many Snails?-Lesson Plan (Module) Pg. 4</p>	<u>EnVision Math</u> : Topic Test <u>EnVision Math</u> : Alternate Assessments <u>EnVision Math</u> : Performance Assessment <u>EnVision Math</u> : Quick Checks

			<p>Other Sites Count with Lecky – Interactive Skill Practice</p> <p>Manipulatives Square Tiles Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Foam 2-Color Counters</p>	
5 days/ ongoing	K.11 a,b & K.12	Geometry: Plane Figures	<p><i>K.11a Identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle);</i></p> <p>Text <u>EnVision Math</u>: Lesson 7-1, 7-2, 7-9, VA-2 (Virginia Handbook T133) <u>EnVision Math</u>: Differentiated Center Activities 7-1, 7-2, 7-9 <u>EnVision Math</u>: Reteaching Set B and Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 7-1, 7-2, 7-9 <u>Envision Math</u>: Problem of the Day – Lessons 7-2, 7-3, 7-5</p> <p>Virginia Department of Education Geometric Figures in Our Classroom - Lesson Plan</p> <p>Other Sites Shapes Shoot (Basic Shapes)- Interactive Skill Practice Matching Shapes - Interactive Skill Practice Identify Shapes 1 - Interactive Skill Practice</p> <p>Manipulatives Attribute Blocks</p> <p><i>K.11b Compare the size (larger, smaller) and shape of plane</i></p>	<p><u>EnVision Math</u>: Topic Test Question # 2, 5, 7 <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

geometric figures (circle, triangle, square, and rectangle.

Text

EnVision Math: Lesson 7-4, 7-9, VA-2 (Virginia Handbook T133)

EnVision Math: Differentiated Center Activities 7-4, 7-9

EnVision Math: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 7-4, 7-9

Virginia Department of Education

[Geometric Figures in Our Classroom](#) - Lesson Plan

Manipulatives

Attribute Blocks

Geometry:
Classification

K.12 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.

Text

EnVision Math : Lesson 2-1 thru 2-6, 7-1, 7-2

EnVision Math: Differentiated Center Activities 2-1 thru 2-6, 7-1, 7-2

EnVision Math: Reteaching Set A–D

EnVision Math: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 2-1 thru 2-6, 7-1, 7-2

Envision Math: Problem of the Day – Lessons 2-1 thru 2-6

Virginia Department of Education

[Geometric Games](#) – Lesson Plan

Other Sites

[Shapes Shoot \(Shapes in Rotation\)](#) - Interactive Skill Practice

Manipulatives

			Attribute Blocks	
8 days	K.5	Number Sense: Fractions	<p><i>K.5 Identify the parts of a set and/or region that represent fractions for halves and fourths.</i></p> <p>Text <u>EnVision Math</u>: Lesson 8-1 thru 8-3, VA-3 (Virginia Handbook T134), VA-4 (Virginia Handbook T135) <u>EnVision Math</u>: Differentiated Center Activities 8-1 thru 8-3 <u>EnVision Math</u>: Reteaching Set A–B <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 8-1 thru 8-3 <u>Envision Math</u>: Problem of the Day – Lessons 8-2, 8-4, and 8-5</p> <p>Virginia Department of Sharing Snacks - Lesson Plan Sharing - Lesson Plan (Modules) Pg. 34</p> <p>Other Sites Halves – Step-by-step Skill Review</p> <p>Manipulatives Square Tiles</p>	<p><u>EnVision Math</u>: Topic Test Questions #1 and 4 <u>EnVision Math</u>: Alternate Assessments Questions #1-3 <u>EnVision Math</u>: Quick Checks</p>
5 days	K.3	Number Sense: Ordinal Numbers	<p><i>K.3 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.</i></p> <p>Text <u>EnVision Math</u>: Lesson 8-4 thru 8-6 <u>EnVision Math</u>: Differentiated Center Activities 8-4 thru 8-6 <u>EnVision Math</u>: Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 8-4 thru 8-6 <u>EnVision Math</u>: Problem of the Day – Lesson 8-6</p>	<p><u>EnVision Math</u>: Topic Test Questions #2,3, and 5 <u>EnVision Math</u>: Alternate Assessments Questions #4-6 <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p>Other Print Resources Ordinal Numbers - Activity Plan</p> <p>Virginia Department of Education Counting on the Bus - Lesson Plan Paper Chains - Lesson Plan (Modules)</p> <p>Other Sites Ordinal Numbers - Interactive Skill Practice Ordinal Numbers - Interactive Skill Practice</p> <p>Manipulatives Square Tiles Fruit, Insect and Pet Counters Counting and Sorting Set Linking Cubes</p>	
5 days/ ongoing	K. 13	Probability and Statistics: Tally Marks	<p><i>K.13 Gather data by counting and tallying.</i></p> <p>Text <u>EnVision Math</u>: Lesson 16-2, 16-4, VA-8 (Virginia Handbook T139) <u>EnVision Math</u>: Differentiated Center Activities 16-2, 16-4 <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lesson 16-2, 16-4</p> <p>Other Print Resources Tallies Tell It All – Activity Plan Tally It Up - Activity Plan Who's Counting? Tally Marks - Activity Plan Daily Tally Chart – Activity Plan</p> <p>Technology Brain Pop, Jr. - Tally Charts - Interactive Skill Practice</p>	

			<p>Virginia Department of Education Using Tally Marks – Lesson Plan</p> <p>Manipulatives Square Tiles Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Foam 2-Color Counters</p>	
5 days	K.10	Measurement: Nonstandard	<p><i>K.10 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.</i></p> <p>Text <u>EnVision Math</u> : Lesson 9-1 thru 9-10, 15-6, 15-7 <u>EnVision Math</u>: Differentiated Center Activities 9-1 thru 9-10, 15-6, 15-7 <u>EnVision Math</u>: Reteaching Set A–C <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 9-1 thru 9-10, 15-6, 15-7 <u>EnVision Math</u>: Problem of the Day – Lessons 9-1 thru 9-10</p> <p>Virginia Department of Education How Long Is It? - Lesson Plan How Tall Are You? - Lesson Plan How Heavy Is It? - Lesson Plan Hot or Cold? - Lesson Plan</p> <p>Other Sites Crystal's Rule - Interactive Skill Practice</p>	<p><u>EnVision Math</u>: Topic Test <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			Manipulatives Linking Cubes Square Tiles	
6 days	Portfolio Review	2 nd Nine Weeks Objectives	Text <u>EnVision Math</u> : Daily Spiral Review - Lessons 2-1 thru 2-6; 6-1 thru 6-5; 7-1, 7-2, 7-4, 7-9; 8-1 thru 8-3; 8-4 thru 8-6; 9-1 thru 9-10	

Course Title/ Course #: Grade K Mathematics

Pacing Resources Assessments MP3

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
Ongoing	K.1 K.11 K.12 K.5 K.3 K.13 K.10	NS: One to One Geometry: Plane Figures Geometry: Classification NS: Fractions NS: Ordinal Numbers PS: Tally Marks Measurement:	See MP2	

		Nonstandard												
14 days	K.6 (P) Story and pic problems 2016	Computation: Addition	<p><i>K.6 Model adding whole numbers, using up to 10 concrete items. (2016-K.6) Model and solve single-step story and picture problems with sums to 10, using concrete items.</i></p> <ul style="list-style-type: none"> <i>Types of problems should include joining, separating, part-part-whole scenarios.</i> <table border="1" data-bbox="646 423 1539 959"> <tr> <td colspan="2" data-bbox="646 423 1539 513">Kindergarten: Common Addition and Subtraction Problem Types</td> </tr> <tr> <td data-bbox="646 513 940 613">Join (Result Unknown)</td> <td data-bbox="940 513 1539 613">Sue had 4 pennies. Josh gave her 2 more. How many pennies does Sue have altogether?</td> </tr> <tr> <td data-bbox="646 613 940 714">Separate (Result Unknown)</td> <td data-bbox="940 613 1539 714">Sue had 8 pennies. She gave 5 pennies to Josh. How many pennies does Sue have now?</td> </tr> <tr> <td data-bbox="646 714 940 815">Part-Part-Whole (Whole Unknown)</td> <td data-bbox="940 714 1539 815">Josh has 4 red balloons and 3 blue balloons. How many balloons does he have?</td> </tr> <tr> <td data-bbox="646 815 940 959">Part-Part-Whole (Both Parts Unknown)</td> <td data-bbox="940 815 1539 959">Josh has 5 balloons. Some of them are red and some of them are blue. How many balloons can be blue and how many can be red?</td> </tr> </table> <p>Text <u>EnVision Math</u>: Lesson 4-6, 10-1 thru 10-7, Lessons 4-6, 10-1 thru 10-3 (2016) <u>EnVision Math</u>: Differentiated Center Activities Lesson 4-6, 10-1 thru 10-7, Lessons 10-1 thru 10-3 (2016) <u>EnVision Math</u>: Reteaching Set A–B and Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lesson 4-6, 10-1 thru 10-7, Lessons 4-6, 10-1 thru 10-3 (2016) <u>EnVision Math</u>: Problem of the Day – Lessons 10-2 thru 10-7,</p>	Kindergarten: Common Addition and Subtraction Problem Types		Join (Result Unknown)	Sue had 4 pennies. Josh gave her 2 more. How many pennies does Sue have altogether?	Separate (Result Unknown)	Sue had 8 pennies. She gave 5 pennies to Josh. How many pennies does Sue have now?	Part-Part-Whole (Whole Unknown)	Josh has 4 red balloons and 3 blue balloons. How many balloons does he have?	Part-Part-Whole (Both Parts Unknown)	Josh has 5 balloons. Some of them are red and some of them are blue. How many balloons can be blue and how many can be red?	<u>EnVision Math</u> : Topic Test <u>EnVision Math</u> : Alternate Assessments <u>EnVision Math</u> : Performance Assessment <u>EnVision Math</u> : Quick Checks
Kindergarten: Common Addition and Subtraction Problem Types														
Join (Result Unknown)	Sue had 4 pennies. Josh gave her 2 more. How many pennies does Sue have altogether?													
Separate (Result Unknown)	Sue had 8 pennies. She gave 5 pennies to Josh. How many pennies does Sue have now?													
Part-Part-Whole (Whole Unknown)	Josh has 4 red balloons and 3 blue balloons. How many balloons does he have?													
Part-Part-Whole (Both Parts Unknown)	Josh has 5 balloons. Some of them are red and some of them are blue. How many balloons can be blue and how many can be red?													

Lessons 10-2 thru 10-4 (2016)

Other Print Resources

[Hopping on the Number Line](#) – Activity Plan

Technology

[Basic Adding - BrainPOP Jr.](#) - Interactive Skill Practice

Virginia Department of Education

[Math Stories](#) - Lesson Plan

Other Sites

K.6 (2016) [Molly Adds Up to 10](#) - Interactive Skill Practice

[Learn to Add](#) (games 1&2 only) - Interactive Skill Practice

Manipulatives

Square Tiles

Insect, Fruit and Pet Counters

Counting and Sorting Set

Linking Cubes

Foam 2- Color Counters

14 days

[K.6](#)

(P)
Story and
pic
problems
2016

Computation:
Subtraction

*K.6 Model subtracting whole numbers, using up to 10 concrete items.
(2016-K.6) Model and solve single-step story and picture problems
with differences to 10, using concrete items.*

- *Types of problems should include joining, separating and part-part-whole scenarios.*

Kindergarten: Common Addition and Subtraction Problem Types

Join
(Results Unknown)

Sue had 4 pennies. Josh gave her 2 more. How many pennies does Sue have altogether?

Separate

Sue had 8 pennies. She gave 5 pennies to Josh.

EnVision Math: Topic Test

EnVision Math: Alternate Assessments

EnVision Math: Performance Assessment

EnVision Math: Quick Checks

(Results Unknown)	How many pennies does Sue have now?
Part-Part-Whole (Whole Unknown)	Josh has 4 red balloons and 3 blue balloons. How many balloons does he have?
Part-Part Whole (Both Parts Unknown)	Josh has 5 balloons. Some of them are red and some of them are blue. How many balloons can be blue and how many can be red?

Text

EnVision Math: Lesson 11-1 thru 11-7, **Lessons 11-1 thru 11-3 (2016)**
EnVision Math: Differentiated Center Activities Lesson 11-1 thru 11-7, **Lesson 11-1 thru 11-3 (2016)**
EnVision Math: Reteaching Set A–D (2016)
EnVision Math: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons Lesson 11-1 thru 11-7, **Lesson 11-1 thru 11-3 (2016)**
EnVision Math: Problem of the Day – Lesson 11-1 thru 11-7, **Lesson 11-1 thru 11-3 (2016)**

Other Print Resources

K.6 (2016) [Subtracting Monkeys- Lesson Plan](#)
[Hopping Backwards on the Number Line](#) – Lesson Plan

Technology

[Basic Subtraction - BrainPOP Jr.](#)- Interactive Skill Practice

Virginia Department of Education

[Math Stories](#) - Lesson Plan

Other Sites

K.6 (2016) [Molly Adds and Subtracts from 10](#) - Interactive Skill

			<p>Practice</p> <p>Manipulatives Square Tiles Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Foam 2- Color Counters</p>	
12 days	K.4 a,b (2009) New K.3a,b,c (2016)	Number Sense: Oral Counting/ Numeric Representation	<p><i>K.4a Count forward to 100 and backward from 10; (2016-K.3a,b)</i></p> <p><i>a) Count forward orally by ones from 0 to 100</i></p> <p><i>b) count backward orally by ones when given any number between 1 and 10;</i></p> <p>Text <u>EnVision Math:</u> Lesson 12-6, VA-1 (Virginia Handbook T132) (2016) <u>EnVision Math:</u> Differentiated Instruction Lesson 12-6 <u>EnVision Math:</u> Leveled Homework – Reteaching, Practice, & Enrichment Master Lesson 12-6</p> <p>Virginia Department of Education Hundreds Board Math - Lesson Plan Lily Pad Hop! (Pg. 29)- Lesson Plans (Modules) Math to 100 and Back: More or Less (Pg. 32) - Lesson Plans (Modules)</p> <p>Technology Videos on How Many? – Interactive Skill Practice Counting Forward and Backwards to 10 - Interactive Skill Practice (2016-K.3a) Find the Missing Number Game - Interactive Skill Practice</p> <p><i>K.4b Identify one more than a number and one less than a number. (2016-K.3c) Identify the number after, without counting, when given</i></p>	<u>EnVision Math:</u> Topic Test Question # 1-5, 7, 8 <u>EnVision Math:</u> Alternate Assessments Question # 2, 4 <u>EnVision Math:</u> Quick Checks

			<p><i>any number between 0 and 100 and identify the number before, without counting, when given any number between 1 and 10. (2016)</i></p> <p>Text <u>Envision Math</u>: Lesson 6-4 (only 1 more and 1 less)</p> <p><u>EnVision Math</u>: Lesson 12-6, 12-10 <u>EnVision Math</u>: Differentiated Instruction Lesson 12-6 <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lesson 12-6 <u>EnVision Math</u>: Reteaching Master Lesson 12-10</p> <p>Virginia Department of Education <u>Math to 100 and Back: More or Less (Pg. 32)</u> - Lesson Plans (Modules) <u>Hundreds Board Math</u> - Lesson Plan</p> <p>Technology K.3b (2016) <u>Blast Off</u> - Interactive Skill Practice</p> <p>Manipulatives Square Tiles Base 10 Magnetic Kits Foam Base 10 Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes Hundred Chart</p>	
6 days	Portfolio Review	3 rd Nine Weeks Objectives	<p>Text <u>EnVision Math</u>: Daily Spiral Review – 10-1 thru 10-7; 11-1 thru 11-7; 12-1 thru 12-6, 12-10</p>	

Pacing Resources Assessments MP4

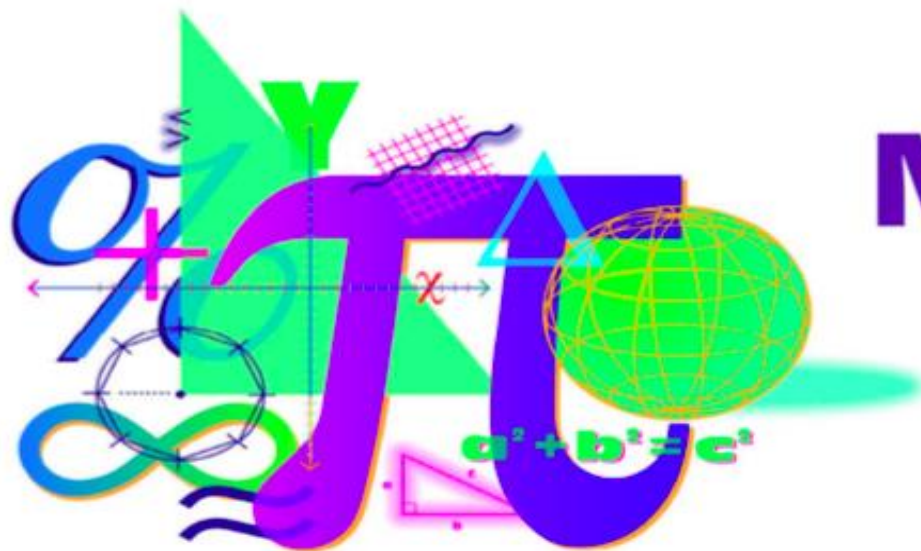
Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
Ongoing	K.6 K.6 K.4 a,b/ New K.3a,b,c (2016)	Comp: Addition Comp: Subtraction NS: Oral Counting/Numeric Representation	See MP3	
10 days	K.4c/ New K.3d (2016)	Number Sense: Skip counting	<p><i>K.4c Count by fives and tens to 100.</i> <i>(2016- K.3d) Count forward by tens to determine the total number of objects to 100. (2016)</i></p> <p>Text <u>EnVision Math</u>: Lesson 12-7 (2016), 12-8 (only 5's & 10's), 12-9 (focus on 5's ONLY) <u>EnVision Math</u>: Differentiated Center Activities 12-7, 12-9 (focus on 5's ONLY) <u>EnVision Math</u>: Reteaching Set A–B and Technology Going Digital <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 12-7, 12-8 <u>EnVision Math</u>: Problem of the Day – Lessons 12-8, 12-10</p> <p>Virginia Department of Education Hundreds Board Math - Lesson Plan Math to 100 and Back: More or Less (Pg. 32) - Lesson Plans (Modules)</p> <p>Other Sites</p>	<p><u>EnVision Math</u>: Topic Test Question #6, 9, 10 <u>EnVision Math</u>: Alternate Assessments Question #1, 3 <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p>Videos: Counting by 5s - Interactive Skill Practice Videos: Counting by 10s - Interactive Skill Practice Skip Counting (Bubbles 5's and 10's ONLY)- Interactive Skill Practice Caterpillar Ordering (Sequencing Numbers: Counting in Multiples of 10 and of 5) - Interactive Skill Practice Catch the Centigurps - Interactive Skill Practice</p> <p>Manipulatives Hundred Chart Square Tiles Base 10 Magnetic Kits Foam Base 10 Insect, Fruit and Pet Counters Counting and Sorting Set Linking Cubes</p>	
10 days	K.7	Measurement: Money	<p><i>K.7 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.</i></p> <p>Text EnVision Math: Lesson 13-1 thru 13-6 EnVision Math: Differentiated Center Activities 13-1 thru 13-6 EnVision Math: Reteaching Set A–D EnVision Math: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 13-1 thru 13-6 EnVision Math: Problem of the Day – Lessons 13-2 thru 13-5</p> <p>Technology Money Mania – Interactive Skill Practice and Lesson Plan Making Sense with Cents –Activity Plan</p> <p>Virginia Department of Education Money Math - Lesson Plan</p>	<p>EnVision Math: Topic Test EnVision Math: Alternate Assessments EnVision Math: Performance Assessment EnVision Math: Quick Checks</p>

			<p>Other Sites Money – Interactive Skill Practice Learning Coins - Interactive Skill Practice</p> <p>Manipulatives Classroom Money Kit</p>	
5 days	K.8	Measurement: Tools	<p><i>K.8 Identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).</i></p> <p>Text <u>EnVision Math</u>: Lesson 9-9, 14-4, 14-5, 15-1, 15-2, 15-4, 15-5, VA-7 (Virginia Handbook T138) <u>EnVision Math</u>: Differentiated Center Activities Lesson 9-9, 14-4, 14-5, 15-1, 15-2, 15-4, 15-5 <u>EnVision Math</u>: Reteaching Set A–D <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 9-9, 14-4, 14-5, 15-1, 15-2, 15-4, 15-5 <u>EnVision Math</u>: Problem of the Day – Lessons 14-1 thru 14-7</p> <p>Other Print Resources Beginning Measurement – Discovery Education Activity Plan</p> <p>Virginia Department of Education Calendar Math Instruments - Lesson Plan</p> <p>Manipulatives Write On, Wipe Off Clocks School Pan Balance School Rocker Scales Yard Sticks Meter Sticks Rulers</p>	

			<p>Customary and Metric Weight Sets Thermometers</p>	
5 days	K.9	Measurement: Time	<p><i>K.9 Tell time to the hour, using analog and digital clocks.</i></p> <p>Text <u>EnVision Math</u> : Lesson 14-1 thru 14-7, 15-5, VA-6 (Virginia Handbook T137 <u>EnVision Math</u>: Differentiated Center Activities 14-1 thru 14-7, 15-5 <u>EnVision Math</u>: Reteaching Set A–D <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, & Enrichment Master Lessons 14-1 thru 14-7, 15-5 <u>EnVision Math</u>: Problem of the Day – Lessons 14-1 thru 14-7</p> <p>Other Print Resources Telling Time to the Hour - Activity Plan What Time Is It? - Lesson Plan</p> <p>Virginia Department of Education What Time Is It? - Lesson Plan</p> <p>Other Sites Demo Clocks - Interactive Skill Practice Time Travel: Learn to Tell Time - Interactive Skill Practice Telling Time – Interactive Skill Practice</p> <p>Manipulatives Write On, Wipe Off Clocks</p>	<p><u>EnVision Math</u>: Topic Test <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>
10 days	K.14	Probability and Statistics: Graphing	<p><i>K.14 Display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data.</i></p> <p>Text <u>EnVision Math</u> : Lesson 5-11, 16-1 thru 16-5, 16-7, VA-8 <u>EnVision Math</u>: Differentiated Center Activities 5-11, 16-1 thru 16-5, 16-7 <u>EnVision Math</u>: Reteaching Set A–D <u>EnVision Math</u>: Leveled Homework – Reteaching, Practice, &</p>	<p><u>EnVision Math</u>: Topic Test <u>EnVision Math</u>: Alternate Assessments <u>EnVision Math</u>: Performance Assessment <u>EnVision Math</u>: Quick Checks</p>

			<p>Enrichment Master Lessons 5-11, 16-1 thru 16-5, 16-7 <u>EnVision Math</u>: Problem of the Day – Lessons 16-1 thru 16-7</p> <p>Other Print Resources We Respect Ourselves - Lesson Plan</p> <p>Virginia Department of Education My Favorite Things - Lesson Plan</p> <p>Manipulatives Graphing Mats</p>	
7 days	Portfolio Review	4 th Nine Weeks Objectives	<p>Text <u>EnVision Math</u>: Daily Spiral Review – Lessons 12-7 thru 12-9; 13-1 thru 13-6; 14-1 thru 14-7; VA-7; 16-1 thru 16-5, 16-7</p>	



Mathematics

Standards of Learning

Curriculum Framework 2009

Kindergarten

Board of Education
Commonwealth of Virginia

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NOTICE

The Virginia Department of Education does not unlawfully discriminate on the basis of race, color, sex, national origin, age, or disability in employment or in its educational programs or services.

The 2009 *Mathematics Curriculum Framework* can be found in PDF and Microsoft Word file formats on the Virginia Department of Education's Web site at <http://www.doe.virginia.gov>.

Virginia *Mathematics Standards of Learning* Curriculum Framework 2009 Introduction

The 2009 *Mathematics Standards of Learning* Curriculum Framework is a companion document to the 2009 *Mathematics Standards of Learning* and amplifies the *Mathematics Standards of Learning* by defining the content knowledge, skills, and understandings that are measured by the Standards of Learning assessments. The Curriculum Framework provides additional guidance to school divisions and their teachers as they develop an instructional program appropriate for their students. It assists teachers in their lesson planning by identifying essential understandings, defining essential content knowledge, and describing the intellectual skills students need to use. This supplemental framework delineates in greater specificity the content that all teachers should teach and all students should learn.

Each topic in the *Mathematics Standards of Learning* Curriculum Framework is developed around the Standards of Learning. The format of the Curriculum Framework facilitates teacher planning by identifying the key concepts, knowledge and skills that should be the focus of instruction for each standard. The Curriculum Framework is divided into three columns: Understanding the Standard; Essential Understandings; and Essential Knowledge and Skills. The purpose of each column is explained below.

Understanding the Standard

This section includes background information for the teacher (K-8). It contains content that may extend the teachers' knowledge of the standard beyond the current grade level. This section may also contain suggestions and resources that will help teachers plan lessons focusing on the standard.

Essential Understandings

This section delineates the key concepts, ideas and mathematical relationships that all students should grasp to demonstrate an understanding of the Standards of Learning. In Grades 6-8, these essential understandings are presented as questions to facilitate teacher planning.

Essential Knowledge and Skills

Each standard is expanded in the Essential Knowledge and Skills column. What each student should know and be able to do in each standard is outlined. This is not meant to be an exhaustive list nor a list that limits what is taught in the classroom. It is meant to be the key knowledge and skills that define the standard.

The Curriculum Framework serves as a guide for Standards of Learning assessment development. Assessment items may not and should not be a verbatim reflection of the information presented in the Curriculum Framework. Students are expected to continue to apply knowledge and skills from Standards of Learning presented in previous grades as they build mathematical expertise.

Students in grades K–3 have a natural curiosity about their world, which leads them to develop a sense of number. Young children are motivated to count everything around them and begin to develop an understanding of the size of numbers (magnitude), multiple ways of thinking about and representing numbers, strategies and words to compare numbers, and an understanding of the effects of simple operations on numbers. Building on their own intuitive mathematical knowledge, they also display a natural need to organize things by sorting, comparing, ordering, and labeling objects in a variety of collections.

Consequently, the focus of instruction in the number and number sense strand is to promote an understanding of counting, classification, whole numbers, place value, fractions, number relationships (“more than,” “less than,” and “equal to”), and the effects of single-step and multistep computations. These learning experiences should allow students to engage actively in a variety of problem solving situations and to model numbers (compose and decompose), using a variety of manipulatives. Additionally, students at this level should have opportunities to observe, to develop an understanding of the relationship they see between numbers, and to develop the skills to communicate these relationships in precise, unambiguous terms.

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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.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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. ● 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>All students should</p> <ul style="list-style-type: none"> ● Understand how quantities relate to each other, which leads to an understanding of how numbers are related to each other. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● 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. ● Compare and describe two sets of 10 or fewer objects, using the terms <i>more</i>, <i>fewer</i>, and <i>the same</i>. ● Given a set of objects, construct a second set which has more, fewer or the same number of objects.

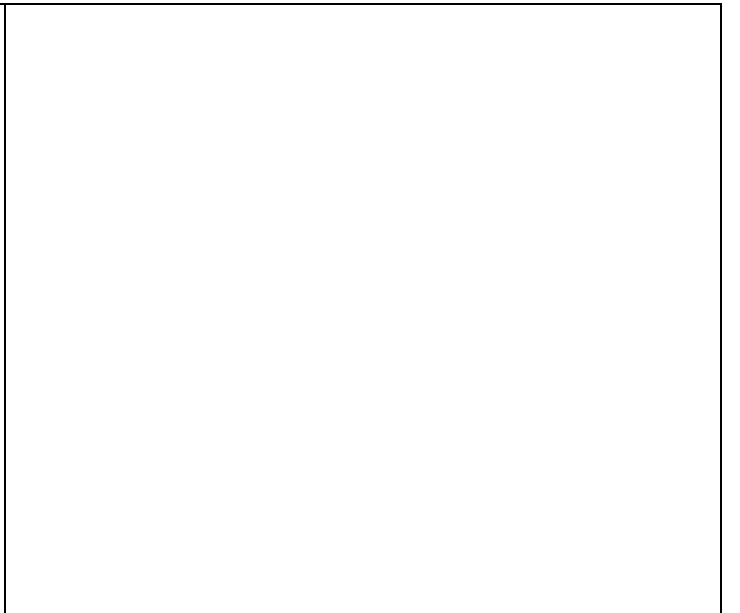
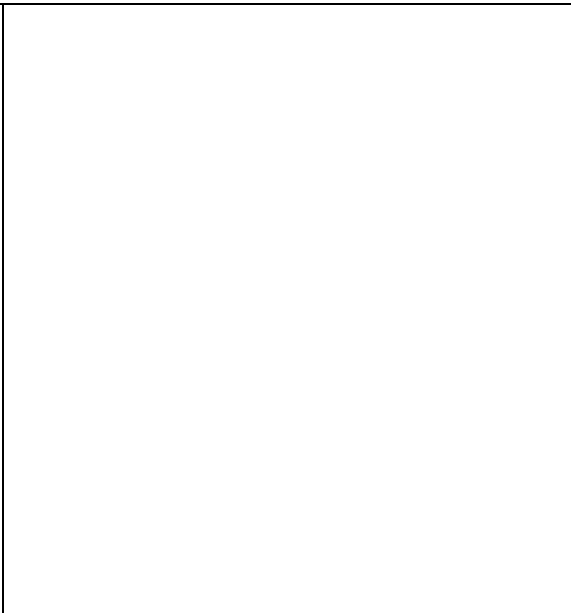
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- K.2 The student will identify, describe, and extend repeating patterns.**
b) write the numeral to tell how many are in the set; and
c) select the corresponding numeral from a given set of numerals.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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 structures. As a digit, zero is used as a placeholder in systems. ● <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 	<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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● 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. ● Identify written numerals from 0 through 15 represented in random order. ● Select the numeral from a given set of numerals that corresponds to a set of 15 or fewer concrete objects. ● Write the numerals from 0 through 15. ● Write a numeral that corresponds to a set of 15 or fewer concrete objects. ● Construct a set of objects that corresponds to a given numeral, including an empty set.

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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K.3 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.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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</i>, <i>ordinal position</i>, and <i>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>All students should</p> <ul style="list-style-type: none"> ● Use ordinal numbers to describe the position of objects in a sequence. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Identify the ordinal positions first through tenth using ordered sets of ten concrete objects and/or pictures of such sets presented from <ul style="list-style-type: none"> –left-to-right; –right-to-left; –top-to-bottom; and/or –bottom-to-top.

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- K.4 The student will**
- a) count forward to 100 and backward from 10;
 - b) identify one more than a number and one less than a number; and
 - c) count by fives and tens to 100.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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 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. ● Skip counting by fives lays the foundation for reading a clock effectively and telling time to the nearest five minutes, counting money, and 	<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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Count forward from 0 to 100. ● Count backward from 10 to 0. ● 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). ● Group 100 or fewer objects together into sets of fives or tens and then count them by fives or by tens. ● Investigate and recognize the pattern of counting by fives to 100, using a variety of tools. ● Investigate and recognize the pattern of counting by tens to 100, using a variety of tools.

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.

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K.5 The student will identify the parts of a set and/or region that represent fractions for halves and fourths.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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). 	<p>All students should</p> <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</i>, <i>fourth</i>) tells the number of equal parts in the whole. ● Understand that the fraction name (<i>half</i>, <i>fourth</i>) of the set model is a subset of the whole set with equal numbers. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Recognize fractions as representing parts of equal size of a whole. ● Given a region, identify half and/or a fourth of the region. ● Given a set, identify half and/or a fourth of the set.

A variety of contexts are necessary for children to develop an understanding of the meanings of the operations such as addition and subtraction. These contexts often arise from real-life experiences in which they are simply joining sets, taking away or separating from a set, or comparing sets. These contexts might include conversations, such as “How many books do we have altogether?” or “How many cookies are left if I eat two?” or “I have three more candies than you do.” Although young children first compute using objects and manipulatives, they gradually shift to performing computations mentally or using paper and pencil to record their thinking. Therefore, computation and estimation instruction in the early grades revolves around modeling, discussing, and recording a variety of problem situations. This approach helps students transition from the concrete to the representation to the symbolic in order to develop meaning for the operations and how they relate to each other.

In grades K–3, computation and estimation instruction focuses on

- relating the mathematical language and symbolism of operations to problem situations;
 - understanding different meanings of addition and subtraction of whole numbers and the relation between the two operations;
 - developing proficiency with basic addition, subtraction, multiplication, division and related facts;
 - gaining facility in manipulating whole numbers to add and subtract and in understanding the effects of the operations on whole numbers;
 - developing and using strategies and algorithms to solve problems and choosing an appropriate method for the situation;
 - choosing, from mental computation, estimation, paper and pencil, and calculators, an appropriate way to compute;
 - recognizing whether numerical solutions are reasonable;
 - experiencing situations that lead to multiplication and division, such as equal groupings of objects and sharing equally; and
 - performing initial operations with fractions.
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K.6 The student will model adding and subtracting whole numbers, using up to 10 concrete objects.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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.● 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	<p>All students should</p> <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.	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none">● 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.● Given a set of 10 or fewer concrete objects, remove, take away, or separate part of the set and determine the result.

Measurement is important because it helps to quantify the world around us and is useful in so many aspects of everyday life. Students in grades K–3 should encounter measurement in many normal situations, from their daily use of the calendar and from science activities that often require students to measure objects or compare them directly, to situations in stories they are reading and to descriptions of how quickly they are growing.

Measurement instruction at the primary level focuses on developing the skills and tools needed to measure length, weight/mass, capacity, time, temperature, area, perimeter, volume, and money. Measurement at this level lends itself especially well to the use of concrete materials. Children can see the usefulness of measurement if classroom experiences focus on estimating and measuring real objects. They gain deep understanding of the concepts of measurement when handling the materials, making physical comparisons, and measuring with tools.

As students develop a sense of the attributes of measurement and the concept of a measurement unit, they also begin to recognize the differences between using nonstandard and standard units of measure. Learning should give them opportunities to apply both techniques and nonstandard and standard tools to find measurements and to develop an understanding of the use of simple U.S. Customary and metric units.

Teaching measurement offers the challenge to involve students actively and physically in learning and is an opportunity to tie together other aspects of the mathematical curriculum, such as fractions and geometry. It is also one of the major vehicles by which mathematics can make connections with other content areas, such as science, health, and physical education.

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K.7 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.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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. ● Students need experiences to develop the concept that a nickel has a value of five cents even though it is one object. 	<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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Describe the properties/characteristics (e.g., color, relative size) of a penny, nickel, dime, and quarter. ● Identify a penny, nickel, dime, and quarter. ● Identify that a nickel is the same value as five pennies. ● 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.

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K.8 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).

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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>All students should</p> <ul style="list-style-type: none"> ● Identify an appropriate measuring tool for a given unit of measure. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Identify a ruler as an instrument to measure length. ● Identify different types of scales as instruments to measure weight. ● Identify different types of clocks (analog and digital) as instruments to measure time. ● Identify the components of a calendar, including days, months, and seasons. ● Identify different types of thermometers as instruments used to measure temperature.

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K.9 The student will tell time to the hour, using analog and digital clocks.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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.	<p>All students should</p> <ul style="list-style-type: none">• Apply an appropriate technique, depending on the type of clock, to determine time to the nearest hour.	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none">• Tell time on an analog clock to the hour.• Tell time on a digital clock to the hour.

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K.10 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.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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>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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● 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). ● 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). ● 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). ● Compare and describe temperatures of two objects or environment (as hotter or colder), using direct comparison.

Children begin to develop geometric and spatial knowledge before beginning school, stimulated by the exploration of figures and structures in their environment. Geometric ideas help children systematically represent and describe their world as they learn to represent plane and solid figures through drawing, block constructions, dramatization, and verbal language.

The focus of instruction at this level is on

- observing, identifying, describing, comparing, contrasting, and investigating solid objects and their faces;
- sorting objects and ordering them directly by comparing them one to the other;
- describing, comparing, contrasting, sorting, and classifying figures; and
- exploring symmetry, congruence, and transformation.

In the primary grades, children begin to develop basic vocabulary related to figures but do not develop precise meanings for many of the terms they use until they are thinking beyond Level 2 of the van Hiele theory (see below).

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.

- **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. (This is the expected level of student performance during grades K and 1.)
- **Level 2: Analysis.** Properties are perceived but are isolated and unrelated. Students should recognize and name properties of geometric figures. (Students are expected to transition to this level during grades 2 and 3.)

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K.11 The student will

- a) identify, describe, and trace plane geometric figures (circle, triangle, square, and rectangle); and
- b) compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

<p>UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)</p>	<p>ESSENTIAL UNDERSTANDINGS</p>	<p>ESSENTIAL KNOWLEDGE AND SKILLS</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. <ul style="list-style-type: none"> –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 	<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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none"> ● Identify a circle, triangle, square, and rectangle. ● Describe the characteristics of triangles, squares, and rectangles, including number of sides and number of angles. ● Describe a circle using terms such as round and curved. ● Trace a circle, triangle, square, and rectangle. ● Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their relative sizes (larger, smaller). ● Compare and group plane geometric figures (circle, triangle, square, and rectangle) according to their shapes. ● Distinguish between examples and nonexamples of identified geometric figures (circle, triangle, square, and rectangle).

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).
- Early experiences with comparing and sorting figures assist students in analyzing the characteristics of plane geometric figures.

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| <ul style="list-style-type: none">• Attribute blocks, relational attribute blocks, and tangrams are among the manipulatives that are particularly appropriate for sorting and comparing size.<ul style="list-style-type: none">–Clay, straws, and paper and scissors are several manipulatives that are appropriate for constructing geometric figures. | | |
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K.12 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.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<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>All students should</p> <ul style="list-style-type: none">• Understand that objects can have different orientations in space.	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul style="list-style-type: none">• Identify pictorial representations of a circle, triangle, square, and rectangle, regardless of their position and orientation in space.• Describe the location of one object relative to another, using the terms <i>above</i>, <i>below</i>, and <i>next to</i>.

Students in the primary grades have a natural curiosity about their world, which leads to questions about how things fit together or connect. They display their natural need to organize things by sorting and counting objects in a collection according to similarities and differences with respect to given criteria.

The focus of probability instruction at this level is to help students begin to develop an understanding of the concept of chance. They experiment with spinners, two-colored counters, dice, tiles, coins, and other manipulatives to explore the possible outcomes of situations and predict results. They begin to describe the likelihood of events, using the terms *impossible*, *unlikely*, *equally likely*, *more likely*, and *certain*.

The focus of statistics instruction at this level is to help students develop methods of collecting, organizing, describing, displaying, and interpreting data to answer questions they have posed about themselves and their world.

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K.13 The student will gather data by counting and tallying.

<p>UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)</p>	<p>ESSENTIAL UNDERSTANDINGS</p>	<p>ESSENTIAL KNOWLEDGE AND SKILLS</p>
<ul 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. 	<p>All students should</p> <ul 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. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul 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).

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K.14 The student will display gathered data in object graphs, picture graphs, and tables, and will answer questions related to the data.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<ul style="list-style-type: none"> ● 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 cost 10 cents). ● Students represent data to convey results of their investigations at a glance, using concrete objects, pictures, and numbers to give a “picture” of the organized data. ● When data are displayed in an organized manner, children can describe the results of their investigations. ● 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). 	<p>All students should</p> <ul 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>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul 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.

<ul style="list-style-type: none">• 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.		
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Stimulated by the exploration of their environment, children begin to develop concepts related to patterns, functions, and algebra before beginning school. Recognition of patterns and comparisons are important components of children's mathematical development.

Students in kindergarten through third grade develop the foundation for understanding various types of patterns and functional relationships through the following experiences:

- sorting, comparing, and classifying objects in a collection according to a variety of attributes and properties;
- identifying, analyzing, and extending patterns;
- creating repetitive patterns and communicating about these patterns in their own language;
- analyzing simple patterns and making predictions about them;
- recognizing the same pattern in different representations;
- describing how both repeating and growing patterns are generated; and
- repeating predictable sequences in rhymes and extending simple rhythmic patterns.

The focus of instruction at the primary level is to observe, recognize, create, extend, and describe a variety of patterns. These students will experience and recognize visual, kinesthetic, and auditory patterns and develop the language to describe them orally and in writing as a foundation to using symbols. They will use patterns to explore mathematical and geometric relationships and to solve problems, and their observations and discussions of how things change will eventually lead to the notion of functions and ultimately to algebra.

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K.15 K.15 The student will sort and classify objects according to attributes.

UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)	ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
<ul 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). 	<p>All students should</p> <ul style="list-style-type: none"> ● Understand that the same set of objects can be sorted and classified in different ways. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul 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.

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K.16 The student will identify, describe, and extend repeating patterns.

<p>UNDERSTANDING THE STANDARD (Background Information for Instructor Use Only)</p>	<p>ESSENTIAL UNDERSTANDINGS</p>	<p>ESSENTIAL KNOWLEDGE AND SKILLS</p>
<ul 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. ● Sample repeating patterns (repeating the core) are <ul style="list-style-type: none"> – ABABABAB; – ABCABC; – AABBAABBAABB; – AABAAB; – AABCAABC; and – ABACABAC. 	<p>All students should</p> <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’. 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p> <ul 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.

