Kindergarten

The big ideas in Kindergarten include

- **counting objects in a set;**
- **comparing sets or numerals;**
- **using numbers to represent quantities and solve problems;**
- **modeling simple joining and separating situations with sets of objects.**

Kindergarten is the start of a formal education for some students, and students enter Kindergarten with varying levels of mathematical understanding and skill. This course blueprint calls for students to begin working with whole numbers to five so that they can begin to develop an understanding of the relationship between numbers and quantities.

Next, they are introduced to the ideas of putting together and taking apart as a foundation for understanding addition and subtraction. Students then expand their work with numbers to ten, first connecting the number names and count sequence to counting and cardinality, and then expanding their work with addition and subtraction. Foundational ideas underlying place-value are implicitly built into this work as students work on "making a ten." Students then expand their work to 20, where work with the numbers 11-19 prepares them for working with place-value in later grades.

Students have an opportunity to practice and apply most of the skills and strategies they have learned throughout the course of the year in a unit titled *Putting it All Together*. Students solve word problems involving addition and subtraction to 10 using objects, drawings, and/or equations. Students use multiple representations to demonstrate their conceptual understanding of addition and subtraction. Additional work with composing and decomposing numbers supports the expectation that all Kindergartners demonstrate fluency with adding and subtracting within 5.

In kindergarten, students also begin to name and describe shapes in their environment and

to name and compare measurable attributes of objects. This course blueprint has students' geometric work interspersed with their work with number, although these topics are independent of each other and can be ordered in other ways.

Note that this course blueprint is only one of many possible ways of arranging a sequence of topics designed to achieve the standards. It is a continually evolving document and we welcome your comments here.

K.1 Numbers to 5

In this unit students

- **learn the count sequence to 5, counting by ones;**
- **connect counting to cardinality by pairing objects with a number name;**
- **answer "how many?" questions;**
- **count objects in sets;**
- **compare numbers of objects;**
- **write numbers.**

Although K.CC.A.1 calls for students to count to 100, the full intent of that standard is not met in this unit. In this unit, students practice counting by ones up to five. The teacher might lead students in choral counting. Students also start learning how to write numbers up to five.

Students begin to develop an understanding of the relationship between numbers and quantities. They point to objects in sequence and match them to number names, and come to understand that the total number of objects in a set corresponds to the last number said in the sequence. They learn that that each successive number name refers to a quantity that is one larger than the last. They learn to make a one-to-one correspondence between numbers names and objects by working with "how many?" questions. They also compare the number of objects in sets of 5 or less.

Although formal work with addition and subtraction has not yet begun, the counting work students do with numbers to 5 is foundational for building fluency in expressing 5 as a sum of two numbers in different ways.

Comment on this unit here.

K.2 Introducing Addition and Subtraction

In this unit students

- **understand addition as putting together or adding to, and subtraction as taking apart or taking from;**
- **represent addition and subtraction with objects;**
- **compose and decompose 5 or less;**
- **begin working towards fluency within 5.**

Counting objects prepares students for addition and subtraction. In this unit they gain an initial understanding of these operations using the ideas of putting together and taking apart, or adding to and taking from. They work with objects to represent these operations. They represent a number as a sum in multiple ways, which is import ant for future fluency and flexibility with numbers.

Students express numbers up to 5 as sums in different ways, e.g., 5 = 2 + 3 and 1 + 4 = 5. They demonstrate their understanding using drawings and objects. They also continue practice with counting and writing numbers.

Comment on this unit here.

K.3 Shapes Around Us

In this unit students

- **identify and describe shapes in the environment using shape names and relative position of the objects;**
- **classify objects into given categories and compose shapes to model real-world objects;**
- **describe measurable attributes of objects (e.g. length or weight) and compare objects based on those attributes.**

In this unit students are introduced to the foundational concepts of geometry. They identify and describe two- and three-dimensional shapes such as squares, circles, triangles, cubes, cylinders, and spheres in the world around them. They use positional language to describe where and how these shapes exist in the environment. They directly compare two objects that have a measurable attribute in common, and use terms such as “less” and “more” to describe the difference in that attribute. For example, they might compare the weight of a pencil and a book and conclude that the book weighs more and the pencil weighs less based on their observations.

Comment on this unit here.

K.4 Numbers within 10

In this unit students

- **count by ones;**
- **pair objects with a number name;**
- **further their understanding of the relationship between number and quantity;**
- **answer "how many?" questions about objects in varied arrangements (lines, arrays, circles, scattered);**
- **count objects in sets and compare sets of objects using greater than, less than, or equal to;**
- **write numbers.**

In this unit students continue their work with numbers to ten. They continue to count by ones, both chorally and independently. They answer "how many?" questions using different arrangements of objects to understand that the total number of objects stays the same, regardless of how they are arranged. They learn about the size of numbers through comparing numbers of objects in different sets. They once more attend to the language of comparison, focusing now on using "greater than" and "less than" to compare the number of objects in two sets.

Students develop a general understanding of the size of numbers represented as numerals between 1 and 10. This can be supported through repeated practice representing numbers with sets of objects. They also practice writing numbers to ten throughout the unit.

Comment on this unit here.

K.5 Addition and Subtraction to 10

In this unit students

- **represent addition and subtraction with objects;**
- **solve word problems;**
- **compose and decompose 10 or less into pairs in more than one way;**
- **introduce expressions in relation to addition and subtraction situations;**
- **develop fluency with addition and subtraction within 5.**

Addition and subtraction is part of the major work of Kindergarten, so students need repeated opportunities to revisit these operations throughout the year. Completing a single unit on addition and subtraction is not sufficient to develop a strong number sense and flexibility with numbers. In this unit students expand their work with addition and subtraction to include sums and differences to ten. They use objects and drawings to represent situations of adding to and taking from. They begin foundational work with tens by exploring the idea of making a ten, that is, given a number between 1 and 9, finding the number whose sum with the given number is 10.

Students start working with addition and subtraction equations, and addition and subtraction word problems, using objects and drawings. Within this unit's focus on numbers to ten, students develop fluency in addition and subtraction within five and expressing five as a sum in multiple ways.

Comment on this unit here.

K.6 Numbers to 20

In this unit students

- **count by ones and tens;**
- **compare sets of objects;**
- **count forward from a number other than one;**
- **write numbers;**
- **answer "how many?" questions about objects in varied arrangements.**

Students further develop their understanding of numbers as they move beyond 10 to 20. They continue practice counting by ones and start counting by 10s. They count forward from a number other than one. They practice writing and recognizing the teen numbers before they work to understand those numbers as ten ones and more ones in the next unit. They also work with objects in various arrangements (lines, arrays, circles, and scattered) to count using a one-to-one correspondence. They learn that zero represents a count of no objects.

Comment on this unit here.

K.7 Ten Ones + More Ones

In this unit students

- **compose and decompose numbers 11–19 into ten ones and more ones, recording with an equation (e.g., 18 = 10 + 8);**
- **write and identify numbers to 20.**

Students in Kindergarten work with numbers 11–19 to lay a foundation for understanding place value in Grade 1, making with clear connections to addition and subtraction. They learn that the numbers 11–19 can be expressed as ten ones plus some more ones. They use objects and drawings to compose and decompose these numbers and match them to equations, e.g., 18 = 10 + 8, that parallel the visual models, such as ten-frames. This gives them additional practice with counting and writing numbers, as well as more time to work towards fluency with addition and subtraction within 5. These operations are part of the major work of grades K–2, so allowing students time to build a strong foundation with basic addition and subtraction concepts is crucial.

Comment on this unit here.

K.8 Putting it All Together

In this unit students

- **count by ones and tens to 100;**
- **practice writing numbers;**
- **understand cardinality;**
- **solve addition and subtraction word problems;**
- **represent addition and subtraction in multiple ways;**
- **compose and decompose numbers;**
- **compare numbers to 10 written as numerals;**
- **achieve fluency in addition and subtraction within 5.**

Students have an opportunity to practice most of the skills and strategies they have learned throughout the course of the year in this unit. As teachers and students have worked (tirelessly) in the other units to practice choral and independent counting by tens and ones, it is here that the full intent of the standard (K.CC.A.1) is met, counting as high as 100! While students are not expected to count out 100 objects using a one-to-one correspondence, developing a sense of the magnitude of a number as large as 100 is useful.

Students solve word problems involving addition and subtraction to 10 using objects, drawings, and/or equations. They use multiple representations to demonstrate their conceptual understanding of addition and subtraction. They develop fluency with adding and subtracting within 5 through continued work with composing and decomposing numbers.

This unit also serves as an opportunity for the teacher to provide support for struggling students and challenges for students who exhibit mastery of the Kindergarten standards.

Comment on this unit here.

K.9 A Closer Look at Shapes

In this unit students

- **classify, analyze, and compare two- and three-dimensional shapes;**
- **use simple shapes to compose more complex shapes.**

In the last unit students circle back to work with shapes, looking more deeply at these geometric structures. This includes understanding the difference between two- and three-dimensional shapes. In Unit K.3, students learned to identify and describe simple shapes. In this unit, they deepen their understanding by analyzing and comparing different attributes of those shapes, describing similarities and differences. Students model real world shapes by building and drawing them. They form larger, more complex shapes using simple shapes. Providing concrete experiences for children in Kindergarten is important, as work with shapes in later grades will prove to be more abstract.

Comment on this unit here.