

**Understand addition and subtraction.**

**NC.K.OA.3** Decompose numbers less than or equal to 10 into pairs in more than one way using objects or drawings, and record each decomposition by a drawing or expression.

**Clarification**

In this standard, students develop an understanding of part-whole relationships as they recognize that a given group of objects (up to 10) can be decomposed into sub-groups while remaining equivalent to the total amount. For example, a set of 6 cubes can be separated into a set of 2 cubes and a set of 4 cubes while remaining 6 total cubes. Additionally, this standard asks students to recognize that a group can be decomposed (broken apart) in multiple ways.

As students use concrete objects and drawings to explore this concept, they search for all partners that compose a number, noticing patterns as they work. Through these experiences, students discover number relationships and begin to internalize addition/subtraction facts.

In Kindergarten, students need ample experiences breaking apart numbers and using the vocabulary “and” & “same amount as” before symbols (+, =) and equations ( $5 = 3 + 2$ ) are introduced. If equations are used, a mathematical representation (picture, objects) needs to be present as well.

**Checking for Understanding**

How many ways can you break 9 into two parts? Use a drawing or numbers to show your work.

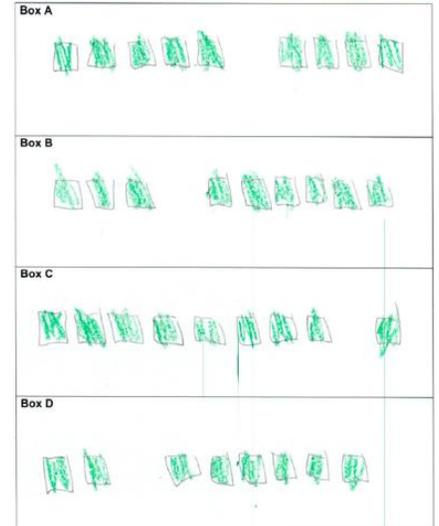
*Possible responses:*

*Student A:*

*Creates a list of partners of 9*

- 1 and 8
- 2 and 7
- 3 and 6
- 4 and 5

*Student B:*



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**NC.K.OA.4** For any number from 0 to 10, find the number that makes 10 when added to the given number using objects or drawings, and record the answer with a drawing or expression.

**Clarification**

This standard builds on the work of NC.K.OA.3, where students developed an understanding that a number, less than or equal to 10, can be decomposed into parts.

Standard NC.K.OA.4 calls for students to find the number that makes ten when added to a given number. Through numerous concrete experiences, kindergarteners will model the various sub-parts of ten and find the missing part of 10.

**Checking for Understanding**

John has 6 beans. How many more beans does he need to have 10 beans?



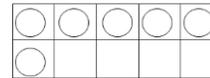
*"I have 6 beans. I need 4 more beans to have 10 in all."*

A full case of juice boxes has 10 boxes. There are only 6 boxes in this case. How many juice boxes are missing?

*Possible responses:*

*Student A: Using a Ten-Frame*

*I used a ten frame for the case. Then, I put on 6 counters for juice still in the case. There's no juice in these 4 spaces. So, 4 are missing.*



*Student B: Think Addition*

*I counted out 10 counters because I knew there needed to be ten. I pushed these 6 over here because they were in the container. These are left over. So, there's 4 missing.*



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**NC.K.OA.5** Demonstrate fluency with addition and subtraction within 5.

**Clarification**

This standard calls for students to show they are fluent in addition and subtraction. Students are fluent when they display accuracy (correct answer), efficiency (a reasonable amount of steps in about 3-5 seconds without resorting to counting), and flexibility (using strategies such as the distributive property).

Fluency is developed by understanding and internalizing the relationships that exist between and among numbers. Often, when children think of each “fact” as an individual item that does not relate to any other “fact”, they are attempting to memorize separate bits of information that can be easily forgotten. In order to fluently add and subtract, children must first be able to see subparts within a number (inclusion).

Once they have reached this milestone, children need repeated experiences with many different types of concrete materials (such as cubes, chips, and buttons) over an extended amount of time in order to recognize that there are only particular sub-parts for each number. Therefore, children will realize that if 3 and 2 is a combination of 5, then 3 and 2 cannot be a combination of 6.

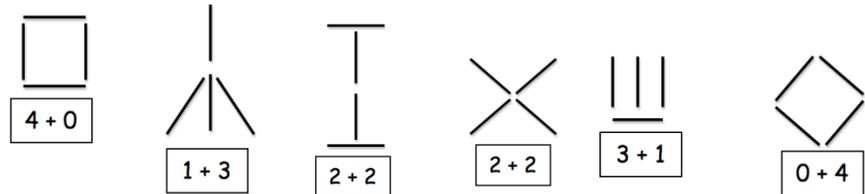
Traditional flash cards or timed tests have not been proven as effective instructional strategies for developing fluency. Rather, numerous experiences with breaking apart actual sets of objects and developing relationships between numbers help children internalize parts of number and develop efficient strategies for fact retrieval.

**Checking for Understanding**

One bird was on the tree. Three more birds came. How many are on the tree now?

There was one bird on the tree. Some more came. There are now 4 birds on the tree. How many birds came?”

*After making various arrangements with toothpicks to represent and discuss “4”, students learn that only a certain number of subparts exist within the number 4,*



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## Number and Operations in Base Ten

### **Build foundation for place value.**

**NC.K.NBT.1** Compose and decompose numbers from 11 to 19 into ten ones and some further ones by:

- Using objects or drawings.
- Recording each composition or decomposition by a drawing or expression.
- Understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

### **Clarification**

This standard calls for students to explore numbers 11-19 using representations, such as manipulatives or drawings. They group ten individual objects to represent “10”, keeping each count as a single unit (1, 2, 3, 4, 5, 6, 7, 8, 9, 10).

In first grade (NC.1.NBT.2), students are introduced the idea that a bundle of ten ones is called a “ten” and seen as a unit (unitizing). This is not the expectation in kindergarten.

### **Checking for Understanding**

#### Sample Student Interview:

Teacher: “I have some chips here. Do you think they will fit on our ten frame? Why? Why Not? Use your ten frame to investigate.”

Student A: “*There are too many to fit on the ten frame. Only 10 will fit!*”

Teacher: “So you have some leftovers?”

Student A: “*Yes. I’ll put them over here next to the ten frame.*”

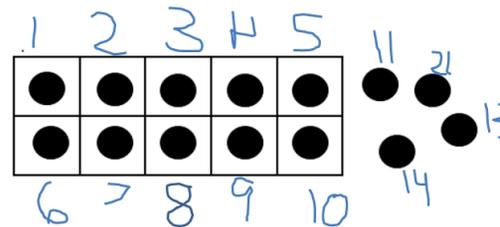
Teacher: “How many do you have in all?”

Student A: “*One, two, three, four, five... ten, eleven, twelve, thirteen, fourteen. I have fourteen. Ten fit on and four didn’t.*”

Student B: *Pointing to the ten frame, “See, that’s 10... 11, 12, 13, 14. There’s fourteen.”*

Teacher: Use your recording sheet (or number sentence cards) to show what you found out.

#### Sample Student Recording Sheets:



14 is 10 on and 4 off.

ALL	On	Off
14	10	4