

Kindergarten

Introduction:

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

1. Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 - 2 = 5$. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.
2. Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Grade K Overview

Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

- Work with numbers 11-19 to gain foundations for place value.

Measurement and Data

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.

Geometry

- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Important Definitions:

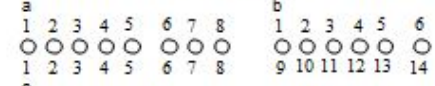
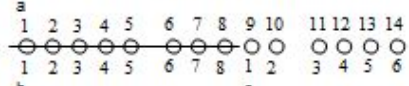

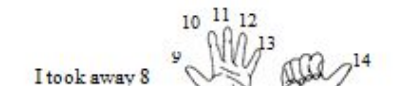
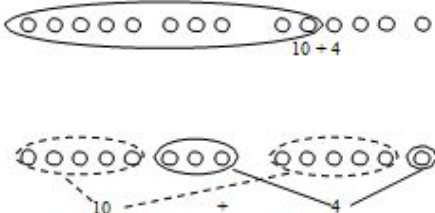
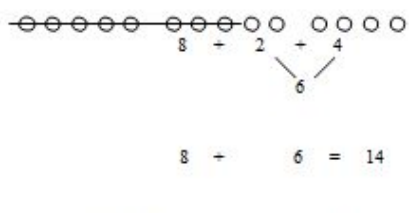
Fluency-skill in carrying out procedures flexibly, accurately, efficiently and appropriately.

Know from memory-quick, effortless, recall of facts. (**Notice there are no Kindergarten standards that require students to “know from memory.”)

⊕ K-2 Common Addition and Subtraction situations ADDITION AND SUBTRACTION PROBLEM TYPES CHART

	Result Unknown	Change Unknown	Start Unknown
Add to (Join) (Combining)	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$ (K)	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$ (1 st)	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$ <i>One-Step Problem</i> (2 nd)
Take from (Separate) (Separating)	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$ (K)	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$ (1 st)	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$ <i>One-Step Problem</i> (2 nd)
	Total Unknown	Addend Unknown	Both Addends Unknown ²
Put Together/ Take Apart³ (Part-Part Whole)	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$ (K)	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$ (K)	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$ (1 st)
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare⁴	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? (1 st)	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? <i>One-Step Problem</i> (1 st)	(Version with "more"): Julie has 3 more apples than Lucy. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?$ $? + 3 = 5$ <i>One-Step Problem</i> (2 nd)
	("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$ (1 st)	(Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?$ $3 + 2 = ?$ <i>One-Step Problem</i> (2 nd)	(Version with "fewer"): Lucy has three fewer apples than Julie. Julie has five apples. How many apples does Lucy have? <i>One-Step Problem</i> (1 st)

K: Problem types to be mastered by the end of the Kindergarten year. 1st: Problem types to be mastered by the end of the First Grade year, including problem types from the previous year(s). However, First Grade students should have experiences with all 12 problem types. 2nd: Problem types to be mastered by the end of the Second Grade year, including problem types from the previous year(s).

Levels	$8 + 6 = 14$	$14 - 8 = 6$
Level 1: Count all (Direct Modeling)	Count All 	Take Away 
Level 2: Counting Strategies <ul style="list-style-type: none"> Counting On Counting Up to Counting Back Counting Back to 	Count On 	To solve $14 - 8$ I count on $8 + ? = 14$ 
Level 3: Use Known Facts Use Derived Facts ADDITION <ul style="list-style-type: none"> Make a Ten Doubles Commutative Property 	Make a Ten (Rcompose) 	$14 - 8$: I make a ten for $8 + ? = 14$ 
Use Derived Facts SUBTRACTION <ul style="list-style-type: none"> Think Addition Build up thru 10 Build down thru 10 	Think Addition - I know that $8 + 6 = 14$, so $14 - 8 = 6$	Build up thru 10 ($14 - 6$, I know that $8 + 2 = 10$, $10 + 4 = 14$, $2 + 4 = 6$) Build down thru 10 ($14 - 6$, I know that $14 - 4 = 10$, $10 - 2 = 8$, $4 + 2 = 6$)

Note:

Many children attempt to count down for subtraction, but counting down is difficult and error-prone.

Children are much more successful with counting on; it makes subtraction as easy as addition.