Kindergarten
End of Year Teacher Pack

Includes:

- Lesson Plans
- Blackline Masters
- Assessment Checklists
- Common Core State Standards Correlations
Unit 10  Number and Operations in Base Ten: Numbers 11 to 20

Mathematical Practices in This Unit
In this unit, you will have the opportunity to assess MP.1 to MP.7. The MP labels in this unit flag both opportunities to develop the mathematical practice standards and opportunities to assess them. Below is a list of where we recommend assessing each standard as well as some examples of how students can show that they have met a standard.

MP.1: NBTK-2 Extensions 2–3, NBTK-5 Extensions 2–3, NBTK-8 Extensions 2–3
In NBTK-5 Extension 3, students are asked to make a large triangle using exactly 9 pattern block triangles. Students make sense of this non-routine problem when they realize that rotating the pattern block triangles and positioning them so that full sides are touching allows them to make sides for a larger shape. Students persevere to solve the problem when they try various combinations and intuitively realize that only certain arrangements need to be checked.

MP.2: NBTK-3 Extension 3, NBTK-4 Activity, NBTK-6 Extension 4, NBTK-7 Activity, NBTK-10 Activity

MP.3: NBTK-11 Extension 5
In NBTK-11 Extension 5, students analyze and critique incorrect reasoning when they use their understanding about flat faces and round faces of solid shapes to explain that a sphere is better for rolling while a cube is better for sliding.

MP.4: NBTK-3 Extension 3, NBTK-6 Extension 4
In NBTK-6 Extension 4, students model mathematically when they use a tool such as a ten-frame or an addition statement to represent and solve a real-world problem involving finding the total number of flat faces on three solid shapes.

MP.5: NBTK-3 Extension 3, NBTK-4 Extension 2, NBTK-6 Extension 4, NBTK-7 Extension 2, NBTK-10 Extension 2

MP.6: NBTK-1 Extension 3

In NBTK-11 Extension 4, students notice the structure that two full ten-frames make 20, and use that structure to find the missing number in an addition problem with total 20. Students make use of the structure of ten-frames when they notice that the number of empty boxes corresponds to the missing number in the addition.
Unit 10  Number and Operations in Base Ten: 
Numbers 11 to 20

Introduction
In this unit, students explore the numbers 11 to 20. As done for the numbers 0 to 10, they begin 
by learning to read and write the numerals and by counting a number of objects presented in an 
organized way. Students then learn to see the numbers 11 to 19 as consisting of 10 ones and 
some extra ones. They represent this understanding of the teen numbers using number-bond 
diagrams and addition sentences. The unit ends with an exploration of the number 20 as 
consisting of 2 tens (represented by the first two rows of a hundreds chart).

NOTE: The picture below shows the number-bond diagram given in the Progressions documents. 
When addressing students, simply refer to it as a picture or a tens and ones tree.

13
10  3

Materials. In addition to the BLMs provided at the end of this unit, the following Generic BLMs, 
found in section R, are used in Unit 10:
BLM Hundreds Chart (p. R-1)
BLM Number Cards 11 to 15 (p. R-4)
BLM Ten-Frames (p. R-24)
BLM Interlined Paper (p. R-45)
BLM Pattern Blocks (p. R-31)
BLM 1 cm Grid Paper (p. R-46)
BLM Game Cards (p. R-10)
BLM I Have ___, Who Has ___? (p. R-8)
BLM Number Cards 16 to 20 (p. R-5)
BLM Number Charts to 20 (p. R-32)
BLM Making a Number (p. R-14)
BLM Number Cards 0 to 5 (p. R-2)
BLM Number Cards 6 to 10 (p. R-3)
BLM Spinner (p. R-34)
BLM Hop on the Bunny Trail (p. R-35)

Recurring activities. The following activities recur several times in the unit, with variations.

Writing Teen Numbers
Type: Individual
Objective: To practice writing teen numbers
Preparation: In advance, write the numbers 11, 12, and 13 each at the beginning of a separate 
line on BLM Interlined Paper.
Instructions: Students complete the BLM by writing the numbers.
What’s My Number?
Type: Individual
Objective: To count a number of objects
Preparation: In advance, prepare bags containing 11, 12, or 13 objects. Provide a ten-frame made from an egg carton or from BLM Ten-Frames.
Instructions: Students count the objects to determine how many are in each bag.
Variation: Fill the bags with two colors of counters, 10 in one color and one, two, or three in the other color. Students can use the counters with or without a ten-frame.

Representing Teen Numbers
Type: Individual, creative
Objective: To count out a given number of objects
Preparation: In advance, cut sheets of cardstock paper into quarters to make three cards for each student. Write the number 11, 12, or 13 at the bottom of each card. Provide each student with a card for 11, 12, and 13, as well as colored pencils, ink stamps, or small stickers.
Instructions: Students decorate each card with the correct number of pictures.

Gathering Teen Numbers
Type: Individual or pairs, active
Objective: To count out a given number of objects
Preparation: In advance, prepare a large ten-frame on the floor using tape or interlocking floor tiles. Provide each student with number cards for 11, 12, and 13 from BLM Number Cards 11 to 15.
Instructions: For each number card, students gather the specified number of objects from around the classroom and place them in the ten-frame with the extras beside it. They might gather shoes or boots, books, counters, or even other students.

Color Me
Type: Individual, creative
Objective: To color a given number of shapes from a larger set
Preparation: In advance, cut out the cards from BLM Color Me.
Instructions: Students write one of the numbers 11, 12, or 13 and then color that many shapes.

Binding 10
Type: Individual or pairs
Objective: To decompose a number of objects into 10 ones and some more ones
Preparation: Provide students with at least 20 pipe cleaners and a number card for each of 11, 12, and 13 from BLM Number Cards 11 to 15.
Instructions: For the number card for 11, students count out 11 pipe cleaners. From their 11 pipe cleaners, they count out a group of 10 pipe cleaners and twist them into a bundle. Then they count the extra one. Students repeat for the number cards for 12 and 13.
Bonus: Students draw the tens and ones tree for each number of pipe cleaners.
Tens in a Flash
Type: Pairs
Objective: To use fingers to show a teen number as 10 ones and some more ones
Instructions: Player 1 says the number 11, 12, or 13. Player 2 shows all 10 fingers and then the extra ones needed to show the number.

Adding Cubes
Type: Individual
Objective: To show the addition of 10 and some ones to make teen numbers
Preparation: Give each student connecting cubes of two colors, 10 of each color.
Instructions: Students use connecting cubes to represent the numbers 11, 12, and 13 by making the ten in one color and adding the ones in the other color.
NBTK-1  Counting to 100

Standards: K.CC.A.1, K.CC.A.2, K.CC.A.3

Goals:
Students count fluently to 100.

Prior Knowledge Required:
Can count to 90

Vocabulary: count, number

Materials:
- number cards for 91 to 100
- 2 bins per group, one containing at least 100 objects (e.g., counters, blocks, connecting cubes, pennies), one bin large enough to hold 100 objects
- modeling clay (see Activity Center 1)
- paint, paintbrushes, and large sheets of paper (see Activity Center 2)
- sand table or sandpaper cut into the shape of the number 9 (see Activity Center 3)
- counters, at least 100 per student (see Extension 1)
- BLM Hundreds Chart (p. R-1, see Extension 1)


Learning numbers to 100. ASK: What comes after 40 when we count? (41) PROMPT: We say 37, 38, 39, 40, …. ASK: What comes after 50? (51) What comes after 60? (61) What do you think comes after 90? (91) What comes after 91? (92) Continue to 99. ASK: Does anyone know what comes after 99? (100) Clearly say “one hundred.” Congratulate the class on reaching 100. Practice counting from 90 to 100 as a class. Add movement to the counting, such as jumping as each number is spoken.

Counting one at a time. Start at 90. Have students take turns saying the next number until you reach 100. Repeat until everyone has had a turn.

Adding 91 to 99 to the number chart. Make enough number cards available so that each student has a card and you have a set of cards. Distribute a number card for 91 to 100 to each student. ASK: Whose number has a 9 and a 1? Have those students hold up their number cards ask a volunteer to add their number to the number chart. Make sure it is oriented correctly. Continue until all numbers to 99 have been added to the chart. Have the class say the count sequence from 91 to 99 as you point to each numeral on the chart, so that students begin to associate the spoken and written numbers.
Adding 100 to the number chart. Have students with 100 hold up their number card. SAY: This is 100. It is the last number we will add to our chart. ASK: What is different about 100? (it is written with three numbers (digits)) Have a volunteer add it to the chart.

Counting 1 to 100. As a class, count from 1 to 100. You may wish to have one or more students lead the count, allowing each student to count at least 10 numbers. You may also wish to point to the numbers on the number chart as everyone counts.

Activity
Counting out hundreds. Divide students into groups of four or five. Give each group an empty bin and a bin containing at least 100 objects, such as counters, blocks, connecting cubes, or pennies. Have students make 10 piles of 10 objects. Then students take turns counting the objects. Student 1 counts from 1 to 10 as each object is placed into the empty bin. Student 2 counts on by the next 10 numbers starting from the last number counted, and so on. At the end, there should be 100 objects in the bin. If using connecting cubes, students can make a chain of 100 cubes. ASK: How high does it reach?
(end activity)

Activity Centers
For guidance on selecting and using the activity centers, see Introduction, p. A-16.

1. Clay Numbers
   Type: Individual, creative
   Objective: To practice making the number 9 using clay
   Preparation: Provide modeling clay.
   Instructions: Have students make the number 9 in clay.

2. Painting Numbers
   Type: Individual, creative
   Objective: To practice painting the number 9
   Preparation: Provide paint, a paintbrush, and paper to each student.
   Instructions: Have students paint the number 9 on paper.

3. Numbers in Sand
   Type: Individual
   Objective: To practice forming or tracing the number 9
   Preparation: Provide a sand table or a sandpaper number 9 to each student.
   Instructions: Have students write the number 9 in a sand table or trace it with their finger on sandpaper.
Extensions
1. Distribute at least 100 counters and BLM Hundreds Chart to each student. Students place one counter per square, counting as they go, until they reach 100.

2. Have students play I Start, You Finish (see introduction to Unit 1, p. C-1) in pairs for the numbers between 90 and 100.

Bonus: Start counting from a number less than 90 and stop before 100 and then have students continue counting until 100.

NOTE: Extension 3 can be done in pairs.

(MP.6) 3. Counting correctly or incorrectly? Say the count sequence from 90 to 100, but make a mistake; for example, skip a number or repeat a number. Students should raise their hand or say “stop” when you make a mistake. Ask them to explain your mistake to a partner.

4. Affix number cards for 91 to 100 to the board in order but with one adjacent pair reversed. Then ask a volunteer to come to the board and correct the mistake. This is a great exercise for generating excitement among the class and for raising the bar. You can increase the challenge by making two mistakes or rearranging three cards.

5. Teach students how to count backward from 5 to 1. Begin by writing or posting a row of numbers from 1 to 5 on the board, and pointing to them one by one in reverse order, from 5 to 1, as students count together. Then, keep the numbers on the board, but do not point to the numbers as students count backward. Finally, erase or remove the row of numbers and have students count backward. Repeat the process for counting backward from 10 to 1.

6. Remove the cards for 11 to 20 and 91 to 100 from the classroom number chart and affix them to the board, as shown below:

<table>
<thead>
<tr>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>91</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>95</td>
<td>96</td>
<td>97</td>
<td>98</td>
<td>99</td>
<td>100</td>
</tr>
</tbody>
</table>

Remove the 15 card and the 95 card from the board. Hold up one of the two cards and ASK: Where does this card belong? Does it belong here (point to the spot for 15)? Does it belong here (point to the spot for 95)? Students signal thumbs up (yes) or thumbs down (no). You might point out that both number cards end with a 5, so students need to look at the other number on the number card (the 1 or the 9). Point out that all of the number cards in the line above start with a 1, while all of the number cards in the line below start with a 9. After placing the 15 and the 95 back in their correct positions, repeat the exercise with another pair of number cards that are vertically aligned. After repeating several times, increase the challenge by using number cards that are not vertically aligned (for example, 93 and 17); now both digits are different. (If students are signaling the correct answers, you might wish to try the pair 91 and 19, which could be challenging for students since these numbers involve the same digits.) Repeat with number cards from 21 to 30.
The Numbers 11, 12, and 13

Pages 90–93


Goals:
Students name, recognize, and begin to write the numbers 11, 12, and 13.
Students count 11, 12, or 13 objects presented in an organized arrangement and count out those numbers of objects from a larger set.

Prior Knowledge Required:
Knows that a ten-frame holds 10 objects
Can count to 10 and recite numbers to 13
Can identify the numbers 1, 2, and 3
Can associate the numerals 1, 2, and 3 with one, two, and three objects and the words “one,” “two,” and “three,” respectively
Can write the numerals from 0 to 3

Vocabulary: a one, ones, ten-frame

Materials:
BLM Number Cards 11 to 15 (p. R-4)
ten-frame made from an egg carton with the lid still attached
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons
13 counters per student
scrap paper
BLM Interlined Paper (p. R-45, see Activity Center 1)
3 bags containing 11, 12, or 13 objects (see Activity Center 2)
BLM What’s My Number? (1) (p. M-48, see Activity Center 3)
cardstock (see Activity Center 4)
colored pencils, ink stamps, or small stickers (see Activity Center 4)
tape or interlocking floor tiles (see Activity Center 5)
BLM Color Me (p. M-52, see Activity Center 6)
bins containing at least 20 similar objects (e.g., blocks) (see Extension 1)
12 ones blocks per student (see Extension 2)
squares and triangles from BLM Pattern Blocks (p. R-31, see Extensions 2, 3)
grid paper or BLM 1 cm Grid Paper (p. R-46, see Extension 2)
4 triangle blocks per student (see Extension 3)
BLM Triangle Paper (p. M-53, see Extension 3)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 1 and 5. Also, review counting from 10 to 20, enunciating clearly.
Recognizing the numerals 11, 12, and 13. Write on the board:

1 2 3 4 5 6 7 8 9 10
11 12 13

Have students count aloud as you point to the numbers one at a time. Pointing to 11, ASK: What number is this? (11) Start at 8 and count on to 11. Pointing to 12, ASK: What number is this? (12) Repeat with 13. Point to 10 and count on to 12. Repeat by choosing a random starting point and counting on to 13.

Hold up number cards for 11 and 12 from BLM Number Cards 11 to 15. ASK: Which number do you think is greater, 11 or 12? (12) Why? (sample answers: 12 comes after 11 when we count, 2 is greater than 1) SAY: 12 comes after 11 when we count. So we know that 12 is the greater number. We can also guess that 12 is greater than 11 because both start with 1, but 12 has a 2 in it. Two is greater than one.

Hold up number cards for 12 and 13. ASK: Which is greater, 12 or 13? (13) How do you know? (sample answers: 13 comes after 12, 3 is greater than 2) SAY: Here’s a tricky one. Hold up number cards for 11 and 13, and ASK: Which is greater? (13)

Hold up a card for 11, 12, or 13 and ASK: What number is this? Repeat until students seem comfortable. Then erase the numbers on the board and repeat.

Counting 11, 12, and 13 with a ten-frame. In advance, make a ten-frame from an egg carton by cutting two cups from one end—keep the lid attached. Open the ten-frame and fill it with 10 counters. ASK: How many counters are in the ten-frame? (10) How do you know? (it is full) Place the open ten-frame on a table so that students can clearly see it. Count out three more counters and place them beside the open ten-frame. ASK: How many do we have now? (13) Count all of the counters to verify. Then close the ten-frame. SAY: This ten-frame is still full. ASK: How many counters does it have? (10) Pointing to the closed ten-frame and the three counters, ASK: How many counters do 10 and 3 make? (13, but students may not be able to answer) Pointing to the closed ten-frame, SAY: There are 10 here. So we can start counting from 10. Pointing to the ten-frame and to each counter in turn, SAY: 10, 11, 12, 13.

Move two of the extra counters to the other side of the closed ten-frame. ASK: How many counters are there now? (13) Count the counters as you did before, starting from 10. Move the extra counters around and repeat.

Introducing ones. Hold up a counter and SAY: We count this so we call it a counter. Sometimes we call it a one.

Counting 11, 12, and 13 with a written ten-frame. Draw a ten-frame on the board and fill it with circles. ASK: How many circles did I draw? (10) How do you know? (the ten-frame is full) Draw two more circles beside the ten-frame. ASK: How many circles are there now? (12)
How do you know? (by counting, by counting on from 10) Write “12” below the picture, as shown below:

```
□ □ □ □ □ □ □ □ □ □ □ □ □
□ □ □
```

12

ASK: How many circles are not in the ten-frame? (2) SAY: We make 12 with 10 and 2 more. Pointing to the ten-frame and to each extra circle in turn, SAY: 10, 11, 12. ASK: How can you tell from the way we write 12 that it is 10 and then 2 more? (answers may vary) Pointing to the tens digit, SAY: The 1 tells us to start with 10. Then the 2 tells us to add two more. Repeat with 11.

**MP.3 Counting 11, 12, and 13 without a ten-frame.** Draw or affix 11 counters to the board, as shown below:

```
□ □ □ □ □ □ □ □ □ □ □ □ □
```

Count the counters as a class or have a volunteer count them. ASK: 11 is 10 and how many more? (1) Have a volunteer circle 10 counters. ASK: How many ones are left? (1)

Add another counter to the drawing on the board. ASK: How many ones are there now? (12) How do you know? (sample answers: 12 is one more than 11, 12 is two more than 10)

SAY: It is helpful to count 10 and then to see how many more. Draw or affix counters to the board to show different arrangements of 11, 12, and 13 objects. For each arrangement, count as students have been taught to count: from left to right for a line, in reading pattern order for an array, and from a marked starting point for a circle. Then count them again by having a volunteer circle 10 and count on from 10. Have a different volunteer write how many below each arrangement. (see examples below)

```
□ □ □ □ □ □ □ □ □ □ □ □ □
□ □ □ □ □ □ □ □ □ □ □ □ □
□ □ □ □ □ □ □ □ □ □ □ □ □
```

12 11 13

**Activity**

Provide a ten-frame made from an egg carton or from BLM Ten-Frames, 13 counters, and scrap paper to each student. Have students count out 11 counters and then fill their ten-frame. When students are done, they write “11” on scrap paper. Repeat for 12 and 13.

(end of activity)
Activity Centers
1. **Writing Teen Numbers** (see unit introduction, p. M-1)

2. **What’s My Number?** (see unit introduction, p. M-2)

3. **What’s My Number?** (see unit introduction, p. M-2)
   
   *Variation:* Cut out the cards from **BLM What’s My Number? (1)**. Students count and write the correct number in the space provided.

4. **Representing Teen Numbers** (see unit introduction, p. M-2)

5. **Gathering Teen Numbers** (see unit introduction, p. M-2)

6. **Color Me** (see unit introduction, p. M-2)

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Extensions
1. Provide students with a bin containing at least 20 similar objects, such as blocks. Students count out 11, 12, or 13 objects from the bin.

   *(MP.1, MP.7)*

2. Give each student 12 ones blocks or squares from **BLM Pattern Blocks**. Have students arrange the blocks into the shape of a rectangle. They can copy their design onto grid paper or **BLM 1 cm Grid Paper**. Challenge students to create as many different rectangles as they can.

   **Sample answers:**
   
   ![Sample rectangles](image)

   *(MP.1, MP.7)*

3. Give students four triangle blocks or triangles from BLM Pattern Blocks. Have students arrange the blocks into the shape of a triangle. They can copy their design onto **BLM Triangle Paper**.

   **Answer:**
   
   ![Sample triangle](image)

4. Draw or build the following arrangement of counters. Have students count the counters.

   ![Sample arrangement](image)

   **Answer:** 12
**NBTK-3  Taking Apart 11, 12, and 13**

Pages 94–96

**Standards:** K.NBT.A.1, K.CC.A.1, K.CC.A.2, K.CC.A.3, K.CC.B.4, K.CC.B.5

**Goals:**
Students begin to understand that the teen numbers consist of ten ones and some more ones. In particular, the numbers 11, 12, and 13 are made of 10 ones and 1, 2, or 3 ones, respectively.

**Prior Knowledge Required:**
Recognizes the numbers from 0 to 13
Can count up to 13 objects

**Vocabulary:** a one, a ten, ones

**Materials:**
blue card for 10 and red cards for 1, 2, and 3 from BLM Teacher Cards (p. M-54)
BLM Tens Cards (p. M-55) copied on blue paper
BLM Ones Cards (p. M-56) copied on red paper
pipe cleaners (see Activity Center 1, Extension 1)
BLM Number Cards 11 to 15 (p. R-4, see Activity Centers 1, 2)
counters (see Activity Center 2, Extension 1)
BLM Hundreds Chart (p. R-1, see Extension 1)

**NOTE:** Use BLM Teacher Cards to copy the tens card on blue paper and the smaller ones cards on red paper.

**Counting practice.** Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 1 and 3 and the numbers 11 and 13. Also review counting from 10 to 20, enunciating clearly.

**(MP.5, MP.7)** 12 is 10 ones and 2 ones. Draw a ten-frame on the board and fill it with circles.
ASK: How many does this show? (10) Write “12” below the ten-frame. ASK: How many ones do I need to draw to show 12? (2) SAY: Let’s check. We can count as we draw. Point to the full ten-frame and SAY: 10. As you draw two more circles, SAY: 11, 12. The picture should look like this:

```
 numeros
        numeros
        numeros
        numeros
        numeros
      
      
12
```

Point to the full ten-frame and SAY: Remember, we can call each counter a one. Sometimes we call a full ten-frame a ten because it holds 10 ones. We made 12 with 10 ones and 2 extra ones.
(MP.7) Showing 12 as 10 and 2 ones. ASK: How many extra ones did we need to make 12? (2) SAY: Twelve is 10 (point to the ten-frame) and 2 ones (point to the ones). We can show it like this. Draw on the board:

```
12
```

Place a blue card for 10 and a red card for 2, as shown below:

```
12

10    2
```

SAY: This shows that we can take apart 12 into 10 ones (point to 10) and 2 ones (point to 2).

(MP.7) 11 is 10 and 1 one. Draw a ten-frame on the board and fill it with circles. ASK: How many does this show? (10) What can we call a full ten-frame? (a ten) Write “11” below the ten-frame. ASK: How many ones do I need to draw to show 11? (1) SAY: The 2 in 12 told us that we needed two extra ones. Eleven has a one. Point to the full ten-frame and SAY: 10. Draw one more circle as you SAY: 11. The picture should look like this:

```
11

10    1
```

SAY: Eleven is 10 ones (point to the full ten-frame) and 1 one (point to the extra circle). We can show it like this. Draw a picture and place a blue card for 10, as shown below:

```
11

10
```

Pointing to the empty branch, ASK: What number goes here? (1) Place a red card for 1, as shown below:

```
11

10    1
```
(MP.7) **13 is 10 and 3 ones.** Draw a ten-frame on the board and fill it with circles. SAY: We are going to write 13 as 10 ones and some more ones. Beside the ten-frame, write “13” with two branches. Pointing to the ten-frame, ASK: How many does this show? (10) Where should I write 10 in the picture? (the left branch) Write “10” at the end of the left branch. ASK: How many ones do I need to make 13? (3) How do you know? (it ends in 3) Draw three circles beside the ten-frame and write “3” at the end of the right branch. The final picture should look like this:

![Ten-frame with 10 and 3 ones]

**Taking apart 10 (optional).** Draw a ten-frame on the board and fill it with circles. ASK: How many does this show? (10) How many ones do I need to draw to make 10? (0, none) SAY: We already have 10 in the ten-frame. We need zero extra. Draw on the board:

![Ten-frame with 10 and 0 ones]

Pointing to the empty branch, ASK: What number goes here? (0) SAY: 10 is 10 ones and no more ones. Write “0” at the end of the empty branch.

**Activity**

**(MP.7) Using cards to create two-digit numbers.** In advance, make copies of BLM Tens Cards on blue paper and BLM Ones Cards on red paper. Give each student a 10 card and a ones card for each of 1, 2, and 3. **NOTE:** Save the cards for 4 to 9 for use in later lessons.

Draw a tens and ones tree for 12 and complete it using cards, as shown below:

![Tens and ones tree for 12]

Remove the cards and show students how to build 12 by placing the 2 card on top of the 10 card so that it covers the zero. ASK: What number do you see? (12) Repeat with 11, 12, and 13. For each number, have students hold up the cards needed to make the number, and then build the number by overlapping the cards.

*(end of activity)*
Activity Centers
1. **Binding 10** (see unit introduction, p. M-2)

2. **Binding 10** (see unit introduction, p. M-2)
   *Variation:* Provide at least 20 counters. Students make a pile of 10 and some extra ones.

3. **Tens in a Flash** (see unit introduction, p. M-3)

4. **Tens in a Flash** (see unit introduction, p. M-3)
   *Variation:* Player 1 shows all 10 fingers and then one, two, or three extra ones. Player 2 says the number shown.

Extensions
1. **How many tens?** Give students 21 to 23 pipe cleaners. Students count the pipe cleaners, make as many bundles of 10 as they can, and then say how many bundles there are.

   Alternatively, give students 21 to 23 counters and a hundreds chart from **BLM Hundreds Chart**. Students place one counter at a time on the hundreds chart as they count it. They write the total number of counters by copying the last number covered. **ASK:** How many stacks of 10 can you make with these counters? Have them make stacks of 10 to check their guesses.

2. Have advanced students repeat the activity from this lesson, but instead of using the tens cards from **BLM Tens Cards**, provide cards with the numbers 10, 20, 30, etc., to 90.

   *(MP.2, MP.4, MP.5)* 3. Rani has a basketball and a hockey puck. How many flat faces are there on Rani’s shapes altogether? Encourage students to choose any tools they think will help them to model and solve the question, such as solid shapes, stickers, blocks, counters, or pencil and paper.
   **Sample answer:** I used a cylinder and a sphere. I counted 2 flat faces on the cylinder, and 0 flat faces on the sphere. So there are 2 flat faces altogether.
**NBTK-4 Making 11, 12, and 13**

Pages 97–99

**Standards:** K.NBT.A.1, K.CC.A.1, K.CC.A.2, K.CC.A.3, K.CC.B.4, K.CC.B.5

**Goals:**
Students write the numbers 11, 12, and 13 as 10 plus 1, 2, and 3, respectively.
Students use objects and pictures to model the additions.

**Prior Knowledge Required:**
Can count to 13
Knows that the numbers from 11 to 13 can be represented as 10 ones and some more ones
Recognizes the plus sign and equal sign

**Vocabulary:** a ten, addition, equal sign (=), ones, plus sign (+)

**Materials:**
- at least 15 counters per student
- BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons
- BLM Game Cards (p. R-10, see Activity Center 1)
- connecting cubes of two colors (see Activity Centers 2, 3, Extension 1)
- scrap paper (see Activity Center 3)
- BLM I Have ____, Who Has ____? (p. R-8, see Activity Center 5)

**Counting practice.** Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 11 and 13. Also review counting from 10 to 20, enunciating clearly.

**(MP.2) 13 is 10 plus 3.** Draw a ten-frame on the board and fill it with circles. ASK: How many does this show? (10) What do we call a full ten-frame? (a ten) Write “10” below the ten-frame. ASK: We have 10 so how many ones do we need to show 13? (3) Draw three more circles and write “3” below them, as shown below:

```
  10   3
```

SAY: This is an addition. We have 10 and 3 more. Write “+” between the numbers. ASK: How many does 10 + 3 make? (13) Write “= 13” to complete the addition sentence, as shown below:

```
  10 + 3 = 13
```
(MP.2) 12 is 10 plus 2. Repeat to show that \(10 + 2 = 12\). The final picture should look like this:

```
\[
\begin{array}{c}
\begin{array}{c}
\Huge\text{\#\#\#\#\#\#\#\#\#\#}\end{array}\\
\Huge+\quad\Huge\text{\#\#}
\end{array}
\]
10 + 2 = 12
```

(MP.2) 11 is 10 plus 1. Repeat to show that \(10 + 1 = 11\). The final picture should look like this:

```
\[
\begin{array}{c}
\begin{array}{c}
\Huge\text{\#\#\#\#\#\#\#\#\#\#}\end{array}\\
\Huge+\quad\Huge\text{\#}
\end{array}
\]
10 + 1 = 11
```

10 is 10 plus 0 (optional). Draw a ten-frame on the board and fill it with circles. ASK: How many does this show? (ten) Write “10” below the ten-frame. ASK: How many ones do we need to draw to make 10? (0, none) SAY: We already have 10 in the ten-frame. We need zero extra. Write the rest of the addition sentence, as shown below:

```
\[
\begin{array}{c}
\begin{array}{c}
\Huge\text{\#\#\#\#\#\#\#\#\#\#}\end{array}
\end{array}
\]
10 + 0 = 10
```

**Activity**

(MP.2) Give each student at least 15 counters and a ten-frame made from an egg carton or from BLM Ten-Frames. Write “10 + 2” on the board and ask students to show the addition using their ten-frame and counters. ASK: What is 10 + 2? (12) Repeat with 10 + 1 and 10 + 3. (end of activity)

**Activity Centers**

1. **Matching** (see introduction to Unit 7, p. J-3)
   *Variation*: In advance, make three pairs of matching cards using BLM Game Cards. Write the numbers 11, 12, and 13 and the additions 10 + 1, 10 + 2, or 10 + 3, each on a separate card. Students match a number card with the correct addition card.

2. **Adding Cubes** (see unit introduction, p. M-3)

3. **Adding Cubes** (see unit introduction, p. M-3)
   *Variation*: Students work in pairs. Each student uses connecting cubes to represent 11, 12, or 13. They trade models with their partners and write an addition for each other’s work on scrap paper.

4. **Tens in a Flash** (see unit introduction, p. M-3)
   *Variation*: Player 1 shows all 10 fingers and then holds up one, two, or three fingers. Player 2 counts on from 10 on Player 1’s fingers to find the number.
5. I Have ___, Who Has ___? (see introduction to Unit 7, p. J-2)

Variation: In advance, prepare cards using BLM I Have ___, Who Has ___? For “I have,” show an addition (i.e., 10 + 1, 10 + 2, 10 + 3). For “Who has,” write the number 11, 12, or 13. Make sure that the bottom of each card can be matched to the top of another card, and vice-versa.

Example:

<table>
<thead>
<tr>
<th>I have</th>
<th>Who has</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 + 2</td>
<td>13</td>
</tr>
</tbody>
</table>

**Extensions**

1. **Adding Cubes** (see unit introduction, p. M-3)

Variation: Students represent the numbers 21, 22, and 23. Provide connecting cubes of two colors (at least 21 in one color and about 10 in the other color). Students make 20 in one color and then add some ones in the other color. Very advanced students can build 2 tens in one color and add some ones in the other color. Students write an addition sentence for each model.

(MP.5, MP.7) 2. Use 10 to add. Choose any tools to help. Explain to a partner how you used 10 to add.

a) 8 + 3  

Selected sample answers:

a) I put 8 counters on the ten-frame. Then I counted out 3 more counters. Two of the counters filled the ten-frame, and there was one more outside the ten-frame. I know 10 and one more makes 11, so 8 + 3 is 11.

b) 5 + 7  

c) 6 + 6  

d) 9 + 2  

e) 7 + 4

3. Students draw counters to show how many are missing.

a)  

Selected sample answers:

a) 2, b) 3, c) 1
NBTK-5  The Numbers 14, 15, and 16

Pages 100–103


Goals:
Students name, recognize, and begin to write the numbers 14, 15, and 16.
Students count 14, 15, or 16 objects presented in an organized arrangement and count out those numbers of objects from a larger set.

Prior Knowledge Required:
Knows that a ten-frame holds 10 objects
Can count to 10 and recite numbers to 16
Can identify the numbers 4, 5, and 6
Can associate the numerals 4, 5, and 6 with four, five, and six objects and the words “four,” “five,” and “six,” respectively
Can write the numerals 0, 1, 4, 5, 6

Vocabulary: ones, ten-frame

Materials:
BLM Number Cards 11 to 15 (p. R-4)
BLM Number Cards 16 to 20 (p. R-5)
ten-frame made from an egg carton with the lid still attached
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons, one or two per student
16 counters per student
scrap paper
BLM Interlined Paper (p. R-45, see Activity Center 1)
3 bags containing 14, 15, or 16 objects (see Activity Center 2)
counters of two colors (see Activity Center 2)
BLM What’s My Number? (2) (p. M-49, see Activity Center 3)
cardstock (see Activity Center 4)
colored pencils, ink stamps, or stickers (see Activity Center 4)
tape or interlocking floor tiles (see Activity Center 5)
BLM Color Me (p. M-52, see Activity Center 6)
bin containing at least 20 similar objects (e.g., blocks) (see Extension 1)
15 or 16 ones blocks per student (see Extension 2)
squares and triangles from BLM Pattern Blocks (p. R-31, see Extensions 2, 3)
grid paper or BLM 1 cm Grid Paper (p. R-46, see Extension 2)
9 triangle blocks per student (see Extension 3)
BLM Triangle Paper (p. M-53, see Extension 3)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 3 and 7. Play I Start, You Finish (see introduction to Unit 1, p. C-1) for the numbers from 10 to 20, enunciating clearly.
(MP.3) Recognizing the numerals 14, 15, and 16. Write on the board:

```
  1  2  3  4  5  6  7  8  9  10
11 12 13 14 15 16
```

Have students count aloud as you point to the numbers one at a time. Starting at 11, have students recite the numbers from 11 to 16. Point to a number from 11 to 16 and ASK: What number is this? Ask about numbers in order at first, then increasingly choose numbers at random with a focus on the numbers 14, 15, and 16.

Hold up number cards for 14 and 15 from BLM Number Cards 11 to 15. ASK: Which number do you think is greater, 14 or 15? (15) Why? (sample answers: 15 comes after 14 when we count; 5 is greater than 4) SAY: 15 comes after 14 when we count. So we know that 15 is the greater number. We can also guess that 15 is greater than 14 because both start with 1 but 15 has a 5 in it. Five is greater than four.

Hold up number cards for 15 and 16 from BLM Number Cards 16 to 20. ASK: Which is greater, 15 or 16? (16) How do you know? (sample answers: 16 comes after 15, 6 is greater than 5) SAY: Here’s a tricky one. Hold up number cards for 14 and 16 and ASK: Which is greater? (16) How do you know? (sample answer: 6 is greater than 4)

Hold up a number card for 14, 15, or 16 and ASK: What number is this? Repeat until students seem comfortable. Then erase the numbers on the board and repeat.

(MP.3) Counting 14, 15, and 16 with ten-frames. In advance, make a ten-frame from an egg carton by cutting two cups from one end—keep the lid attached. Open the ten-frame and fill it with 10 counters. ASK: How many counters are in the ten-frame? (10) How do you know? (it is full) Close the ten-frame. ASK: How many are in the ten-frame now? (10) SAY: There are still 10 counters in the ten-frame. Count out four more counters and place them beside the closed ten-frame. ASK: How many do we have now? (14) SAY: Let’s count. Pointing to the ten-frame and each counter in turn, SAY: 10, 11, 12, 13, 14.

Move two of the counters to the other side of the ten-frame. ASK: How many are there now? (14) Count again, as before, starting from 10. Move the extra counters around and repeat.

Add two more counters and count again as a class. SAY: We have a lot of counters now. Let’s put the extra ones in a ten-frame, too. Place the additional counters in another open ten-frame. Add and remove counters and have the class say or count each number shown. Use numbers from 11 to 16.

SAY: We can draw pictures to show numbers too. Draw a ten-frame on the board and fill it with circles. ASK: How many circles did I draw? (10) How do you know? (the ten-frame is full) Draw five more circles beside the ten-frame, and SAY: Remember, the extra circles are called ones. ASK: How many ones are there? (5) How many does this picture show? (15) Count to verify.
Write “15” below the picture. The picture should look like this:

```
  15
```

ASK: How can you tell from the way we write 15 that it is 10 and then 5 ones? (answers may vary) Pointing in turn to each digit in 15, SAY: The 1 tells us to start with 10. The 5 tells us to add five more.

SAY: Let’s draw 16. But let’s put the ones in a ten-frame too. Erase the 5 ones and draw a second ten-frame. Have a volunteer draw six circles in the second ten-frame. ASK: How many does this show? (16) Count to verify. Have a volunteer write “16” below the picture, as shown below:

```
  16
```

(MP.3) Counting 14, 15, and 16 without a ten-frame. Draw or affix 14 counters to the board, as shown below:

```
  14
```

Count the counters as a class or have a volunteer count them. ASK: Fourteen is 10 and how many more? (4) If we circle 10, how many ones will be left? (4) Students can signal the answer on their fingers. Have a volunteer circle 10 counters. ASK: How many ones are left? (4)

Add another counter to the drawing on the board. ASK: How many are there now? (15) How do you know? (sample answers: 15 is one more than 14, 15 is 5 more than 10)

SAY: It is helpful to count 10 and then see how many more. Draw or affix counters to the board to show different arrangements of 14, 15, and 16 objects. For each arrangement, count as students have been taught to count: from left to right for a line, in reading pattern order for an array, and from a marked starting point for a circle. Then count them again by having a volunteer circle 10, and count on from 10. Have a different volunteer write how many below each arrangement. (see examples below)
Activity
Distribute one or two ten-frames made from egg cartons or from BLM Ten-Frames, 16 counters, and scrap paper to each student. Have students count out 14 counters and fill their ten-frame(s). When students are done, they write “14” on scrap paper. Repeat for 15 and 16.
(end of activity)

Activity Centers
1. Writing Teen Numbers (see unit introduction, p. M-1)
   Variation: Have students write 14, 15, and 16.

2. What's My Number? (see unit introduction, p. M-2)
   Variations:
   1. Prepare bags containing 14, 15, or 16 objects.
   2. Fill the bags with two colors of counters, 10 in one color and four, five, or six in the other. Students can use the counters with or without a ten-frame.

3. What's My Number? (see unit introduction, p. M-2)
   Variation: Cut out the cards from BLM What’s My Number? (2). Students count and write the correct number in the space provided.

4. Representing Teen Numbers (see unit introduction, p. M-2)
   Variation: Label the cards 14, 15, or 16.

5. Gathering Teen Numbers (see unit introduction, p. M-2)
   Variation: Provide students with a number card for each of 14, 15, and 16 from BLM Numbers 11 to 15 and BLM Number Cards 16 to 20. Students gather 14, 15, or 16 objects from the classroom.

6. Color Me (see unit introduction, p. M-2)
   Variation: Students write one of the numbers 14, 15, or 16 and then color that many shapes.

Extensions
1. Provide students with a bin containing at least 20 similar objects, such as blocks. Students count out 14, 15, or 16 objects from the bin.

(MP.1, MP.7) 2. Give each student 15 or 16 ones blocks or squares from BLM Pattern Blocks. Students arrange the cubes into the shape of a rectangle. They can copy their design onto grid paper or BLM 1 cm Grid Paper. Challenge students to create as many different rectangles as they can.

Sample answers:
NOTE: If students did not do Extension 3 in Lesson NBTK-2, have them start with four triangles.

(MP.1, MP.7) 3. Give students nine triangle blocks or triangles from BLM Pattern Blocks. Students arrange the blocks into the shape of a triangle. They can copy their design onto BLM Triangle Paper.

Answer:

![Triangle Diagram]

4. Draw or build the following using counters. Students count the counters.

a) 

b) 

Answers: a) 14, b) 15
NBTK-6  Taking Apart 14, 15, and 16

Pages 104–106


Goals:
Students begin to understand that the numbers 14, 15, and 16 are composed of 10 ones and 4, 5, or 6 ones, respectively.

Prior Knowledge Required:
Recognizes the numbers from 0 to 16
Can count up to 16 objects

Vocabulary: a ten, ones

Materials:
blue card for 10 and red cards for 4, 5, and 6 from BLM Teacher Cards (p. M-54)
BLM Tens Cards (p. M-55) copied on blue paper
BLM Ones Cards (p. M-56) copied on red paper
pipe cleaners (see Activity Center 1, Extension 1)
BLM Number Cards 11 to 15 (p. R-4, see Activity Centers 1, 2)
BLM Number Cards 16 to 20 (p. R-5, see Activity Centers 1, 2)
counters (see Activity Center 2, Extension 1)
BLM Hundreds Chart (p. R-1, see Extension 1)
connecting cubes of two colors (see Extension 2)

NOTE: Use BLM Teacher Cards to copy the tens card on blue paper and the smaller ones cards on red paper.

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 3 and 7 and the numbers from 14 to 16. Also review counting from 10 to 20, enunciating clearly.

(MP.5, MP.7) 15 is 10 and 5 ones. Draw two ten-frames on the board and fill one with circles. ASK: How many does this show? (10) Write “15” below the ten-frames. ASK: How many ones do I need to draw to show 15? (5) How do you know? (15 ends in 5) SAY: Let’s check. Draw or have a volunteer draw five circles in the second ten-frame. Count as a class from 10 to 15.
The final picture should look like this:

```
000000  00000
```

15
(MP.7) **Showing 15 as 10 and 5 ones.** ASK: How many extra ones did we need to make 15?  
(5) SAY: Fifteen is 10 (point to the ten-frame) and 5 ones (point to the ones). We can make a picture for 15. Draw on the board:

```
  15
```

Pointing to the branch on the left, ASK: What goes here? (10) Repeat for the branch on the right. (5) Complete the picture using a blue card for 10 and a red card for 5, as shown below:

```
  15
  10  5
```

Repeat for 14 and 16 by drawing two ten-frames and a tens and ones tree as you did for 15. Allow volunteers do as much as possible.

Draw a tens and ones tree for each number from 11 to 16 and have volunteers fill them in.

**Activity**  
(MP.7) **Using cards to create two-digit numbers.** In advance, make copies of **BLM Tens Cards** on blue paper and **BLM Ones Cards** on red paper. Give each student a 10 card and a card for each of 4, 5, and 6. Remind students how to make a two-digit number by placing the 4 card on top of the 10 card so that it covers the zero. ASK: What number do you see? (14)

One at a time, say the numbers 14, 15, and 16. Have students hold up the cards needed to make the number, and then build the number by overlapping the cards.  
(end of activity)

**Activity Centers**
1. **Binding 10** (see unit introduction, p. M-2)  
   *Variation:* Provide number cards for 14, 15, and 16 from **BLM Number Cards 11 to 15** and **BLM Number Cards 16 to 20** and at least 25 pipe cleaners. Students do the activity for 14, 15, and 16 pipe cleaners.  
   *Bonus:* Students draw the tens and ones tree for each number of pipe cleaners.

2. **Binding 10** (see unit introduction, p. M-2)  
   *Variation:* Provide at least 25 counters. Students use 14, 15, or 16 counters and make a pile of 10 and some extra ones.

3. **Tens in a Flash** (see unit introduction, p. M-3)  
   *Variation:* Player 1 says the number 14, 15, or 16.  
   *Bonus:* Students play using the numbers from 11 to 16.
4. **Tens in a Flash** (see unit introduction, p. M-3)

*Variation:* Player 1 shows all 10 fingers and then four, five, or six extra ones. Player 2 says the number shown.

---

**Extensions**

1. **How many tens?** Give students 34 to 36 pipe cleaners. Students count the pipe cleaners. ASK: How many bundles of 10 do you think you can make with your pipe cleaners? Students verify their guesses by making as many bundles of 10 as they can, and then say how many bundles there are.

Alternatively, give students 34 to 36 counters and a hundreds chart from BLM *Hundreds Chart*. Students place one counter at a time on the hundreds chart as they count it. They write the total number of counters by copying the last number covered. ASK: How many stacks of 10 can you make with these counters? Have them make stacks of 10 to check their guesses.

2. Give students 10 connecting cubes of one color and at least 6 of another color, for example, red and blue. Have students make a chain of 12 cubes using 10 red and then 2 blue. SAY: This chain shows 12—10 red and 2 blue. ASK: What number will we show if we add two more blue? Have students add cubes to verify that there are 14. Repeat by starting with other numbers added to 10 (do not exceed 16).

3. Have advanced students repeat the activity from this lesson, but instead of using the tens cards from BLM *Tens Cards*, provide cards with the numbers 10, 20, 30, etc., to 90.

**(MP.2, MP.4, MP.5)** 4. Rani has a cone, a cylinder, and a cube. How many flat faces are there on Rani’s shapes altogether? Encourage students to choose any tools they think will help them to model and solve the question, such as solid shapes, stickers, blocks or counters, pencil and paper, a number line, or a ten-frame.

**Sample answer:** I used a cylinder, a cone, a cube, and stickers. I counted 2 flat faces on the cylinder, 1 flat face on the cone, and 6 flat faces on the cube. I used stickers to keep track of the faces on the cube. I wrote the numbers down and used blocks to help me add. 2 + 1 + 6 = 9

Redirecting students: If students struggle to keep track of all the faces, encourage them to use stickers and write down the numbers for each shape before counting the flat faces on the next shape.
Goals:
Students write the numbers 14, 15, and 16 as 10 plus 4, 5, and 6, respectively.
Students use objects and pictures to model the additions.

Prior Knowledge Required:
Can count to 16
Knows that the numbers from 11 to 16 can be represented as 10 ones and some more ones
Recognizes the plus sign and equal sign

Vocabulary: a ten, addition, equal sign (=), ones, plus sign (+)

Materials:
at least 20 counters per student
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons, two per student
BLM Game Cards (p. R-10, see Activity Center 1)
connecting cubes of two colors (see Activity Centers 2, 3, Extension 1)
scrap paper (see Activity Center 3)
BLM I Have ___, Who Has ___? (p. R-8, see Activity Center 5)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 14 and 16. Also review counting from 10 to 20, enunciating clearly.

(MP.2) 16 is 10 plus 6. Draw two ten-frames on the board and fill one with circles. Write “16” above the picture. Pointing to the full ten-frame, ASK: How many does this show? (10) What do we call a full ten-frame? (a ten) Write “10” below the full ten-frame. ASK: We have 10, so how many ones do we need to show 16? (6) Have a volunteer draw six circles in the empty ten-frame. Write “6” below the second ten-frame. The picture should look like this:

\[
\begin{array}{cc}
16 & \\
10 & + \\
6 & = 16 \\
\end{array}
\]
(MP.2) **14 is 10 plus 4.** Draw two ten-frames on the board and write the number 14 above them. Have volunteers complete the picture for the addition, prompting them as needed. The final picture should look like this:

\[
\begin{array}{c}
14 \\
\hline
10 \quad + \quad 4 = 14
\end{array}
\]

(MP.2) **15 is 10 plus 5.** Draw two rectangles on the board and write “15” above them. Pointing to the first rectangle, ASK: How many will be in this ten-frame? (10) SAY: Instead of drawing all 10 circles, I will write the number 10 to show it is full. Write “10” in the first rectangle. Continue as before until the final picture looks like this:

\[
\begin{array}{c}
15 \\
\hline
10 \quad + \quad 5 = 15
\end{array}
\]

(MP.2) **Review 11 to 13 (optional).** Draw on the board:

\[
\begin{array}{c}
11 \\
\hline
12 \\
\hline
13
\end{array}
\]

Have volunteers complete the picture and write the addition for each number.

**Activity**

(MP.2) Give each student at least 20 counters and two ten-frames made from egg cartons or from **BLM Ten-Frames**. Write “10 + 4” on the board and ask students to show the addition using their ten-frames and counters. ASK: What is 10 + 4? (14) Repeat with 10 + 5 and 10 + 6. You might also have students practice showing additions for the numbers 11, 12, and 13.

(end of activity)

**Activity Centers**

1. **Matching** (see introduction to Unit 7, p. J-3)
   Variation: In advance, make pairs of matching cards using **BLM Game Cards**. Write the numbers from 11 to 16 and the additions from 10 + 1 to 10 + 6, each on a separate card. Students match a number card with the correct addition card.

2. **Adding Cubes** (see unit introduction, p. M-3)
   Variation: Students represent the numbers 14, 15, and 16.
3. **Adding Cubes** (see unit introduction, p. M-3)
   *Variation:* Students work in pairs. Each student uses connecting cubes to represent a number from 11 to 16. They trade models with their partners and write an addition for each other’s work on scrap paper.

4. **Tens in a Flash** (see unit introduction, p. M-3)
   *Variation:* Player 1 shows all 10 fingers and then holds up four, five, or six fingers. Player 2 counts on from 10 on Player 1’s fingers to find the number.

5. **I Have ____, Who Has ____?** (see introduction to Unit 7, p. J-2)
   *Variation:* In advance, prepare cards using BLM I Have ____, Who Has ____? For “I have,” show an addition from 10 + 1 to 10 + 6. For “Who has,” write a number from 11 to 16. Make sure that the bottom of each card can be matched to the top of another card, and vice-versa. Example:

   ![Card Example]

---

**Extensions**

1. **Adding Cubes** (see unit introduction, p. M-3)
   *Variation:* Students represent the numbers 24, 25, and 26. Provide connecting cubes of two colors (at least 21 in one color and about 10 in the other color). Students make 20 in one color and then add some ones in the other color. Very advanced students can build two tens in one color and add some ones in the other color. Students write an addition sentence for each model.

   *(MP.5, MP.7)* 2. Use 10 to add. Choose any tools to help. Explain to a partner how you used 10 to add.
   
   a) 8 + 6 \hspace{1cm} b) 5 + 9 \hspace{1cm} c) 6 + 9 \hspace{1cm} d) 8 + 8 \hspace{1cm} e) 9 + 7

   **Selected sample answers:**
   
   a) I put 8 counters on a ten-frame. Then I counted out 6 more counters. Two of the counters filled the ten-frame, and there were 4 more outside the ten-frame. I know 10 and 4 more makes 14, so 8 + 6 is 14.
   
   e) I counted out 9 connecting cubes first. Then I counted out 7 more. I joined 10 together to make a chain. I had six extras, and I know 10 and six more makes 16, so 9 + 7 is 16.
The Numbers 17, 18, and 19

Pages 110–113


Goals:
Students name, recognize, and begin to write the numbers 17, 18, and 19.
Students count 17, 18, or 19 objects presented in an organized arrangement and count out those numbers of objects from a larger set.

Prior Knowledge Required:
Knows that a ten-frame holds 10 objects
Can count to 10 and recite the numbers to 19
Can identify the numbers 7, 8, and 9
Can associate the numerals 7, 8, and 9 with seven, eight, and nine objects and the words “seven,” “eight,” and “nine,” respectively
Can write the numerals from 0 to 9

Vocabulary: ones, ten-frame

Materials:
BLM Number Cards 16 to 20 (p. R-5)
ten-frame made from an egg carton with the lid still attached
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons, two per student
19 counters per student
scrap paper
BLM Interlined Paper (p. R-45, see Activity Center 1)
3 bags containing 17, 18, or 19 objects (see Activity Center 2)
counters of two colors (see Activity Center 2)
BLM What's My Number? (3) (p. M-50, see Activity Center 3)
cardstock (see Activity Center 4)
colored pencils, ink stamps, or stickers (see Activity Center 4)
tape or interlocking floor tiles (see Activity Center 5)
BLM Color Me (p. M-52, see Activity Center 6)
bin containing at least 20 similar objects (e.g., blocks) (see Extension 1)
18 ones blocks per student (see Extension 2)
squares and triangles from BLM Pattern Blocks (p. R-31, see Extensions 2, 3)
grid paper or BLM 1 cm Grid Paper (p. R-46, see Extension 2)
16 triangle blocks per student (see Extension 3)
BLM Triangle Paper (p. M-53, see Extension 3)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 5 and 10. Play I Start, You Finish (see introduction to Unit 1, p. C-1) for the numbers from 10 to 20, enunciating clearly.
(MP.3) Recognizing the numerals 17, 18, and 19. Write on the board:

```
  1  2  3  4  5  6  7  8  9  10
11 12 13 14 15 16 17 18 19
```

Have students count aloud as you point to the numbers one at a time. Starting at 11, have students recite the numbers from 11 to 19. Point to a number from 11 to 19 and ASK: What number is this? Ask about numbers in order at first, then increasingly choose numbers at random with a focus on 17, 18, and 19.

Hold up number cards for 17 and 18 from BLM Number Cards 16 to 20. ASK: Which is greater, 17 or 18? (18) Why? (sample answers: 18 comes after 17, 8 is greater than 7) SAY: We know that 18 is greater than 17 because 18 comes after 17 when we count. We can also guess that 18 is greater than 17 because both start with 1 but 8 is greater than 7.

Repeat with cards for 17 and 18, then 17 and 19.

Hold up a number card for 17, 18, or 19 and ASK: What number is this? Repeat until students seem comfortable. Then erase the numbers from the board and repeat.

(MP.3) Counting 17, 18, and 19 with ten-frames. In advance, make a ten-frame from an egg carton by cutting two cups from one end—keep the lid attached. Fill the ten-frame with 10 counters and show it to students. Close the lid and ASK: How many counters are in here? (10) Place seven counters in a second ten-frame and ASK: How many are in here? (7) Count as a class or have a volunteer count. SAY: How many do we have together? Let’s count. Point to the closed ten-frame and SAY: 10. Then as a class, count on from 11 to 17.

Repeat with 18 and 19.

SAY: Let’s do this with pictures now. Draw two ten-frames on the board and fill the first one with circles. ASK: How many circles did I draw? (10) Draw seven circles in the second ten-frame. ASK: How many ones are there? (7) How many does this picture show? (17) Count to verify. Write “17” below the picture. ASK: How can you tell from the way we write 17 that it is 10 and then 7 ones? (answers may vary) Pointing in turn to each digit in 17, SAY: The 1 tells us to start with 10. Then the 7 tells us to add seven more. The final picture should look like this:

```
  □  □  □  □  □  □  □  □  □  □
  □  □  □  □  □  □  □  □  □  □
17
```

Repeat with 19 and 18.
(MP.3) **Counting 17, 18, and 19 without a ten-frame.** Draw or affix 17 counters to the board, as shown below:

![Counters](image)

Count the counters as a class or have a volunteer count. ASK: Seventeen is 10 and how many more? (7) If we circle 10, how many ones will be left? (7) Students can signal the answer on their fingers. Have a volunteer circle 10 counters. ASK: How many ones are left? (7)

Add another counter to the drawing on the board. ASK: How many ones are there now? (8) Count as a class and write “8” on the board below the ones. ASK: How many in the whole picture? (18)

SAY: It is helpful to count 10 and then see how many more. Draw or affix counters to the board to show different arrangements of 17, 18, and 19 objects. For each arrangement, count as students have been taught to count: from left to right for a line, in reading pattern order for an array, and from a marked starting point for a circle. Then recount by having a volunteer circle 10, and count on from 10. Have a different volunteer write how many below each arrangement. (see examples below)

![Arrangements](image)

**Activity**

Distribute two ten-frames made from egg cartons or from BLM Ten-Frames, 19 counters, and scrap paper to each student. Have students count out 17 counters and then fill their ten-frames. Ensure that they have seven counters in the second ten-frame. When students are done, they write “17” on scrap paper. Repeat for 18 and 19.

*(end of activity)*

**Activity Centers**

1. **Writing Teen Numbers** (see unit introduction, p. M-1)
   *Variation:* Have students write 17, 18, and 19.

2. **What’s My Number?** (see unit introduction, p. M-2)
   *Variations:*
   1. Prepare bags containing 17, 18, or 19 objects.
   2. Fill the bags with two colors of counters, 10 in one color and 7, 8, or 9 of the other. Students can use the counters with or without a ten-frame.

3. **What’s My Number?** (see unit introduction, p. M-2)
   *Variation:* Cut out the cards from BLM What’s My Number? (3). Students count and write the correct number in the space provided.
4. **Representing Teen Numbers** (see unit introduction, p. M-2)
   *Variation:* Label the cards 17, 18, or 19.

5. **Gathering Teen Numbers** (see unit introduction, p. M-2)
   *Variation:* Provide students with a number card for each of 17, 18, and 19 from BLM Numbers 16 to 20. Students gather 17, 18, or 19 objects from the classroom.

6. **Color Me** (see unit introduction, p. M-2)
   *Variation:* Students write one of the numbers 17, 18, or 19 and then color that many shapes.

---

**Extensions**

1. Provide students with a bin containing at least 20 similar objects, such as blocks. Students count out 17, 18, or 19 objects from the bin.

   *(MP.1, MP.7)*

2. Give each student 18 ones blocks or squares from BLM Pattern Blocks. Students arrange the blocks into the shape of a rectangle. They can copy their design onto grid paper or BLM 1 cm Grid Paper. Challenge students to create as many different rectangles as they can.
   
   **Sample answers:**

   ![Sample answers](image)

   **NOTE:** Extension 3 is suitable for very advanced students. If they did not do Extension 3 in either Lesson NBTK-2 or NBTK-5, have them start with four triangles and then nine triangles.

   *(MP.1, MP.7)*

3. Give students 16 triangle blocks or triangles from BLM Pattern Blocks. Students arrange the blocks into the shape of a triangle. They can copy their design onto BLM Triangle Paper.

   **Answer:**

   ![Answer](image)
Goals:
Students begin to understand that the numbers 17, 18, and 19 are composed of 10 ones and 7, 8, or 9 ones, respectively.

Prior Knowledge Required:
Recognizes the numbers from 0 to 19
Can count up to 19 objects

Vocabulary: a ten, ones

Materials:
blue card for 10 and red cards for 7, 8, and 9 from BLM Teacher Cards (p. M-54)
BLM Tens Cards (p. M-55) copied on blue paper
BLM Ones Cards (p. M-56) copied on red paper
BLM Number Cards 16 to 20 (p. R-5, see Activity Centers 1, 2)
pipe cleaners (see Activity Center 1, Extension 1)
counters (see Activity Center 2, Extension 1)
BLM Hundreds Chart (p. R-1, see Extension 1)
connecting cubes of two colors (see Extension 2)

NOTE: Use BLM Teacher Cards to copy the tens card on blue paper and the smaller ones cards on red paper.

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 5 and 10 and between 17 and 19. Also review counting from 10 to 20, enunciating clearly.

(MP.5, MP.7) 17 is 10 and 7 ones. Draw two ten-frames on the board and fill one with circles. ASK: How many does this show? (10) Write “17” below the ten-frames. ASK: We have 10, so how many ones do I need to show 17? (7) How do you know? (17 ends in 7) SAY: Let’s check. Draw or have a volunteer draw seven circles in the second ten-frame. Count as a class from 10 to 17. The final picture should look like this:

```
  □□□□□□□□ □□□□□□□□
  □□□□□□□□ □□□□□□□□
```

17
(MP.7) Showing 17 as 10 and 7 ones. Draw on the board:

![Image of 17 with tens and ones tree]

Pointing to the branch on the left, ASK: What goes here? (10) Repeat for the branch on the right. (7) Have a volunteer place a blue card for 10 and a red card for 7 to complete the picture, as shown below:

![Image of 17 with cards]

Repeat for 18 and 19 by drawing two ten-frames and a tens and ones tree as you did for 17. Allow volunteers do as much as possible.

Draw a tens and ones tree for each number from 11 to 19 and have volunteers fill them in.

**Activity**

(MP.7) Using cards to create two-digit numbers. In advance, make copies of BLM Tens Cards on blue paper and BLM Ones Cards on red paper. Give each student a 10 card and a card for each number from 1 to 9. Remind students how to make a two-digit number by placing the 9 card on top of the 10 card so that it covers the zero. ASK: What number do you see? (19)

One at a time, say the numbers 17, 18, and 19. Have students hold up the cards needed to make the number, and then build the number by overlapping the cards. Then, say the numbers from 11 to 19 randomly and have students show the number.

(end of activity)

**Activity Centers**

1. **Binding 10** (see unit introduction, p. M-2)
   *Variation:* Provide number cards for 17, 18, and 19 from BLM Number Cards 16 to 20 and at least 30 pipe cleaners.
   *Bonus:* Students draw the tens and ones tree for each number of pipe cleaners.

2. **Binding 10** (see unit introduction, p. M-2)
   *Variation:* Provide at least 30 counters. Students use 17, 18, or 19 counters and make a pile of 10 and some extra ones.

3. **Tens in a Flash** (see unit introduction, p. M-3).
   *Variation:* Player 1 says the number 17, 18, or 19.
   *Bonus:* Students play using the numbers from 11 to 19.
4. **Tens in a Flash** (see unit introduction, p. M-3)  
*Variation:* Player 1 shows all 10 fingers and then seven, eight, or nine extra ones. Player 2 says the number shown.

**Extensions**

1. **How many tens?** Give students 47 to 49 pipe cleaners. Students count the pipe cleaners. ASK: How many bundles of ten do you think you can make with your pipe cleaners? Students verify their guesses by making as many bundles of ten as they can, and then saying how many bundles there are.

   Alternatively, give students 47 to 49 counters and a hundreds chart from BLM Hundreds Chart. Students place one counter at a time on the hundreds chart as they count it. They write the total number of counters by copying the last number covered. ASK: How many stacks of ten can you make with these counters? Have them make stacks of ten to check their guesses.

   (MP.7) 2. Give students 10 connecting cubes in one color and at least 9 cubes in another color, for example, red and blue. Have students connect 13 cubes in a chain using 10 red and 3 blue. Have students model the following story as you tell it. SAY: Sam puts 13 cubes in a chain. One cube falls off. Then Sam adds two more cubes. ASK: How many cubes are in the chain now? Repeat by starting with other numbers added to 10 (do not exceed 19). After a few repetitions, ask students to predict how many cubes will be in the chain.

   Look for students to use the structure (MP.7) of the 10 blocks in one color (for example, red), and count more efficiently by starting from 10 and then counting only the blocks of the second color (for example, blue) rather than counting from 1.

   Individual or small group follow-up: If students do not make use of the 10 and count only from 1, ASK: Did it take a long time to count all the blocks? (yes) Which group of blocks stayed the same each time? (the red blocks) How many red blocks are there? (10) How could you make counting faster? (don’t count the red blocks every time; start counting after 10)

3. Have advanced students repeat the activity from this lesson, but instead of using the tens cards from BLM Tens Cards, provide cards with the numbers 10, 20, 30, etc. to 90.
Goals:
Students write the numbers 17, 18, and 19 as 10 plus 7, 8, and 9, respectively.
Students use objects and pictures to model the additions.

Prior Knowledge Required:
Can count to 19
Knows that the numbers from 11 to 19 can be represented as ten ones and some more ones
Recognizes the plus sign and equal sign

Vocabulary: a ten, addition, equal sign (=), ones, plus sign (+)

Materials:
at least 20 counters per student
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons, two per student
BLM Game Cards (p. R-10, see Activity Center 1)
connecting cubes of two colors (see Activity Centers 2, 3, Extension 1)
scrap paper (see Activity Center 3)
BLM I Have ____, Who Has ____? (p. R-8, see Activity Center 5)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 17 and 19. Also review counting from 10 to 20, enunciating clearly.

(MP.2) 17 is 10 plus 7. Draw two ten-frames on the board and fill one with circles. Write “17” above the picture. Pointing to the full ten-frame, ASK: How many does this show? (10) Write “10” below the full ten-frame. ASK: We have 10, so how many ones do we need to show 17? (7) Have a volunteer draw seven circles in the empty ten-frame. Write “7” below the second ten-frame. The picture should look like this:

17
10 + 7 = 17
18 is 10 plus 8. Draw two ten-frames on the board and write the number 18 above them. Have volunteers complete the picture for the addition, prompting them as needed.

Repeat for 19 is 10 plus 9—instead of drawing a full ten-frame, draw a box labeled with the number 10.

(MP.2) Review 11 to 19 (optional). Draw two ten-frames for each number from 11 to 19 on the board. Have volunteers complete the pictures and write the additions as they did before.

Activity
(MP.2) Give each student at least 20 counters and two ten-frames made from egg cartons or from BLM Ten-Frames. Write “10 + 7” on the board and ask students to show the addition. When they are done, ASK: What is 10 + 7? (17) Repeat with 10 + 8 and 10 + 9. You might also have students practice showing the additions for the numbers from 11 to 16.

(end of activity)

Activity Centers
1. Matching (see introduction to Unit 7, p. J-3)
   Variation: Make pairs of matching cards using BLM Game Cards. Write “10 + 1” to 10 + 9, each on a separate card. Students match a number card with the correct addition card.

2. Adding Cubes (see unit introduction, p. M-3)
   Variation: Students represent the numbers 17, 18, and 19.

3. Adding Cubes (see unit introduction, p. M-3)
   Variation: Students work in pairs. Each student uses connecting cubes to represent a number from 11 to 19. They trade models with their partners and write an addition for each other’s work on scrap paper.

4. Tens in a Flash (see unit introduction, p. M-3)
   Variation: Player 1 shows all 10 fingers and then holds up seven, eight, or nine fingers. Player 2 counts on from 10 on Player 1’s fingers to find the number.

5. I Have ___, Who Has ___? (see introduction to Unit 7, p. J-2)
   Variation: In advance, prepare cards using BLM I Have ___, Who Has ___. For “I have,” show an addition from 10 + 1 to 10 + 9. For “Who has,” write a number from 11 to 19. Make sure that the bottom of each card can be matched to the top of another card, and vice-versa. Example:
Extensions
1. Adding Cubes (see unit introduction, p. M-3)
Variation: Students represent the numbers 37, 38, and 39. Provide connecting cubes of two colors (at least 31 in one color and about 10 in another color). Students make 30 in one color and add the ones in the other color. Very advanced students can build three tens in one color and add some ones in the other color. Students write an addition sentence for each model.

(MP.5, MP.7) 2. Use 10 to add. Choose any tools to help. Explain to a partner how you used 10 to add.
   a) 9 + 8  b) 8 + 9  c) 9 + 9
Selected answers:
   b) I put 8 counters on a ten-frame. Then I counted out 9 more counters. Two of the counters filled the ten-frame, and there were 7 more outside the ten-frame. I know 10 and 7 more makes 17, so 8 + 9 is 17.
   c) I counted out 9 connecting cubes first. Then I counted out 9 more. I joined 10 together to make a chain. I had eight extras, and I know 10 and eight more makes 18, so 9 + 9 is 18.

3. Have very advanced students make each number in the addition using counters or connecting cubes. Then they move the counters into ten-frames from BLM Ten-Frames or link the cubes to make a ten and some ones. Then they find the answer.
   a) 6 + 5 + 3  b) 7 + 4 + 8  c) 4 + 6 + 7
Answers: a) 14, b) 19, c) 17
NBTK-11 The Number 20

Pages 120–122


Goals:  
Students name and recognize the number 20.  
Students count 20 objects presented in an organized arrangement.  
Students learn that 20 is made of 2 tens and is equal to 10 plus 10.

Prior Knowledge Required:  
Can count to 20  
Can recognize and name the numerals from 11 to 19  
Can count up to 19 objects presented in an organized arrangement  
Knows that each number from 11 to 19 can be represented as ten ones and some more ones  
Recognizes the plus sign and equal sign

Vocabulary: a ten, equal, equal sign (=), ones, plus, plus sign (+), ten-frame

Materials:  
ten-frame made from an egg carton with the lid still attached  
counters  
BLM What’s My Number? (pp. M-48–51)  
cardstock (see Activity Center 1)  
colored pencils, ink stamps, and/or small stickers (see Activity Center 1)  
BLM Number Cards 11 to 15 (p. R-4, see Activity Center 2)  
BLM Number Cards 16 to 20 (p. R-5, see Activity Center 2)  
pipe cleaners (see Activity Center 2, Extension 2)  
BLM Game Cards (p. R-10, see Activity Center 3)  
BLM I Have ____, Who Has ____? (p. R-8, see Activity Center 5)  
20 ones blocks or squares from BLM Pattern Blocks (p. R-31) per student (see Extension 1)  
grid paper or BLM 1 cm Grid Paper (p. R-46, see Extension 1)  
BLM Hundreds Chart (p. R-1, see Extension 2)  
BLM Ten-Frames (p. R-24) or ten-frames made of egg cartons, two per student (see Extensions 3, 4)

Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 11 and 19. Play I Start, You Finish (see introduction to Unit 1, p. C-1) for the numbers from 10 to 20, enunciating clearly.

Recognizing the numeral 20. Write on the board:

```
  1   2   3   4   5   6   7   8   9   10
11  12  13  14  15  16  17  18  19  20
```
Have students count aloud as you point to the numbers one at a time. Starting at 11, have student recite the numbers from 11 to 20. Pointing to 20, ASK: What number is this? (20)

**Counting 20 with ten-frames.** In advance, make a ten-frame from an egg carton by cutting two cups from one end—keep the lid attached. Fill the ten-frame with 10 counters and show it to students. Close the lid and ASK: How many counters are in here? (10) Fill the second ten-frame. ASK: How many are in here? (10) Count as a class or have a volunteer count. ASK: How many do you think we have together? SAY: Let’s count. Pointing to the closed ten-frame, SAY: 10. Then as a class, count on from 11 to 20. SAY: Two full ten-frames makes 20.

**(MP.2) Showing 20 as 10 + 10.** Draw two full ten-frames on the board. ASK: How many does this show? (20) We know that two full ten-frames makes 20. Write “20 = ____ + ____” below the picture. ASK: What addition could we write for this picture? If needed, point to the ten-frame on the left and PROMPT: How many in this ten-frame? (10) Write “10” in the first blank. ASK: How many in the second ten-frame? (10) Write “10” in the second blank. The final picture should look like this:

```
  10   10
  20 =   10   +   10
```

**Counting 20 without ten-frames.** SAY: We can use 20 counters to make lots of shapes. Draw some organized arrangements of 20 on the board. Have volunteers count to verify that there are 20 in each shape. (see examples below)

Activity
*What’s My Number?* (see unit introduction, p. M-2)
*Variation:* Cut out all of the cards from BLM *What’s My Number?* Students count and write the correct number in the space provided.
*(end of activity)*

**Activity Centers**
1. **Representing Teen Numbers** (see unit introduction, p. M-2)
*Variation:* Label the cards from 11 to 20.

2. **Binding 10** (see unit introduction, p. M-2)
*Variation:* Provide number cards for 11 to 20 from BLM *Number Cards 11 to 15* and BLM *Number Cards 16 to 20*, and at least 30 pipe cleaners.
*Bonus:* Students draw a tens and ones tree for each number of pipe cleaners.
3. **Matching** (see introduction to Unit 7, p. J-3)
   Variation: Make pairs of matching cards using **BLM Game Cards**. Write the numbers from 11 to 20 and the additions from \(10 + 1\) to \(10 + 10\), each on a separate card. Students match a number card with the correct addition card.

4. **Tens in a Flash** (see unit introduction, p. M-3)
   Variation: Player 1 shows all 10 fingers and then holds up 1 to 10 fingers. Player 2 counts on from 10 on Player 1’s fingers to find the number.

5. **I Have ___, Who Has ___?** (see introduction to Unit 7, p. J-2)
   Variation: In advance, prepare cards using **BLM I Have ___, Who Has ___?** For “I have,” show an addition from \(10 + 1\) to \(10 + 10\). For “Who has,” write a number from 11 to 20. Example:

   ![I Have, Who Has Card Example](image)

---

### Extensions

1. Give each student 20 ones blocks or squares from **BLM Pattern Blocks**. Students arrange the blocks or squares into the shape of a rectangle. They can copy their design onto grid paper or **BLM 1 cm Grid Paper**.
   **Bonus:** Students make as many different rectangles as they can.
   **Sample answer:**
   ![Sample Rectangle](image)
   Bonus: \(4 \times 5, 5 \times 4, 2 \times 10, 10 \times 2, 1 \times 20, 20 \times 1\)

2. **How many tens?** Give students a large number of pipe cleaners (a multiple of 10, such as 40 or 50). Students count the pipe cleaners. **ASK:** How many bundles of 10 do you think you can make with your pipe cleaners? Students verify their guesses by making as many bundles of 10 as they can, and then say how many bundles there are.

   Alternatively, give students a large number of counters (a multiple of 10, such as 40 or 50) and a hundreds chart from **BLM Hundreds Chart**. Students place one counter at a time on the hundreds chart as they count it. They write the total number of counters by copying the last number covered. **ASK:** How many stacks of 10 can you make with these counters? Have them make stacks of 10 to check their guesses.
3. Students use two ten-frames and counters to add.
   a) 11 + 3       b) 12 + 5       c) 18 + 2       d) 14 + 4       e) 13 + 6
   **Answers:** a) 14, b) 17, c) 20, d) 18, e) 19

(MP.7) 4. Students use two ten-frames and counters to find how many more make 20.
   a) [Diagram] b) [Diagram] c) [Diagram]
   \[17 + \_\_\_ = 20\] \[18 + \_\_\_ = 20\] \[19 + \_\_\_ = 20\]
   **Answers:** a) 3, b) 2, c) 1

(MP.3) 5. Eddy says that spheres are better than cubes for sliding, because they are round.
   Do you agree with Eddy? Explain why or why not. Have students explain to a partner orally or in writing.
   **Sample answer:** I disagree with Eddy. A sphere is round, but that’s why it’s good for rolling, not sliding. A cube would be better than a sphere for sliding because a cube has flat faces.

Redirecting students: Encourage students to think about what sliding means and what rolling means, and how they are different.
NBTK-12 Using a Chart to Count to 20

Pages 123–124


Goals:
Students represent the numbers from 11 to 20 on the first two rows of a hundreds chart.
Students deepen their understanding of teen numbers as 10 ones and some more ones.

Prior Knowledge Required:
Can count to 20
Can recognize and name the numerals from 11 to 20
Can count up to 20 objects arranged in an organized way
Knows that each number from 11 to 20 can be represented as ten ones and some more ones
Recognizes the plus sign and equal sign

Vocabulary: a ten, equal, ones, plus, ten-frame

Materials:
overhead projector (optional)
transparency of BLM Hundreds Chart (p. R-1, optional)
transparency of BLM Number Charts to 20 (p. R-32, optional)
at least 20 transparent counters per student (e.g., base ten ones blocks or squares cut out from a colored transparency)
blue card for 10 and red cards for ones from BLM Teacher Cards (p. M-54)
BLM Tens Cards (p. M-55) copied on blue paper, two per student
BLM Ones Cards (p. M-56) copied on red paper, one set per student
BLM Number Charts to 20 (p. R-32)
BLM Making a Number (p. R-14)
sealable bags containing up to 20 counters (see Activity Center 1)
bin containing at least 20 counters (see Activity Center 2)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 2)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 2)
BLM Number Cards 11 to 15 (p. R-4, see Activity Center 2)
BLM Number Cards 16 to 20 (p. R-5, see Activity Center 2)
BLM Spinner (p. R-34, see Activity Center 3)
pencil, paper clip, and 2 two-sided counters or tokens (see Activity Center 3)
BLM Hop On the Bunny Trail (p. R-35, see Activity Center 3)
cup containing up to 20 two-sided counters per student (see Extension 1)
14 opaque counters (see Extension 2)

NOTE: Instead of using transparent ones blocks, you can use a colored transparency and cut out squares (to fit inside the boxes on BLM Number Chart to 20). Use BLM Teacher Cards to copy the tens card on blue paper and the smaller ones cards on red paper.
Counting practice. Practice counting to 100 as a class. Play “Let’s Compare” using numbers between 10 and 20. Also review counting to 20.

(MP.5) Exploring the hundreds chart. Draw students’ attention to the hundreds chart in the classroom, or preferably project a transparency of a hundreds chart from BLM Hundreds Chart. Pointing to the row for the 20s, have students count from 21 to 30. ASK: What is the same about most of these numbers? (they start with 2, they are twenty something) SAY: All but the last number start with a 2, and we start by saying “twenty.” Repeat with the row for the 30s. Then repeat with the row for the 70s. SAY: We counted each row so far in the same way. ASK: Do we count this way for every row? (no) Which rows do we count in a different way? (the first two rows)

Point to the 3s column (3, 13, 23, and so on) in the hundreds chart. If you are projecting the hundreds chart, cover all but that column. ASK: What do you notice about these numbers? (they all have 3) Repeat for the 6s column. ASK: Do you think every column has a number that repeats? Go across the hundreds chart from left to right and have students say each number that repeats.

Have students practice counting across 10 on the chart (e.g., start at 7 and count to 13).

(MP.2) Counting to 10 on a number chart. Draw on the board the first two rows of a hundreds chart, or project a transparency of BLM Number Charts to 20. SAY: We can use the hundreds chart to count. Using five transparent counters, place a counter on each box as you count from 1 to 5. ASK: How many counters are there? (5) What number does the last counter cover? (5) Give a quantity of less than 10 counters to a volunteer who repeats the exercise.

Repeat for a different number under 10 but do not count aloud as you go. When the counters have been placed on the chart, ASK: Can you tell how many counters there are without counting? (yes) How? (by looking at the last number)

Counting to 20 on a number chart. Repeat the above with 13 counters, first by counting and then by not counting as you go. Then place 13 counters on the chart but skip some boxes so that you put the last counter on 18. ASK: Are there 18 counters on the chart? (no) The last counter is on 18, so why did you say no? (you skipped boxes)

Place different numbers (between 10 and 20) of counters on the hundreds chart, sometimes counting and sometimes not counting. For each number, ASK: How many counters are there? End with 14 counters. Draw on the board a picture for 14 using a blue card for 10 and a red card for 4 from BLM Teacher Cards, as shown below:
SAY: We know that we can make 14 from 10 ones and some more ones. The number chart shows this too. Count across the top row to get 10. SAY: There are 10 ones in the top row. Place a 10 card to the right of the top row. ASK: How many are in the bottom row? (4) Count to verify and put the 4 card to the right of the second row, as shown below:

```
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
```

**Activity**  
(MP.7) In advance, make copies of BLM Tens Cards on blue paper and BLM Ones Cards on red paper. Provide each student with two blue 10 cards, a set of red cards for 1 to 9, a number chart from BLM Number Charts to 20, and BLM Making a Number. Also, provide each student with at least 20 transparent counters. SAY: We are going to make the number 12 every way we know how. Let’s start by counting out 12 ones. Students count out 12 counters and then place them in order in the boxes on the number chart. ASK: What is the last number covered? (12) How many ones are on the top row? (10) Have students count if they are unsure. Students place a card for 10 beside the top row. ASK: How many ones are on the second row? (2) Students place the card for 2 beside the second row. ASK: What addition can we write for 12? (10 + 2) Lead students through filling in an addition on BLM Making a Number.

Repeat with other numbers, including 20.

**Bonus:** For the numbers 12, 15, 16, 18, and 20, challenge students to make a rectangle using square transparent counters.

(end of activity)

**Activity Centers**

1. **Using a Chart to Count 1**  
   **Type:** Individual  
   **Objective:** To count an unknown number of objects using a number chart  
   **Preparation:** In advance, prepare several small sealable bags containing up to 20 counters. Provide students with a number chart from BLM Number Charts to 20.  
   **Instructions:** Students select a bag of counters. They place the counters in order on the number chart to determine how many are in the bag. Then they count to verify.  
   **Bonus:** Students use a hundreds chart from BLM Hundreds Chart and bags containing more than 20 counters.

2. **Using a Chart to Count 2**  
   **Type:** Individual  
   **Objective:** To count out a given number of objects using a number chart.
Preparation: Provide students with a bin containing at least 20 counters and number cards for 1 to 20 from BLM Number Cards 0 to 5, BLM Number Cards 6 to 10, BLM Number Cards 11 to 15, and BLM Number Cards 16 to 20.

Instructions: Students pick a card at random and count out that many counters. They place the counters on a number chart from BLM Number Charts to 20 to verify.

3. Hop on the Bunny Trail
Type: Pairs, competitive
Objective: To move around a board in order and arrive at the number 20
Preparation: In advance, cut out the spinner on BLM Spinner. Provide each student pair with a spinner, a pencil and a paper clip, 2 two-sided counters or tokens, and BLM Hop on the Bunny Trail. Alternatively, instead of a spinner, provide each pair with numbers cards for 1 to 4 (from BLM Number Cards 0 to 5) in a paper bag.
Instructions: Players take turns to spin the spinner (or choosing a number from the paper bag) and move around the board, counting aloud for each box they land on. If using the spinner, Player 1 holds the pencil while Player 2 spins the paper clip.
Bonus: Players do not move to the box for 20 unless they land on it exactly.
Variation: Students play on a number chart from BLM Number Charts to 20 instead of the game board.

Extensions
1. Give each student a cup containing 11 to 20 two-sided counters and BLM Making a Number. Students count how many counters are in the cup. Then they gently tip the counters from the cup, sort the counters by color, and write the addition on the BLM.

(MP.7) 2. Draw on the board a number chart from 1 to 20. Place 14 opaque counters on the chart so that the numbers are completely blocked. ASK: How many counters are on the chart? (14) Have students explain their answer. Students may, for example, know that the number before 15 is 14, or they may recognize that there are 10 counters in the top row and 4 counters in the second row making 14 in all.
Bonus: Place counters on a blank chart.

3. Draw on the board:

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ASK: Without counting, how can you tell where 15 goes on the chart? (below 5 because the ones in the number 15 is 5) Repeat for 14, 17, and 19.
NOTE: Extension 4 is suitable for students who know how to count in the twenties.

4. Draw on the board:

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ASK: Without counting, how can you tell where 25 goes on the chart? (below 15 because the ones in the number 25 is 5) Repeat for 24, 27, and 29.
What’s My Number? (I)
What’s My Number? (2)
What's My Number? (3)

1. Stars
2. Hexagons
3. Pentagons
4. Triangles
5. Circles
6. Smiley faces
What’s My Number? (4)
Color Me

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---

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Triangle Paper
Teacher Cards

1 0 1 2

3 4 5 6

7 8 q
Tens Cards

I 0 I 0 I 0

I 0 I 0 I 0

I 0 I 0 I 0
Ones Cards

1 1 2 2 3 3
4 4 5 5 6 6
7 7 8 8 q q
Unit 11  Operations and Algebraic Thinking:
Subtraction within 5

Mathematical Practices in This Unit
In this unit, you will have the opportunity to assess MP.2 to MP.8. The MP labels in this unit flag both opportunities to develop the mathematical practice standards and opportunities to assess them. Below is a list of where we recommend assessing each standard as well as some examples of how students can show that they have met a standard.

**MP.2:** OAK-26 Extension 1, OAK-27 Activity and Extensions 1–2, OAK-29 Extension 1, OAK-30 Activity Center 3, OAK-31 Activity and Extension 3
In OAK-26 Extension 1, students reason abstractly and quantitatively when they think of a real-world context for an abstract subtraction problem and use the real-world context to help them solve the subtraction question.

**MP.3:** OAK-26 Extension 4, OAK-27 Extensions 3–4, OAK-30 Extension 2

**MP.4:** OAK-27 Extension 2, OAK-28 Extensions 1–2

**MP.5:** OAK-27 Extension 2, OAK-28 Extensions 1–2, OAK-29 Extension 2, OAK-31 Activity
In OAK-27 Extension 2, students strategically choose tools (such as blocks, craft sticks, ten-frames, pencil and paper to draw sketches) to model and solve real-world problems involving both addition and subtraction.

**MP.6:** OAK-26 Activity Center 1, OAK-31 Extension 3
In OAK-31 Extension 3, students attend to precision when they use an example to explain to a partner the meanings of the minus sign and the equal sign.

**MP.7:** OAK-25 Extension 1, OAK-26 Extension 3, OAK-30 Extension 3, OAK-32 Extension 1

**MP.8:** OAK-26 Extension 4, OAK-27 Extensions 3–4, OAK-30 Extension 2
In OAK-26 Extension 4, students look for and express regularity in repeated reasoning when they notice a pattern about what happens to the total in addition problems where the first addend increases by one, and use this pattern to predict the answer to $6 + 5$ (based on knowing the answer to $5 + 5$).
Unit 11 Operations and Algebraic Thinking: Subtraction within 5

Introduction
In this unit, students will subtract from numbers less than or equal to 5. As done for addition, they will begin with the most intuitive subtraction, “Subtract From with Result Unknown” situations, as summarized in Table 1 on p. 7 of the Common Core Operations and Algebraic Thinking Progressions document. Students will act out subtraction situations and represent them with objects and pictures. Finally, students will develop fluency within 5 by composing 5 from a given addend. Students will gradually develop the skills needed to read and write subtraction expressions and equations throughout the unit.

NOTE: For students who struggle with writing or who might enjoy the activity, you may wish to provide circles or squares cut from BLM Circles and Squares that they can glue instead of drawing circles (beginning in Lesson OAK-29). This may also help students who require physical representations to produce subtraction pictures.

Materials. For students who require writing support, you might create a template for subtractions using BLM Interlined Paper, as shown below. Students can use the template instead of scrap paper to record subtractions.

In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section R, are used in Unit 11:
- BLM Hundreds Chart (p. R-1)
- BLM Game Cards (p. R-10)
- BLM Interlined Paper (p. R-45)
- BLM Foods (p. R-36)
- BLM Number Cards 0 to 5 (p. R-2)
- BLM Pets (1) (p. R-11)
- BLM Animal Cards (pp. R-6–7)
- BLM Making Subtraction Stories (p. R-37)
- BLM Circles and Squares (p. R-38)
- BLM Subtractions within 5 (pp. R-39–40)
- BLM I Have ___, Who Has ___? (p. R-8)
- BLM Dominoes (1) (p. R-15)
- BLM Number Lines (p. R-23)
- BLM Making 5 (p. R-13)
- BLM Ten-Frames (p. R-24)
Recurring activities. The following activities recur several times in the unit, with variations.

Subtracting with Objects
Type: Individual
Objective: To find what is left in subtraction stories using objects
Preparation: Provide each student with 5 blocks or counters, a yarn circle, and BLM Subtracting with Frogs (1).
Instructions: Students model each subtraction on BLM Subtracting with Frogs (1) by placing blocks inside the yarn circle to represent the number at the start and then take away the indicated number. They record the answer on the BLM.
Bonus: Using scrap paper or BLM Subtraction Stories, write stories such as “4 dogs. 3 dogs leave. How many dogs stay?” Have students find and circle the numbers, subtract, and then write the answer.

Telling Subtraction Stories
Type: Pairs, imaginative
Objective: To make up and answer subtraction stories
Preparation: Provide each student pair with 5 blocks or counters and a yarn circle. You may wish to provide miniature models of animals or cards from BLM Animal Cards to help students do the activity.
Explanation: SAY: You can make up your own number stories and tell them to each other. To the first student in the pair, ASK: What would you like your story to be about? (sample answer: horses) How many horses are there? Pick a number from 3 to 5. (sample answer: 4) SAY: So there are four horses. Give the second student in the pair a yarn circle and SAY: Put four horses in the circle. ASK: What can we use for horses? (blocks or counters) Have the second student put four blocks or counters in the circle. To the first student, ASK: How many horses go home? Students should pick a number less than the number of horses in the circle. (sample answer: 1) To the second student, ASK: How many blocks should you take out of the circle? (1) How many horses are left? (3) Have students take turns telling stories and subtracting.
Variations:
1. Students choose two number cards for 1 to 5 from BLM Number Cards 0 to 5, determine which number is greater, and use these numbers in the subtraction story.
2. Cut BLM Subtraction Stories into strips, one question per strip. Students choose a strip and use the pictures to make a story.
Bonus: Students use fingers instead of blocks to tell the stories.

Subtraction Bowling
Type: Pairs, active
Objective: To write the subtraction modeled by five bowling pins
Preparation: Set up a bowling lane using five plastic bowling pins or empty plastic water bottles per student pair. Provide a soft ball and BLM Making Subtraction Stories (with the starting number, 5, filled in by you, if needed). Since students may knock over either all or none of the pins, make sure they can subtract $5 - 5 = 0$ and $5 - 0 = 5$ before they do the activity.
Instructions: Set up five pins. Students roll the ball once and then use the BLM to write the subtraction for how many pins were knocked down and how many stayed upright.
Subtraction with Five Counters

Type: Individual

Objective: To write the subtraction modeled by two-sided counters

Preparation: Give each student 5 two-sided counters (or five dried beans painted on one side), a paper cup, and scrap paper.

Instructions: Students gently tip the counters from the cup and sort the counters by color. They write the subtraction expression.

Variations:
1. Vary the number of two-sided counters.
2. Students use scrap paper to record the results by drawing and crossing out circles.
OAK-25  Counting by Tens

Pages 125–126

Standards: K.CC.A.1

Goals:
Students count by tens to 100.

Prior Knowledge Required:
Can count to 100 by ones
Can add 10 + 10
Can count out 10 objects from a larger group

Vocabulary: count by tens

Materials:
bin per group, each containing exactly 90 objects (e.g., blocks, connecting cubes, pipe cleaners)
transparency of BLM Hundreds Chart (p. R-1, optional)
overhead projector (optional)
number cards for the tens made using BLM Game Cards (p. R-10, see Activity Center 2)
scrap paper or BLM Interlined Paper (p. R-45, see Activity Center 3)
counters (see Activity Center 3)
BLM Hundreds Chart (p. R-1, see Activity Center 3)

NOTE: Activity 1 is intended to help students realize that counting by tens makes it much easier to count a large number of objects.

Activity 1
(MP.1, MP.6) Divide students into groups of four or five and give each group a bin containing exactly 90 objects, such as blocks, connecting cubes, or pipe cleaners. Tell students that each bin has the same number of objects and that they need to count to find how many there are. Let them work at the task long enough to realize that it is difficult to count a large number of objects.

ASK: Was it easy to count? (no) If any group(s) did get a final count, ask for the count. Ask for suggestions about how to make the counting easier. SAY: One way is to make groups that are easier to count. Let’s try counting again. This time, I want you to make piles of 10. Have students separate the objects in their bin into piles of 10.

ASK: How many piles of 10 did you make? (9) How many are nine piles of 10? (answers may vary) SAY: Today we will learn to count by tens.

(end of activity)
Using a hundreds chart to count by tens. Direct students to the classroom number chart or project BLM Hundreds Chart, and have students point to 10. ASK: What is 10 plus 10? (20) Where is 20 in the hundreds chart? Pointing to 20, SAY: 20 is below 10. ASK: What number is below 20? (30) SAY: All of the numbers that end in zero are lined up. Let’s say them. As a class, recite: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100. SAY: When we say all of the numbers that end in zero, we count by tens. Practice reciting the tens using the hundreds chart and then without the chart.

Using gestures to count by tens. Hold out both hands with fingers extended. ASK: How many fingers? (10) Close your fists and then flash 10 fingers twice. ASK: How many fingers this time? (20) Repeat the motion as you SAY: “10, 20.” Have students count by tens with you while showing 10 and then 20 on their hands. Repeat to count by tens to 30, then with random tens up to 100.

Developing fluency. As a class, play I Start, You Finish (see introduction to Unit 1, p. C-1) counting by tens.

Finding the missing tens. Write on the board:

\[
10 \quad 20 \quad 30 \quad 40 \quad 50 \quad \ldots \quad 70 \quad 80 \quad 90 \quad 100
\]

SAY: A number is missing. Let’s find the missing number. Count by tens pointing to each number in turn until you reach the blank. ASK: What number is missing? (60) How do we write 60? (write a 6 and a 0) SAY: All of the tens end in zero so that part is easy. ASK: How can we tell by looking at the other numbers that the missing number starts with 6? (there’s a 5 and a 7) SAY: The first numbers count up. Pointing to each number in turn, count from 1 to 9. (Do not continue on to 100 since that could be confusing.) Write “60” in the blank. Erase a different number and repeat. Finally, write a sequence of 3 tens with the middle number missing. (see example below)

\[
20 \quad \ldots \quad 40
\]

Count aloud from 10, but start pointing to the numbers on the board when you reach 20.

(MP.2) Counting groups of 10. SAY: Do you remember how we show a full ten-frame? We draw it like this. Draw on the board:

\[
\begin{array}{c}
\text{10}
\end{array}
\]

SAY: What if we have two full ten-frames? Draw a second full ten-frame on the board. ASK: How many do we have together? (20) Pointing to each ten-frame in turn, count aloud: “10, 20.” Draw a third full ten-frame on the board. ASK: How many do we have now? How can we find out? (count by tens) Count as a class: “10, 20, 30.” Draw three more full ten-frames to make six altogether. As a class or by asking volunteers, count by tens to 60. Practice a few more times. You may also wish to count from zero.
(MP.4) The number 10 in nature. ASK: How many fingers do you have on both hands? (10)
How many toes do you have on both feet? (10) SAY: You have 10 toes. ASK: How many fingers
and toes do you have together? (20) SAY: 10 and 10 make 20. ASK: Do you know how many
legs a crab has? SAY: A crab has 10 legs. Draw a crab on the board, as shown below:

SAY: Two of the crab’s legs end in large claws. Count the crab’s legs. ASK: How many legs
would two crabs have together? (20) SAY: 10 and 10 make 20 legs!

(MP.2, MP.3) SAY: I want to find how many legs are on five crabs without counting all the legs
one at a time. Draw four more crabs on the board. ASK: How can I find how many legs the
crabs have? (count by tens) SAY: Each crab has 10 legs, so we can find how many together by
counting by tens. As a class, count by tens as you point to each crab in turn to get 50. Then
SAY: One crab has 10 legs. Write “10” below the first crab. ASK: How many legs do two crabs
have? (20) Ask a volunteer to write “20” below the second crab. Continue to 50, as shown below:

Activity 2
(MP.5) Students return to the objects they sorted in Activity 1. Make sure that each group has
correctly sorted the objects into piles of 10. Together, count the piles by tens to get 90.
(end of activity)

Activity Centers
For guidance on selecting and using the activity centers, see Introduction p. A-16.

1. I Start, You Finish (see introduction to Unit 1, p. C-1)
Variation: Play the game counting by tens to 100, in pairs or groups of three.

2. Counting by Tens
Type: Small groups
Objective: To count by tens
Preparation: In advance, prepare cards for the tens from 10 to 100 using BLM Game Cards.
Instructions: Students distribute the cards randomly and as evenly as possible to each other.
The student holding the 10 card starts by saying “10.” Then the student holding the 20 card says
“20.” Play continues until the group has counted to 100.

3. Writing the Tens
Type: Pairs
Objective: To practice writing the tens
Preparation: Distribute scrap paper or BLM Interlined Paper.
Instructions: Player 1 flashes a number (10, 20, 30, …, 100) using their fingers. Player 2 counts aloud or in her head and then writes the number. For example, to show 30, Player 1 closes and opens his fists three times. Player 2 counts by 10 each time that all 10 fingers are displayed. Then students switch roles and repeat.

Variation: Students keep track of the tens by placing counters in the tens column of a hundreds chart (from BLM Hundreds Chart), and then write the last number covered. This variation may be helpful for students who can count by tens but do not yet associate the written numbers with their names.

Extensions

(MP.7) 1. Give each student between 30 and 50 objects. Ask students to use counting by tens to help them count the objects. In pairs, have students explain how they used tens to count the objects.

Sample answer: First I made as many groups of ten as I could. Then I counted the tens. I counted 10, 20, 30, 40. Then I counted the ones left over. I counted 41, 42, 43. There are 43 objects.

2. Write on the board:

10 20 30 40 50 60 70 80 90 100

Underline the first digit of each number, except for the 100 (underline the first two digits), as shown below:

10 20 30 40 50 60 70 80 90 100

ASK: What do you notice about the numbers that are underlined? (they are in counting order) Have students say the underlined numbers. ASK: What do you think comes next? (11 or 11 zero) Write or have a volunteer write “110” at the end and underline the 11. ASK: What do you think this number is? (answers may vary) SAY: We read it as “one hundred ten.” Prompt students to continue to extend the pattern and guess the names of the numbers.
OAK-26  Acting Out Subtraction

Pages 127–129

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 5 by acting them out.

Prior Knowledge Required:
Can count to 5

Vocabulary: count by tens, left, subtract, take away

Materials:
5 real or toy apples
toy apple cores (optional)
scrap paper
colored pencils, markers, or crayons
magazines, scissors, and glue (optional)
toy food or BLM Foods (p. R-36, see Activity Center 1)
BLM Number Cards 0 to 5 (p. R-2, see Extension 1)
dice (see Extension 1)
BLM Pets (1) (p. R-11, see Extension 2)

Counting practice. Practice counting by tens from 10 to 100 as a class (see Introduction, p. A-23). Play “Let’s Compare” using the tens. Tell students that when counting by tens, the numbers get bigger as they count. Point out how this is the same as when they count by ones.

Play “Five Little Monkeys.” SAY: Let’s play “Five Little Monkeys.” Everybody hold up your little monkeys. Hold up your hand with fingers spread and wiggle your fingers. As you recite the rhyme, move your raised hand up and down to mimic jumping. SAY: Five little monkeys jumping on the bed. One fell off and bumped his head. ASK: How can we show that one monkey fell off the bed? (put down one finger) Continuing the rhyme, SAY: Mama called the doctor and the doctor said, “No more monkeys jumping on the bed.” ASK: Do the monkeys listen? Do they stop jumping on the bed? (shake your head for “no” to prompt the correct answer) Now how many monkeys are jumping on the bed? How many fingers are up? (4)

Repeat the verse for four monkeys. SAY: Four little monkeys jumping on the bed. One fell off and bumped her head. Mama called the doctor and the doctor said, “No more monkeys jumping on the bed.” Continue the rhyme until there are no more monkeys jumping on the bed.

(MP.4) Introduce subtraction language. SAY: Every time a monkey falls off the bed, we take away a finger. Let’s act out some other take away stories. Five children are playing in the park. Two children go home for lunch. The end. ASK: At the end of the story, how many children
are playing in the park? (let students answer but do not respond) Are you sure? SAY: Let’s act out the story and check. When the story starts, there are five children at the park. Ask five volunteers to be the children. SAY: Then two children go home for lunch. Have two of the volunteers sit down. SAY: We know that when more children come, we add. When the children leave or when we take something away, we subtract. ASK: How many children are playing in the park now? (3) SAY: Five children take away two children make three children. There are three children left.

Repeat with four children playing and one child goes home. (3 children are left)

Practice subtracting and subtraction language. Show students five apples and SAY: I have five apples. I eat one apple. Pretend to eat an apple. Replace the apple with a toy apple core, if available. ASK: How many apples are left? (4) Repeat with other scenarios using the terms "take away" and "left." You might allow students to take turns telling the story.

Activity
(MP.1) Provide students with scrap paper and colored pencils, markers, or crayons. Alternatively, provide magazines, scissors, and glue. Students draw or cut out pictures from magazines to create their own subtraction stories. For example, they might draw three ducks on a pond and two ducks flying away to illustrate “5 ducks take away 2 ducks make 3 ducks.” Students use their pictures to tell their subtraction story to a classmate.

Preparation for the AP pages. Show students AP Book K.2, Unit 11, p. 127. Pointing to Question 1, SAY: The picture shows children playing. One child is leaving (point to the child leaving). Write how many children stay.

Show students AP Book K.2, Unit 11, p. 128. Pointing to Question 3, SAY: The picture shows three apples. Pointing to the apple core, SAY: This apple is eaten. Write how many apples are left.

Activity Centers
(MP.6) 1. Acting Out Subtraction
Type: Pairs, imaginative
Objective: To act out subtraction situations
Instructions: Provide students with toy food or pictures from BLM Foods. They use the food to act out subtraction situations. They take turns saying how many at the start, how many to take away, and how many are left. For example, Player 1 has an apple, a banana, and a pear. Player 2 takes away the pear. Player 2 says, “There are three fruits at the start. I take away one fruit. Now there are two fruits left.”

2. One Potato, Two Potato
Type: Small groups of five or fewer, active
Objective: To take away one at a time from 5 until none are left
Instructions: Students play a version of “One Potato, Two Potato” until no fists remain. Students sit in a circle. Everyone puts two fists into the circle. (For groups of three or more, each player puts one fist into the circle.) The leader goes around the circle and touches the top of each fist as everyone chants: “One potato, two potatoes, three potatoes, four, five potatoes, six potatoes, seven potatoes, more!” When students say “more” the student whose fist the leader touches is “out” and takes his fist out of the circle. After each round, students count how many are left. Then they repeat the chant, starting from the next student and with a different leader.

NOTE: There is no winner in this game.

Extensions
(MP.2) 1. In small groups, one student picks two number cards from BLM Number Cards 0 to 5 (exclude the card for 0). Students decide which number is greater. One student tells a subtraction story starting with the greater number. The smaller number tells how many to take away. The other students act out the subtraction story. Students decide together how many are left. Students take turns telling a story. Alternatively, students can use dice instead of number cards.

2. Students draw a picture or use cards from BLM Pets (1) to illustrate a subtraction story.

(MP.7) 3. Find the missing number.

a) 10, 20, ___, 40  
b) 30, 40, ___, 60  
c) 60, ___, 80, 90

Answers: a) 30, b) 50, c) 70

NOTE: Look for students to notice the structure (MP.7) that the number patterns involve counting by tens or that the tens digits go up by one. You can have students answer orally, in partners, or in writing if they are able to.

(MP.3, MP.8) 4. a) Draw circles to show 2 + 2.

b) Draw another picture like the one you drew for part a), but show 3 + 2.

c) Partner A: Draw circles to show 3 + 3. Change your picture just enough to show 4 + 3. Use a different color to show the change.

Partner B: Draw circles to show 4 + 4. Change your picture just enough to show 5 + 4. Use a different color to show the change.

Partners A and B: Talk about what you did that is the same as each other.

d) How can you find 6 + 5 if you know 5 + 5 = 10?

e) In pairs, explain your answers to part d). Do you agree with each other? Why or why not?

Selected answers: c) we both drew two groups of circles and then we just had to add a circle to the first group of circles, e) add 1 because the answer is one more; when we added a circle to the first group, we were adding a circle to the answer, so 6 + 5 is 11, because that’s one more than 10.

NOTE: In part e), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems.
OAK-27 Subtracting with Objects (1)

Pages 130–133

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 5 by modeling them with objects.

Prior Knowledge Required:
Can count to 5
Can act out “Take From with Result Unknown” subtractions

Vocabulary: count by tens, left, minus, subtract, take away

Materials:
5 enlarged paper frogs from BLM Frogs on a Log (p. N-37)
logs from BLM Frogs on a Log (p. N-37)
5 blocks or counters per student
5 one-centimeter connecting cubes or ones blocks per student
yarn circles (see Activity Centers 1, 3)
BLM Subtracting with Frogs (pp. N-38–39, see Activity Centers 1, 2)
scrap paper (see Activity Center 1)
BLM Subtraction Stories (p. N-40, see Activity Centers 1, 3)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 2)
miniature models of animals or BLM Animal Cards (pp. R-6–7, see Activity Center 3)
5 plastic bowling pins or empty plastic water bottles, and a soft ball per student pair (see Activity Center 4)
BLM Making Subtraction Stories (p. R-37, see Activity Center 4)
opaque bags (see Extension 1)
BLM Number Lines (p. R-23, see Extension 4)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 5.

Singing “Five Green and Speckled Frogs.” Sing the first verse of “Five Green and Speckled Frogs” (sometimes called “Five Little Frogs”) and use fingers to show the number of frogs. The lyrics and hand gestures can be found online.

NOTE: In advance, enlarge and cut out five frogs from BLM Frogs on a Log for demonstration.

(MP.2) Modeling subtraction from 5 with frogs. SAY: In the song, every time a frog jumps off the log, we take away one finger. We can also say that we subtract. Let’s tell some other frog stories. Draw on the board a log long enough for five paper frogs to sit on, as shown below:
SAY: Five frogs sit on a log. Above the log, write “5 frogs sit on a log.” Affix five enlarged paper frogs from BLM Frogs on a Log to the log. SAY: One frog hops off. Write “1 frog hops off.”
ASK: How can we show a frog hopping off? (take away 1 frog) SAY: We take away a frog. Remove one frog from the log and move it to the side. ASK: How many frogs stay? (4) Below the log, write “4 frogs stay.” The final picture should look like this:

5 frogs sit on a log.
1 frog hops off.

4 frogs stay.

Introduce “minus.” Draw on the board:

5 frogs sit on a log.
2 frogs hop off.

SAY: Five frogs sit on a log. Affix five frogs to the log. SAY: Two frogs hop off. ASK: How do we show two frogs hopping off? (take away 2 frogs) Have a volunteer move two frogs to the side. SAY: When we add, sometimes we say “plus.” When we take away, we say minus. We can say “5 frogs take away 2 frogs” or “5 frogs minus 2 frogs.” Write “5 frogs minus 2 frogs = ___ frogs” below the log. ASK: How many frogs are left? (3) Write “3” in the blank. SAY: Five frogs minus two frogs equals three frogs. The final picture should look like this:

5 frogs sit on a log.
2 frogs hop off.

5 frogs minus 2 frogs = 3 frogs

Repeat with “5 frogs sit on a log. 4 frogs hop off.”

(MP.2) Modeling subtraction from other numbers. ASK: Can we subtract only from 5? (no) SAY: Let’s start with four frogs. Above the log, write “4 frogs sit on a log.” Have a volunteer affix four frogs to the log. SAY: One frog hops off. We will subtract one frog. Write “1 frog hops off.” Have a volunteer move one frog to the side. Write “4 frogs minus 1 frog = ___ frogs” below the
log. ASK: How many frogs stay on the log? (3) SAY: Four frogs minus one frog equals three frogs. Write “3” in the blank. The final picture should look like this:

```
4 frogs sit on a log.
1 frog hops off.
```

```
4 frogs minus 1 frog = 3 frogs
```

Repeat with “4 frogs sit on a log. 2 frogs hop off.” You may wish to do an example using blocks or counters to represent frogs if you have been using only paper frogs.

**Activity**

**(MP.2)** Provide each student with a picture of a log from BLM Frogs on a Log and 5 blocks or counters. Tell stories about frogs on a log as done earlier and have students model each story using blocks. Have students signal the final answer.

*(end of activity)*

**Preparing for the AP pages.** Provide 1 cm connecting cubes or ones blocks to each student. Show students Question 1 on AP Book K.2, Unit 11, p. 130. Read the question aloud. ASK: How many frogs are on the log at the start? (5) How many frogs hop off? (1) SAY: The first sentence tells how many frogs are on the log at the start. Put one block on each picture of a frog. The next sentence tells how many frogs hop off. Take away one block for each frog that hops off. Then write how many stay (indicating the space provided).

**Activity Centers**

**(MP.2, MP.4)** 1. **Subtracting with Objects** (see unit introduction, p. N-2)

**(MP.2, MP.4)** 2. **Subtracting with Objects** (see unit introduction, p. N-2)

*Variation:* Students use fingers instead of blocks. SAY: We can use our fingers to keep track of number stories. Let’s try it together with this story: Four frogs sit on a log. Have students show 4 on their fingers. SAY: Keep four fingers up. Then one frog hops off. ASK: How many fingers do you need to put down? (1) How many fingers are left? (3) SAY: So now there are three frogs. Provide students with number cards from 1 to 5 from BLM Number Cards 0 to 5. Students choose two number cards and determine which number is greater. They create a number story starting with the greater number and taking away the smaller number. Example: 3 frogs minus 1 frog. Then students model the story on their fingers and find the answer. Students complete a strip from BLM Subtracting with Frogs 2) with the numbers from their story.

**(MP.2, MP.4)** 3. **Telling Subtraction Stories** (see unit introduction, p. N-2)

**(MP.2, MP.5)** 4. **Subtraction Bowling** (see unit introduction, p. N-2)
Extensions

(MP.2) 1. Students place five blocks in a bag. Without looking or counting, they remove some blocks and then count how many blocks are out of the bag. They use subtraction to guess how many blocks are in the bag. Students then check their guess by counting the blocks left in the bag.

NOTE: Extensions 2–3 should be done in order.

(MP.2, MP.4, MP.5) 2. Tell stories that combine addition and subtraction using numbers within 7. Have students choose tools to model the stories. Students explain their choice of tools and their solution to a partner. Have students say (or write, if they can) the final answer as a full sentence.

a) 3 frogs are on a log. 2 more frogs hop on. Then 1 frog hops off. How many frogs are on the log now?

b) 5 turtles are on a log. 2 turtles slide off. 3 other turtles climb on. How many turtles are on the log now?

c) 5 apples and 4 pears are in a bowl. Amit eats 2 apples. How much fruit is in the bowl now?

Selected sample answer: b) I used blocks for turtles and a craft stick for the log. I put 5 blocks on the log. Then I took two blocks off to show the turtles that slide off. Then I put 3 blocks on the log to show the 3 that climb back on. Now there are 6 blocks on the stick, so there are 6 turtles on the log.

(MP.3, MP.8) 3. Make up stories like those in Extension 2, but in which you subtract one and then add one from the starting number. Example: 4 frogs are on a log. 1 frog hops off. Another frog hops on. How many frogs are on the log now? For the first few stories, have students use blocks and then have them predict the final answer without using blocks.

Have students explain to a partner how they know the answer without using blocks.

Sample explanation: Every time I take away a block and then add one back, I end up with the number I started with.

(MP.3, MP.8) 4. Provide students with BLM Number Lines.

a) Draw jumps on a number line to show 4 + 2, 5 + 2, 6 + 2, and 7 + 2.

b) Look at your answers to part a). How do the answers change as the starting number goes up by 1?

c) If you know 8 + 2 = 10, how can you find 9 + 2?

d) In pairs, have students explain their answer to part c). Do they agree with each other? Have them discuss why or why not.

Selected answers: b) the answer goes up by 1 too; c) it’s one more than 10, so it’s 11; d) 8 is one more than 7, so starting at 8 ends up one further than starting at 7.

NOTE: For part d), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems.
OAK-28  Subtracting with Objects (2)

Pages 134–137

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students continue to do “Take From with Result Unknown” subtractions within 5 by modeling them with objects.
Students are introduced to the minus sign (−).

Prior Knowledge Required:
Can count to 5
Can act out “Take From with Result Unknown” subtractions within 5
Can model “Take From with Result Unknown” subtractions starting with 5 objects

Vocabulary: count by tens, equal sign (=), equals, greater, left, minus, minus sign (−), plus, plus sign (+), subtract, take away

Materials:
5 real or toy apples (optional)
5 blocks or counters per student
1 cm connecting cubes or ones blocks
BLM Number Cards 0 to 5 (p. R-2, see Activity Centers 1, 2)
scrap paper (see Activity Center 1)
BLM Making Subtraction Stories (p. R-37, see Activity Centers 1–3)
stickers (see Activity Centers 1, 4)
frogs from BLM Frogs on a Log (p. N-37, see Activity Centers 1, 2)
glue (see Activity Centers 1, 2)
yarn circles (see Activity Center 3)
BLM Animal Cards (pp. R-6–7, see Activity Center 3)
5 plastic bowling pins or empty plastic water bottles and a soft ball per student pair (see Activity Center 4)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 5.

Review “minus.” Show students five apples (or blocks). SAY: I have five apples. Kate eats two apples. ASK: How do I show this? (take away 2 apples) Move two apples to the side. ASK: How many apples are left? (3) SAY: We can use counters to show apples. Write on the board and affix counters, as shown below:

5 apples  2 eaten
〇 〇 〇 〇 〇

5 apples minus 2 apples = ____ apples
SAY: When we add, we sometimes say “plus.” ASK: What do we say when we take away?
(minus) SAY: Five apples minus two apples means five apples take away two apples.
ASK: What is five apples minus two apples? (3 apples) Write “3” in the blank.

**MP.6** Introduce the minus sign (−). Repeat with the following story but use the minus sign instead of the word “minus.” SAY: Three bananas are in a bowl. Anwar eats one banana. The final picture should look like this:

3 bananas 1 eaten

3 bananas − 1 banana = 2 bananas

SAY: When we add, we can write a plus sign instead of the word “plus.” ASK: What does a plus sign look like? PROMPT: Show me with your fingers. (+) Model a plus sign with your fingers and have a volunteer write a plus sign on the board. SAY: When we subtract, we can write a minus sign instead of the word “minus.” The minus sign is a little line. When we see the minus sign, we say “minus.” Read the subtraction sentence aloud, pointing to each word as you go. Have a volunteer point to the minus sign in the sentence. SAY: You can model the minus sign with your arm like this. Hold your arm horizontally in front of you, bent at the elbow. Have students model the minus sign. Ask a volunteer to point to the equal sign, and ASK: What is the difference between the minus sign and the equal sign? (minus sign has 1 line, equal sign has 2 lines)

**Practice with math signs.** ASK: What does the plus sign look like? Show me with your fingers. Model a plus sign with your own fingers. Model the minus and the equal signs with your arms as well and tell students what they are. Have students mimic your gestures. Model each of the three signs and have students call out the name of each one. Then call out the signs one at a time and have students model them.

**(MP.2, MP.4)** Practice with other scenarios. SAY: Let’s pretend bunnies are playing. Write on the board:

4 bunnies play. 1 bunny hops away.

Read each sentence aloud. SAY: We can use counters to show this story. ASK: How many counters should we start with? (4) Underline the 4 in the first sentence and affix four counters to the board, as shown below:

4 bunnies play. 1 bunny hops away.

ASK: How many bunnies hop away? (1) Have a volunteer underline the 1. ASK: How do we show one bunny hopping away? (take away 1 counter) Move one counter to the side. Write “4 bunnies − 1 bunny” below the counters. Point to the subtraction and read it aloud. SAY: This is the same as four bunnies take away one bunny. ASK: How many bunnies are four bunnies...
minus one bunny? (3) Write “= 3 bunnies” to complete the subtraction sentence. The final picture should look like this:

4 bunnies play. 1 bunny hops away.

\[
\begin{array}{c|c|c|c}
\hline
\text{4 bunnies} & \hline
\text{1 bunny hops away.} & \hline
\text{4 bunnies} & \hline
\text{1 bunny} & \hline
\end{array}
\]

4 bunnies \(-\) 1 bunny = 3 bunnies

Repeat with other examples, gradually asking volunteers to do more of the work.

**Activity**

*(MP.2, MP.4)* Give each student five blocks or counters. As you tell each of the following stories, have students use the blocks to model the story and then signal the answer.

• 3 bunnies are playing. 1 bunny hops away. 3 bunnies minus 1 bunny equals what? (2)
• 4 children are on swings. 2 children go home for lunch. How many children are still on the swings? (2) What number sentence can you make with minus? (4 children minus 2 children equals 2 children)
• 5 frogs are on a log. 3 frogs jump off. How many frogs are on the log now? (2) What number sentence can you make with minus? (5 frogs minus 3 frogs equals 2 frogs)
• 4 bananas in a bowl. 3 bananas are eaten. How many bananas are left? (1) What number sentence can you make with minus? (4 bananas minus 3 bananas equals 1 banana)
• 5 cats are playing. 4 cats go to sleep. How many cats are playing now? (1) What number sentence can you make with minus? (5 cats minus 4 cats equals 1 cat)

(end of activity)

**Preparing for the AP pages.** Provide 1 cm connecting cubes or ones blocks and have students use them to model the subtractions and record the answers on AP Book K.2, Unit 11, pp. 134–137.

**Activity Centers**

1. **Subtracting with Objects** (see unit introduction, p. N-2)

*Variation:* Give each student five blocks or counters and number cards for 1 to 5 from BLM Number Cards 0 to 5. Students choose two number cards and determine which number is greater. They use blocks to model the number story, starting with the greater number and taking away the smaller number. (sample story: 3 frogs minus 1 frog) They find the answer and record their work on scrap paper or a strip from BLM Making Subtraction Stories.

*Bonus:* Students use stickers or glue frogs from BLM Frogs on a Log to illustrate their story.

Example:

\[
\begin{array}{c|c|c|c}
\hline
\text{3 frogs} & \hline
\text{1 frog} & \hline
\text{2 frogs} & \hline
\end{array}
\]

3 frogs \(-\) 1 frog = 2 frogs
2. **Subtracting with Objects** (see unit introduction, p. N-2)  
Variation: Repeat Activity Center 1, but have students use fingers instead of blocks to model the subtractions.  
**Bonus:** Students glue frogs cut from BLM Frogs on a Log to illustrate the story.

(MP.2, MP.4) 3. **Telling Subtraction Stories** (see unit introduction, p. N-2)  
Variation: Students record their work on a strip from BLM Making Subtraction Stories.

(MP.2, MP.5) 4. **Subtraction Bowling** (see unit introduction, p. N-2)  
Variation: Students use stickers to illustrate the subtraction produced by bowling.

---

**Extensions**  
**NOTE:** Extensions 1 and 2 should be done in order.

(MP.4, MP.5) 1. Make up “Take Apart with Result Unknown” stories. Students model the stories using tools of their choice. Students explain their solution to a partner. Examples:  
a) 5 apples are in a bowl. 3 of them are red. The rest are green. How many are green?  
b) 4 students are in the gym. 2 of them wear glasses. How many do not wear glasses?  
c) Grace has cats and dogs. She has 5 pets in all. She has 2 dogs. How many pets are cats?  
**Selected sample answer:** b) I cut out 4 pictures of happy faces for students. I drew glasses on 2 of the faces. I counted 2 faces with no glasses. So, 2 students do not wear glasses.

(MP.4, MP.5) 2. Make up stories that combine addition and subtraction using putting together and taking apart scenarios. Students model the stories using tools of their choice. Students explain their solution to a partner. Examples:  
a) 4 apples and 5 pears are in a bowl. Josh eats 3 apples. How much fruit is in the bowl now?  
b) 4 boys and 3 girls are playing. 1 girl goes home. How many children are playing now?  
c) 5 turtles are on a log. 3 turtles slide off. 2 other turtles climb on. How many turtles are on the log now?  
**Selected sample answer:** a) I used red blocks for apples, yellow blocks for pears, and a yarn circle for a bowl. I put 4 red blocks and 5 yellow blocks in the yarn circle to show the fruit in the bowl. Then I took 3 red blocks out of the yarn circle. I counted 6 blocks in the yarn circle. So there are 6 pieces of fruit in the bowl.

3. Students draw pictures to illustrate one of the stories in Extensions 1 and 2. For example, they might draw red and green apples for the first story.
OAK-29 Subtracting with Pictures

Pages 138–141

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 5 by modeling them with pictures.

Prior Knowledge Required:
Can count to 5
Can use objects to model “Take From with Result Unknown” subtractions within 5
Can compare two numbers within 5 to determine which is greater

Vocabulary: count by tens, greater, left, minus, minus sign (−), subtract, subtraction, take away

Materials:
blocks or counters
scrap paper
erasable boards (optional)
BLM Circles and Squares (see Activity Centers 1–4)
BLM Making Subtraction Stories (p. R-37, see Activity Centers 1, 2, 4)
paper bags (see Activity Center 3)
5 plastic bowling pins or empty plastic water bottles and a soft ball per student pair (see Activity Center 4)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 10.

(MP.1) Introduce subtraction with pictures. SAY: Five apples are in a bowl. Kyle eats two apples. Write on the board:

\[
\begin{array}{ll}
5 \text{ apples} & 2 \text{ eaten}
\end{array}
\]

Do the subtraction as you did in Lesson OAK-28 using blocks or counters, but do not write the number sentence below the picture. SAY: Let’s do this subtraction again but this time I will draw pictures. I will draw circles to show apples. ASK: How many circles should I draw to start? (5) SAY: When we used blocks, we started with five. Now we are going to start with five circles. Draw five circles on the board. ASK: How do we show subtracting when we use blocks? (we take them away or move them over) Can I take away a circle that I drew? (no) How can I show that a circle is gone? (cross it out) SAY: I am going to show how many apples Kyle ate by crossing them out. ASK: How many circles should I cross out? (2) Cross out two circles.
ASK: How many are left? (3) Write “5 apples − 2 apples = 3 apples” below the picture, as shown below:

5 apples 2 eaten

○ ○ ○ x x

5 apples − 2 apples = 3 apples

Point to the minus sign and SAY: We say minus when we see this line.

Repeat with 4 apples and 1 eaten. The final picture should look like this:

4 apples 1 eaten

○ ○ ○ x

4 apples − 1 apple = 3 apples

(MP.1) Practice subtraction with pictures. Do more subtractions within 5 using circles to illustrate other contexts. For each, write the subtraction sentence using a minus sign. Two examples are shown below:

3 children are playing. 1 child goes home.

○ ○ x

3 children − 1 child = 2 children

4 cats are sleeping. 2 cats run away.

○ ○ x x

4 cats − 2 cats = 2 cats

Activity
(MP.1) As you tell each of the following stories, have students use scrap paper to draw and cross out circles to model the story. If students have erasable boards, you can do the activity at the carpet. At the end of each story, have students signal the answer on their fingers. Examples:
• 5 spiders are climbing up a wall. 2 spiders get washed away by the rain. How many spiders are left? (3)
• Ed draws 4 rectangles. Then he colors 1 rectangle. How many rectangles are left to color? (3)
• Anne has 3 peas on her plate. She eats 2 peas. How many peas are left? (1)

(end of activity)
Activity Centers

NOTE: Instead of drawing and crossing out circles, some students may benefit from using circles or squares from BLM Circles and Squares.

1. **Subtracting with Objects** (see unit introduction, p. N-2)
   *Variation:* Students model subtractions with pictures. Give each student a strip from BLM Making Subtraction Stories with a subtraction sentence filled in by you. Students draw and cross out circles to show a subtraction (e.g., 5 circles and 2 circles crossed out).

   *(MP.2, MP.4)*

2. **Telling Subtraction Stories** (see unit introduction, p. N-2)
   *Variation:* Using scrap paper or a strip from BLM Making Subtraction Stories, students draw and cross out circles to model and record their subtraction story.

   *(MP.1)*

3. **Subtraction Hide and Seek**
   *Type:* Pairs
   *Objective:* To use a subtraction picture to find how many are left
   *Preparation:* Distribute a paper bag, five blocks or counters, and scrap paper to each student or student pair.
   *Instructions:* Player 1 places up to five blocks or counters in the paper bag and then draws circles on scrap paper to show how many objects are in the bag. Player 2 takes objects from the bag without looking and then crosses out that number of circles on the drawing. For example, Player 1 places four blocks in the bag and draws four circles. Player 2 takes three blocks from the bag and crosses out three of the four circles. Together, they determine how many blocks are left in the bag. Then they verify the subtraction by looking in the bag. Players switch roles and repeat.

   *(MP.2, MP.5)*

4. **Subtraction Bowling** (see unit introduction, p. N-2)
   *Variation:* Students use a strip from BLM Making Subtraction Stories (with the starting number, 5, filled in by you) and draw and cross out circles to show how many pins were knocked down and how many stayed upright. They then complete the number sentence.

   *(MP.2)*

Extensions

*(MP.2)* 1. Students tell a story based on a picture of subtraction that either you or the student draws (e.g., 4 circles and then 1 circle crossed out).

   *(MP.5)* 2. Use any tools to help you subtract. Explain to a partner how you used your tools.
   a) There are 5 bunnies. 3 bunnies hop away. Then 1 bunny hops away.
   b) There are 5 frogs. 1 frog hops away. Then 3 frogs hop away.
   **Sample answers:** a) I put 5 blocks in a yarn circle for the 5 bunnies. Then I took away 3. Then I took away 1 more. There is 1 block in the yarn circle. There is 1 bunny left; b) I drew 5 circles for frogs. Then I crossed out 1. Then I crossed out 3 more. There is 1 circle that isn’t crossed out. There is one frog left.

   Whole class follow-up: Explain why the answers for parts a) and b) are the same: whether you subtract 3 first and then 1, or 1 first and then 3, you are taking away the same amount.
OAK-30 Subtraction Expressions

Pages 142–144

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 5 by modeling expressions with pictures.

Prior Knowledge Required:
Can count to 5
Can use pictures to model “Take From with Result Unknown” subtractions within 5
Can compare two numbers within 5 to determine which is greater
Is familiar with the minus sign (−)

Vocabulary: count by tens, minus, minus sign (−), subtract, subtraction, take away

Materials:
scrap paper
BLM Interlined Paper (p. R-45, optional)
BLM Subtractions within 5 (pp. R-39–40)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 1)
5 two-sided counters or dried beans painted on one side and a paper cup per student (see Activity Center 2)
colored pencils, crayons, or markers (see Extension 3)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 5.

Completing a subtraction expression from a picture. SAY: Four bunnies are playing on the grass. Draw four circles on the board. SAY: One bunny hops away. ASK: How do I show that a bunny hopped away? (cross out a circle) Cross out a circle, as shown below. As you talk, write the subtraction expression below the picture. SAY: We started with four bunnies. Then one bunny hopped away. The picture should look like this:

\[
\begin{align*}
\bigcirc & \quad \bigcirc & \quad \bigcirc & \quad \bigcirc \\
4 & - & 1 \\
\end{align*}
\]

SAY: When we write the numbers and the minus sign without any words, we call it a subtraction. This subtraction says “4 − 1.”

Draw on the board:

\[
\begin{align*}
\bigcirc & \quad \bigcirc & \quad \bigcirc & \quad \bigcirc & \quad \bigcirc \\
\end{align*}
\]
SAY: This picture shows another bunny story. ASK: How many bunnies are there at the start? (5) Write "5 − ___" below the picture. ASK: How many did we subtract? How many did we take away? (3) How can you tell? (3 circles are crossed out) Where do I write “3” in the subtraction? (on the line, after the minus sign) Fill in the subtraction expression, as shown below:

$$5 - 3$$

Repeat with other examples, gradually letting volunteers do most of the steps.

**Crossing out to show subtraction.** SAY: Let’s start from the subtraction. Leaving space above the expression, write “3 − 1” on the board. SAY: The subtraction starts with 3 so I will draw three bunnies. Draw three circles above the expression. ASK: How many bunnies hop away? (1) Where do you see that in the subtraction? (after the minus sign) How many bunnies should we cross out? (1) Cross out one circle, as shown below:

$$3 - 1$$

Pointing to the circles, SAY: Three bunnies. Pointing to the crossed out circle, SAY: Minus one bunny. Repeat with other examples, letting students cross out the circles that you draw.

**Showing subtraction expressions with pictures.** Write on the board “3 − 2” and leave space above the expression. ASK: How many circles do we need to show this subtraction? (3) How do you know it’s 3, not 2? (it’s the first number) Have a volunteer draw three circles above the expression. ASK: How many do we cross out? (2) Have the volunteer cross out two circles, as shown below:

$$3 - 2$$

Repeat with other examples, letting volunteers draw the whole picture.

**Subtracting zero.** Write “4 − 0” on the board. SAY: This looks like a tricky one. ASK: How many circles do we start with? (4) Is that different from the other examples? (no) Have a volunteer draw four circles. ASK: How many do we cross out? (zero, none) SAY: We are subtracting zero so we have nothing to cross out. We are done. The picture should look like this:

$$4 - 0$$
**Subtracting all.** Write “4 – 4” on the board. ASK: How many circles do we start with? (4) Is that different from the other examples? (no) Have a volunteer draw four circles. ASK: How many do we cross out? (4) Have the volunteer cross out four circles. ASK: How many are left? (zero, none) SAY: We subtracted all of the circles so we have zero left. The final picture should look like this:

```
  X  X  X  X
4 – 4
```

**Activity**

Give each student scrap paper. **NOTE:** Provide students who need writing support with a template for subtraction created using **BLM Interlined Paper** instead of scrap paper.

Give each small group of students a set of cards from **BLM Subtractions within 5 (1)**. Note that using **BLM Subtractions within 5 (2)** is optional. Each student chooses a card at random and writes the subtraction expression on scrap paper. Then they draw and cross out circles to illustrate the story.

*(end of activity)*

**Activity Centers**

1. **Writing Subtractions**
   Type: Individual
   **Objective:** To write a subtraction expression for two numbers drawn at random
   **Preparation:** Give each student a set of cards for 1 to 5 from **BLM Number Cards 0 to 5**.
   **Instructions:** Students choose two cards at random. They determine which number is greater and use scrap paper to write and illustrate the subtraction expression by drawing and crossing out circles.

2. **Subtraction with Five Counters** (see unit introduction, p. N-3) *(MP.2)*

3. **Making Subtraction Stories**
   Type: Pairs, imaginative
   **Objective:** To tell a subtraction story that illustrates a subtraction expression
   **Preparation:** Provide each student pair with a set of cards from BLM Subtractions within 5.
   **Instructions:** Students take turns choosing a card at random and telling a story based on the card. For example, for a card that says “4 – 1,” a student might say: “Four bunnies are eating. One feels full so he stops eating.”

**Extensions**

1. Subtract.
   a) 5 – 0  
   b) 4 – 0  
   c) 2 – 0  
   d) 1 – 0  
   e) 3 – 0  
   **Bonus:** 0 – 0

**Answers:** a) 5, b) 4, c) 2, d) 1, e) 3, Bonus: 0
NOTE: Extension 2 should be completed right after students have completed Extension 1.

(MP.3, MP.8) 2. a) Have students state a rule for subtracting 0 to a partner (orally or in writing).
b) In pairs, students explain why the rule works. Do they agree with each other? Have them discuss why or why not.
c) Have students predict the answer to 15 – 0, and explain their prediction.

Sample answers:
a) When you subtract 0, you end up with the same number you started with.
b) If you start with blocks or anything else, and you don't take any away, you have the same number you started with.
c) 15, because if you start with 15 blocks and you don't take any away, you'll still have 15 blocks.

NOTE: For part b), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems to guide students.

(MP.7) 3. Write a subtraction for the picture.

Answers: a) 3 – 1, b) 5 – 2, c) 4 – 2

4. Show students how to use color instead of crossing out to show subtraction.

Example: 5 – 3

Remind students that the picture can also be used to show 2 + 3.

Have students write an addition and a subtraction for the picture.

Answers: a) 3 + 2, 5 – 2; b) 1 + 3, 4 – 3; c) 2 + 1, 3 – 1
OAK-31 Subtracting

Pages 145–147

Standards: K.OA.A.1, K.OA.A.2, K.OA.A.5

Goals:
Students use pictures or concrete models to subtract.

Prior Knowledge Required:
Can count to 5
Can use objects or pictures to model “Take From with Result Unknown” subtractions within 5
Can compare two numbers within 5 to determine which is greater
Is familiar with the minus sign (−)

Vocabulary: count by tens, equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, take away

Materials:
BLM Subtractions within 5 (pp. R-39–40)
blocks or counters
colored pencils, crayons, or markers
scrap paper
BLM I Have ____, Who Has ____? (p. R-8, see Activity Center 1)
BLM Dominoes (1) (p. R-15, see Activity Center 2)
BLM Game Cards (p. R-10, see Activity Center 3)
BLM Number Lines (p. R-23, see Extension 2)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 10. As a class, play I Start, You Finish (see introduction to Unit 1, p. C-1) counting by tens.

(MP.2) Subtracting with pictures. Write “3 − 1” on the board. ASK: How do we read this? (3 minus 1) Write “=” beside the expression. ASK: How can we find what it equals? (draw a picture, use fingers, use blocks) PROMPT: What are some ways that we have learned to subtract? SAY: I will draw a picture for this subtraction. ASK: How many things should I draw first to show the subtraction? (3) SAY: I will draw circles. Pointing to the expression, SAY: This does not say what we are subtracting. ASK: Does it matter what I draw? Does it have to be circles? (no) SAY: The subtraction is the same no matter what kind of shape I draw. Draw three circles. ASK: How do I show subtraction? (cross out circles) How many circles do I need to cross out? (1) Cross out one circle, as shown below:

3 − 1 =

〇 〇 ✗
ASK: How many do three minus one make? (2) Write “2” and read the subtraction aloud as “3 minus 1 equals 2.” ASK: If we drew squares instead of circles, would we get the same answer? (yes) What if we used three blocks and then took away one block, how many blocks would we have left? (2)

Repeat with 5 − 3. Have a different volunteer do each step. The final picture should look like this:

\[
5 - 3 = 2
\]

\[
\bigcirc \quad \bigcirc \quad \bigcirc \quad \bigcirc \quad \bigcirc
\]

Repeat with 4 − 1. If students are ready, let a volunteer do the whole problem.

**Subtracting zero.** Write “3 − 0” on the board and have students draw a picture for the expression. ASK: How many do we have left? (3) SAY: When we take away zero, we take away nothing. We still have 3. Write “= 3” as shown below:

\[
3 - 0 = 3
\]

\[
\bigcirc \quad \bigcirc
\]

**Subtracting all.** Write “2 − 2” on the board and have students create the picture for the expression. ASK: How many do we have left? (0) SAY: We started with two and then we took away two. We have none left. Write “= 0” as shown below:

\[
2 - 2 = 0
\]

\[
\bigcirc \quad \bigcirc
\]

**(MP.2, MP.5) Subtracting with fingers.** Write “4 − 2 =” on the board. SAY: We will do this subtraction on our fingers first. Show me four fingers on one hand. Now put down two fingers. ASK: How many fingers are still up? (2) SAY: Now let’s do the subtraction with pictures. ASK: How many circles should I draw first? (4) Draw four circles. ASK: What should I do next? (cross out circles) How many should I cross out? (2) Have a volunteer cross out two circles. ASK: How many circles are left? (2) What is 4 minus 2? (2) Write “2” beside the equal sign.

Repeat with 5 − 1. Have students subtract on fingers first. ASK: Will we get a different answer if we draw a picture? (no) SAY: Let’s check. Repeat the subtraction using a picture. ASK: Why is the answer the same? (we are subtracting the same numbers, the number story is the same) Will the answer change if we use blocks to find the answer? (no)

Repeat with 3 − 3.

**Activity**

**(MP.2, MP.5)** SAY: Today you are going to subtract. You can use blocks to subtract. You can draw pictures to subtract. You can use your fingers to subtract. You pick how you want to
subtract. Show students a subtraction card from BLM Subtractions within 5 (1). SAY: You will pick a subtraction card and write the subtraction on paper. Then use whatever way you like to find how many are left and write the answer.

Give each small group of students a set of cards from BLM Subtractions within 5 (1). Note that BLM Subtractions within 5 (2) is optional. Provide blocks or counters, colored pencils, crayons, or markers, and scrap paper.

(end of activity)

Activity Centers
(MP.2) 1. I Have ____, Who Has ____? (see introduction to Unit 7, p. J-2)
Variation: In advance, make cards using BLM I Have ____, Who Has ____? For “I have,” write a subtraction expression within 5 that students can work out in advance. For “Who has,” write a number from 1 to 4. Make sure that each number is represented only once. Example:

```
I have
3 \(-\) 2
Who has
4
```

(MP.2) 2. Subtraction with Dominoes
Type: Individual
Objective: To write subtraction expressions shown on a domino and find the answer
Preparation: In advance, gather dominoes with dots that are less than or equal to 5 (on each side), or use dominoes from BLM Dominoes (1). Give students scrap paper to record their work.
Instructions: Students choose a domino. They count the dots on each side and decide which side has more. They turn the domino so that this side is on the left (this step should be optional for some students). Then they write the subtraction and find the answer.

(MP.2) 3. Matching (see introduction to Unit 7, p. J-3)
Variation: In advance, make four pairs of matching cards using BLM Game Cards, using numbers from 1 to 4 and a subtraction for each number you wrote (e.g., 4 and 5 \(-\) 1).

Extensions
1. Tell students that when there are two subtraction signs, they need to do the first subtraction. Then they need to use the answer to do the second subtraction. Example:

\[
5 \(-\) 1 \(-\) 2 \\
\text{First subtraction: } 5 \(-\) 1 = 4 \\
\text{Second subtraction: } 4 \(-\) 2 = 2 \\
\text{So } 5 \(-\) 1 \(-\) 2 = 2
\]

Subtract.

\[
a) 5 \(-\) 1 \(-\) 2 \\
b) 4 \(-\) 2 \(-\) 1 \\
c) 5 \(-\) 3 \(-\) 2 \\
d) 4 \(-\) 1 \(-\) 3
\]

Answers: a) 2, b) 1, c) 0, d) 0
2. **Subtracting on a number line.** Give each student **BLM Number Lines.** SAY: We can use a number line to subtract. Let’s subtract 5 – 2. Just like we did with adding, we start by drawing a dot at the first number. ASK: What is the first number? (5) Draw a dot at 5. SAY: When we add, we jump forward from the number toward the bigger numbers. ASK: What do you think we do when we subtract? (jump back) How many jumps should we draw? (2) Draw two jumps back. ASK: What is 5 – 2? (3) SAY: We landed on the answer.

![Number line example](image)

Repeat with 4 – 1 and have students work along on their own number lines.

Write “3 – 1” on the board. ASK: Where do we draw the dot? (at 3) Have students draw a dot at 3 on a number line. ASK: How many times do we jump back to show minus one? (1 time) Demonstrate by drawing one jump and have students make one jump back on their own number lines. ASK: What number did we land on? (2) What is 3 – 1? (2) SAY: We landed on the answer.

![Number line example](image)

Subtract on a number line.

a) 4 – 2  
\hspace{5cm} b) 5 – 4  
\hspace{5cm} c) 2 – 1  \hspace{5cm} d) 3 – 3

**Answers:** a) 2, b) 1, c) 1, d) 0

(MP.2, MP.6) 3. There are 5 birds in a tree. Two birds fly away. Now there are 3 birds in the tree.

a) Write a subtraction to show what happens with the birds. Use the minus sign and the equal sign.

b) Have students use this example to explain to a partner what the minus sign (−) means, and what the equal sign (=) means.

**Answer:** a) 5 – 2 = 3

**Sample answer:** b) The “−” sign means minus (or subtract, or take away). It means you are taking away some things to find how many are left. When I wrote 5 – 2, I meant 5 birds in the tree take away 2 birds that fly away. That makes 3 birds left on the tree. The equal sign means the same number. Five minus two is the same number as three.
OAK-32 Writing Subtractions

Pages 148–149

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students represent subtractions within 5 using expressions or equations.

Prior Knowledge Required:
Can count to 5
Can use objects or pictures to model “Take From with Result Unknown” subtractions
Can compare two numbers within 5 to determine which is greater
Can use pictures or objects to subtract within 10

Vocabulary: count by tens, equals, equal sign (=), greater, left, minus, minus sign (−), subtraction, take away

Materials:
counters
BLM I Have ___, Who Has ___? (p. R-8)
scrap paper or BLM Making Subtraction Stories (p. R-37, see Activity Centers 1–4)
5 two-sided counters or dried beans painted on one side and a paper cup per student (see Activity Center 1)
5 plastic bowling pins or empty plastic water bottles and a soft ball per student pair (see Activity Center 2)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 4)
dice (see Activity Center 4)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 10. In pairs, have students play I Start, You Finish (see introduction to Unit 1, p. C-1) counting by tens.

(MP.4) Writing subtractions for situations that are acted out. SAY: Let’s act out a subtraction. Three children are playing soccer. One child goes home for lunch. Ask volunteers to be the children playing soccer. SAY: We are going to write a subtraction sentence for our story. ASK: How many children are at the start of the story? (3) Write “3” on the board. SAY: One child goes home for lunch. Have one volunteer step to the side. ASK: How do we show take away one with a sign and a number? (− 1) Have students show minus with a finger. Have a volunteer write “− 1” beside the 3. ASK: How many are left? (2) SAY: Three minus one equals two. ASK: How do we write “equals 2”? Have students show an equal sign with their arms. Have a volunteer write “= 2” to complete the subtraction sentence, as shown below:

\[ 3 - 1 = 2 \]
Repeat with “5 children are playing. 3 children leave.” The subtraction should look like this:

\[ 5 - 3 = 2 \]

**(MP.4) Writing subtractions for situations modeled with objects.** SAY: We can also write a subtraction for a story that we show with counters. Four bunnies are eating carrots. ASK: How many counters do we need to start? (4) Affix four counters on the board. ASK: What number does the subtraction start with? (4) Have a volunteer write “4” on the board. SAY: Two bunnies hop away. ASK: How do we use counters to show two bunnies hopping away? (take away 2 counters) How do we use a sign and a number to show that two bunnies hopped away? (− 2) Have volunteers move two counters to the side and write “− 2” on the board. ASK: How many are left? (2) What do we write to show that there are 2 left? (= 2) Have a volunteer write “= 2” to complete the subtraction sentence, as shown below:

\[
\begin{align*}
\text{□□} & - \text{□□} \\
4 - 2 & = 2
\end{align*}
\]

Repeat with 5 − 1.

**(MP.4) Writing subtractions for situations modeled with pictures.** SAY: Let’s show a subtraction with pictures this time. There are five bees on a flower. ASK: How many circles do we need to draw? (5) Draw five circles on the board. ASK: What number does the subtraction start with? (5) Have a volunteer write “5” on the board. SAY: Two bees fly away. ASK: How do we use the picture to show two bees flying away? (cross out 2 circles) How do we use a sign and a number to show two bees flying away? (− 2) Have volunteers cross out two circles and write “− 2” on the board. ASK: How many are left? (3) What do we write to show that there are three left? (= 3) Have a volunteer write “= 3” to complete the subtraction sentence. The final picture should look like this:

\[
\begin{align*}
\text{□□□} & - \text{□□□} \\
5 - 2 & = 3
\end{align*}
\]

Repeat with 4 − 3.

**(MP.4) Writing subtraction expressions directly from pictures.** Draw on the board:

\[
\begin{align*}
\text{□□□□} & - \text{□□□□} \\
3 - 3 & = 0
\end{align*}
\]

SAY: We can write a subtraction for the picture without telling a story. ASK: What number do we start with? (3) Why? Where do you see “3” in the picture? (there are 3 circles) Write “3” below the picture. ASK: Are we adding or taking away? (taking away) How do we show taking away in the picture? (by crossing out circles) How many circles are crossed out? (2) How do we write
take away 2? (− 2) Have students signal the minus sign with a finger. Write “− 2.” The final picture should look like this:

3 − 2

Practice writing subtraction expressions a few times, gradually increasing what volunteers do before proceeding to writing subtraction equations.

(MP.4) Writing subtraction equations directly from pictures. Draw on the board:

Have a volunteer write the subtraction expression “4 − 3.” ASK: How many are left when you start with four and take away three? (1) SAY: Four minus three equals one. ASK: How do we write “equals 1”? Have a volunteer write “= 1” on the board. The final picture should look like this:

4 − 3 = 1

Repeat with more examples.

Activity
I Have ___, Who Has ___? (see introduction to Unit 7, p. J-2)

Variation: In advance, prepare cards using BLM I Have ___, Who Has ____? For “I have,” show a representation of a subtraction. For “Who Has,” write a subtraction expression. Make sure that the bottom of each card can be matched to the top of another card, and vice versa. Example:

![Card Example]

(end of activity)

Activity Centers

NOTE: For all of the activity centers, have students use scrap paper or Making Subtraction Stories to write subtraction equations. You may also wish to have students draw and cross out circles for any of the activity centers before they write the subtraction.
(MP.2, MP.5) 1. Subtraction with Five Counters (see unit introduction, p. N-3)
Variation: Students record the results of the toss by drawing and crossing out circles, and then write the subtraction expression.

(MP.2, MP.5) 2. Subtraction Bowling (see unit introduction, p. N-2)
Variation: Students write the subtraction expression for how many pins were knocked down and how many stayed upright.

(MP.2, MP.5) 3. Subtraction with Five Counters (see unit introduction, p. N-3)
Variation: Played in pairs using fingers, Player 1 holds up a number of fingers on one hand. Player 2 counts how many fingers are down and writes the subtraction equation. Players switch roles and repeat.

4. Writing Subtraction Equations
Type: Pairs
Objective: To write a subtraction equation for a picture
Preparation: Give each student pair two sets of number cards for 1 to 5 from BLM Number Cards 0 to 5.
Instructions: Working independently at first, each player draws two cards from their own set. They decide which number is greater and draw that number of circles on scrap paper. Then they use the smaller number to determine how many circles to cross out. Once they are both done, players exchange work and write the subtraction equation (with final answer) for each other’s picture.
Variation: Students use dice to determine numbers.

---

Extensions
(MP.7) 1. What subtraction does the picture show?

a)  
\[
\begin{array}{c}
10 \\
\circ \times \times \\
\end{array}
\]

b)  
\[
\begin{array}{c}
10 \\
\circ \circ \\
\end{array}
\]

c)  
\[
\begin{array}{c}
10 \\
\circ \circ \times \\
\end{array}
\]

Answers: a) 14 – 3, b) 13 – 1, c) 15 – 3

2. Find the answer for each subtraction in Extension 1.
Answers: a) 11, b) 12, c) 12

NOTE: Extensions 3 and 4 are for very advanced students.

3. What subtraction does the picture show?

a)  
\[
\begin{array}{c}
10 \\
10 \\
\times \times \\
\end{array}
\]

b)  
\[
\begin{array}{c}
10 \\
10 \\
10 \\
\times \times \times \\
\end{array}
\]

Answers: a) 30 – 10, b) 50 – 20

4. Find the answer for each subtraction in Extension 3.
Answers: a) 20, b) 30
OAK-33  Composing 5

Pages 150–151

Standards: K.OA.A.3, K.OA.A.5

Goals:
Given a number from 1 to 4, students use objects or pictures to find how many more make 5.

Prior Knowledge Required:
Can count to 5
Can add within 5
Can model addition using objects or pictures
Can model subtraction using objects or pictures
Knows that a five-frame holds 5 ones
Can compare two numbers within 5 to determine which is greater

Vocabulary: count by tens, five-frame, greater, less, more, plus, subtraction

Materials:
two-sided counters, at least 5 per student
scrap paper
BLM Game Cards (p. R-10, see Activity Center 1)
BLM Dominoes (1) (p. R-15, see Activity Center 2)
BLM Making 5 (p. R-13, see Activity Centers 2, 3)
five-frames made from BLM Ten-Frames (p. R-24, see Activity Center 3)

Counting practice. Practice counting by tens from 10 to 100 as a class. Play “Let’s Compare” using numbers from 1 to 5.

Review decomposing 5. Affix 5 two-sided counters to the board, with two counters showing one color and three counters showing the other color. Alternatively, draw five circles, with two in one color and three in another color. ASK: How many counters in all? (5) Have a volunteer count. Pointing to each color of counter in turn, ASK: How many in this color? (2) How many in the other color? (3) What addition does this picture show? (sample answers: 5 = 2 + 3, 5 = 3 + 2, 2 + 3 = 5, 3 + 2 = 5) Have a volunteer write on the board:

\[ 5 = 2 + 3 \]

Repeat with 4 + 1 or 0 + 5.

(MP.2) Composing 5 with fingers. ASK: Is two less than or greater than five? (less than)
SAY: Let’s find out how many more we need to make 5. Write on the board:

\[ 2 + \_ \_ \_ = 5 \]
SAY: Hold up all of your fingers on one hand. (Demonstrate as you talk.) ASK: How many fingers are you showing? (5) SAY: Now hold up two fingers. ASK: How many more fingers would make 5? PROMPT: How many fingers are down? (3) Write “3” in the blank.

Repeat with some other combinations.

(MP.2) Composing 5 with a five-frame. ASK: What else can help us count to 5? (a five-frame) Draw a five-frame on the board and write “1 + ___ = 5” below it. SAY: We start with 1. Draw a circle in the first square of the five-frame. SAY: I drew the circle for the 1. ASK: How can I find how many more make 5? (fill the rest of the boxes with circles, count the rest) SAY: The empty boxes are like the fingers that are down. We can count them to find how many more make 5. Have a volunteer count and write “4” in the blank, as shown below:

\[
\begin{array}{|c|c|c|}
\hline
\circ & \circ & \circ \\
\hline
\end{array}
\]

1 + _4_ = 5

Repeat with some other combinations.

(MP.2) Composing 5 with pictures. Write “3 + ___ = 5” on the board and SAY: Let’s use pictures to find the missing number. We can start by drawing all 5. Draw five circles on the board. Pointing to the 3, SAY: We can color in this number. Color three circles, as shown below:

\[
\begin{array}{|c|c|c|}
\hline
\circ & \circ & \circ & \circ & \circ \\
\hline
\end{array}
\]

3 + ___ = 5

ASK: Three plus what makes 5? (2) Point to the empty circles and SAY: Two more make 5. Write “2” in the blank.

Repeat with some other combinations.

Activity
(MP.2) Give each student scrap paper and 5 two-sided counters. Have students place all of the counters so that they show the same color. Write on the board:

\[
\begin{array}{c}
\circ \\
\hline
\end{array}
\]

2 + ___ = 5

Students turn over two counters and count the other counters to find the missing number. They write the completed addition sentence. Repeat with all of the following examples:

a) 4 + ___ = 5   b) 1 + ___ = 5

\[
\begin{array}{|c|c|}
\hline
\circ & \circ \\
\hline
\end{array}
\]

c) 3 + ___ = 5   d) 5 + ___ = 5

Answers: a) 1, b) 4, c) 2, d) 0
(end of activity)
Activity Centers

**Matching** (see introduction to Unit 7, p. J-3)

*Variation*: In advance, make six pairs of matching cards using BLM Game Cards using numbers from 0 to 5 and an addition to 5 with a missing addend for each number you wrote (e.g., 4 and 1 + ___ = 5).

**2. How Many More Make 5?**

*Type*: Individual

*Objective*: To find how many more make 5 and write the addition

*Preparation*: In advance, cut out the half dominoes from BLM Dominoes (1), on which one side shows no more than 5 dots and the other side is blank.

*Instructions*: Students draw dots on the blank side of the domino so that there are five dots altogether. They can write the additions on BLM Making 5 or scrap paper.

**3. How Many More Make 5?**

*Variation*: Instead of using dominoes, in advance, use BLM Making 5 to write numbers from 0 to 5 for the first number to be added for the additions. Students use the method of their choice to find the missing number for each addition. Make two-sided counters and five-frames available. You can make five-frames by cutting apart ten-frames from BLM Ten-Frames.

---

**Extensions**

1. Find the missing number.
   a) ___ + 3 = 5  
   b) ___ + 1 = 5  
   c) ___ + 2 = 5  
   d) ___ + 4 = 5  
   **Bonus**: ___ + 5 = 5  
   **Answers**: a) 2, b) 4, c) 3, d) 1, Bonus: 0

2. Find the missing number.
   a) 2 + ___ = 4  
   b) 2 + ___ = 3  
   c) 3 + ___ = 4  
   d) 0 + ___ = 5  
   e) 4 + ___ = 4  
   **Answers**: a) 2, b) 1, c) 1, d) 5, e) 0

3. Write a subtraction using the numbers 2, 3, and 5. Now write a different subtraction using the numbers 2, 3, and 5.
   **Answers**: 5 – 3 = 2 or 5 – 2 = 3
Frogs on a Log
Subtracting with Frogs (I)

5 sit on a log. 3 hop off.

= _____

5 sit on a log. 1 hops off.

= _____

4 sit on a log. 2 hop off.

= _____
Subtracting with Frogs (2)

___ sit on a log. ___ hop off.

= ___

___ sit on a log. ___ hop off.

= ___

___ sit on a log. ___ hop off.

= ___
Subtraction Stories

_____ minus _____ = _____

_____ minus _____ = _____

_____ minus _____ = _____

_____ minus _____ = _____
Unit 12  Operations and Algebraic Thinking:
Subtraction within 10

Mathematical Practices in This Unit
In this unit, you will have the opportunity to assess MP.1 to MP.5, MP.7, and MP.8. The MP labels in this unit flag both opportunities to develop the mathematical practice standards and opportunities to assess them. Below is a list of where we recommend assessing these standards as well as some examples of how students can show that they have met a standard.

**MP.1:** OAK-35 Extension 4
In OAK-35 Extension 4, students are asked to find all the ways in which 9 cookies can be arranged on two plates so that the bigger plate always has more cookies. Students make sense of this non-routine problem when they realize the problem is related to finding additions that make 9. Students persevere to solve the problem when they use an organized approach to list all the possible additions and determine which ones help them answer the question.

**MP.2:** OAK-36 Extension 2, OAK-37 Extension 2, OAK-38 Extension 3

**MP.3:** OAK-34 Extension 5, OAK-36 Extension 5, OAK-37 Extension 3, OAK-39 Extension 4, OAK-40 Extension 5
In OAK-39 Extension 4, students analyze and critique incorrect reasoning about a situation involving addition and subtraction. Students construct an argument about why the reasoning must be incorrect, and have an opportunity to further analyze and critique a partner’s argument.

**MP.4:** OAK-35 Extension 4, OAK-36 Extension 2, OAK-37 Extension 2, OAK-38 Extension 3
In OAK-36 Extension 2, students model mathematically when they create representations using tools such as blocks, yarn circles and drawings to solve non-routine real-world problems involving both additions and subtractions.

**MP.5:** OAK-35 Extension 4, OAK-36 Extensions 2 and 5, OAK-37 Extension 2, OAK-39 Activity and Extension 4, OAK-40 Extension 5

**MP.7:** OAK-40 Extension 2, OAK-41 Extension 5

**MP.8:** OAK-34 Extension 5, OAK-37 Extension 3
In OAK-37 Extension 3, students notice and express regularity in repeated reasoning when they realize and explain to a partner that no matter what number they start with or which objects they use, if they subtract two and then add two, they will end up with the same number they started with.
Unit 12  Operations and Algebraic Thinking: Subtraction within 10

Introduction
In this unit, students will subtract from numbers less than or equal to 10. The focus will be on “Take From with Result Unknown” situations, as summarized in Table 1 on p. 7 of the Common Core Operations and Algebraic Thinking Progressions document. As done for subtraction within 5, students will act out subtraction situations and represent them with objects and pictures. They will develop fluency with 10 by composing 10 from a given addend. Students will continue to develop their ability to read and write subtraction expressions and equations, which were introduced for subtractions within 5 in Unit 11.

Literature connections. Use picture books and other age-appropriate children’s books that expose students to subtraction, such as The Action of Subtraction (Math Is Categorical) by Brian P. Cleary.

Materials. For students who require writing support, you might create a template for subtractions using BLM Interlined Paper, as shown below. Students can use the template instead of scrap paper to record subtractions.

−

In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section R, are used in Unit 12:
BLM Number Charts to 20 (p. R-32)
BLM Interlined Paper (p. R-45)
BLM Number Charts to 50 (p. R-33)
BLM Foods (p. R-36)
BLM Number Cards 0 to 5 (p. R-2)
BLM Number Cards 6 to 10 (p. R-3)
BLM Animal Cards (pp. R-6–7)
BLM Number Cards 11 to 15 (p. R-4)
BLM Ten-Frames (p. R-24)
BLM Making Subtraction Stories (p. R-37)
BLM Subtractions within 10 (pp. R-41–44)
BLM Subtractions within 5 (pp. R-39–40)
BLM I Have ____, Who Has ____? (p. R-8)
BLM Dominoes (pp. R-15–17)
BLM Game Cards (p. R-10)
BLM Number Lines (p. R-23)
BLM Spinner (p. R-34)
BLM Hop on the Bunny Trail (p. R-35)
BLM Making a Number (p. R-14)
## OAK-34  Counting On to 50

### Pages 153–154

**Standards:** K.CC.A.1, K.CC.A.2, K.CC.A.3

**Goals:**
Students count on to 50 starting from any number less than 50.

**Prior Knowledge Required:**
Can count to 50
Can write numbers to 10

**Materials:**
- BLM Number Charts to 20 (p. R-32, see Activity Center 1)
- BLM Numbers to 50 (1) (p. O-35, see Activity Center 2)
- scissors (optional, see Activity Center 2)
- glue (see Activity Center 2)
- dice (see Activity Center 3)
- scrap paper or **BLM Interlined Paper** (p. R-45, see Extension 1)
- BLM Number Charts to 50 (p. R-33, see Extensions 2, 3)
- 50 tokens or counters per student (see Extension 3)
- paper bag (see Extension 3)
- BLM Numbers to 50 (2) (p. O-36, see Extension 4)

**Counting to 50.** Practice counting from 1 to 50 as a class. Divide the class into five small groups and have each group count a set of ten numbers (1 to 10, 11 to 20, 21 to 30, and so on to 50). You might have groups take turns practicing their set of numbers and then conduct a counting choir of the numbers from 1 to 50 in order, with one group at a time counting their set of numbers.

**Counting to 50 with a lead-in.** Explain that you will start counting from a number and that students will finish counting to 50 from where you end. Start counting with 41, 42. Repeat with 31, 32, then 21, 22, and finally with 1, 2. Omit the teens for now.

**Counting from the teens.** Practice counting from 10 to 20 as a class. Then SAY: I am going to say a number (for example, 10). You need to say the next number (for example, 11). Then I will say the number after that (for example, 12). We will keep going until someone says 50. Repeat several times starting from a number between 10 and 20. When everyone seems comfortable, have students count on to 50 after you SAY: “11, 12.”

**Saying the next number.** Say any number from 1 to 50 and have the class respond with the next number. Do this as a class first and then select volunteers to respond individually. Pay special attention to the teens and to numbers ending in 9 and 0.
Counting on to 50. Say any number from 1 to 50 and have the class count on from that number to 50. If some students have difficulty with starting the count sequence, encourage them to count up in their head from a reasonable starting point to the given number. Let students pick the starting point to maintain their interest.

Activity Centers
For guidance on selecting and using the activity centers, see Introduction p. A-16.

1. I Start, You Finish (see introduction to Unit 1, p. C-1)

Variation: Play in pairs. Player 1 chooses a number from 1 to 20 and then Player 2 counts on to 50. Students can choose a number or randomly select a number by pointing to it on a number chart from 1 to 20. Make charts from BLM Number Charts to 20 available.

2. Completing a Number Chart to 50

Type: Individual

Goal: To complete a partially-filled number chart from 1 to 50

Preparation: In advance, cut out the number sequences (below the number chart) on BLM Numbers to 50 (1). Alternatively, provide students with scissors to cut out the sequences. Provide each student with glue and the chart from the BLM.

Instructions: Students glue each number sequence where it belongs on the number chart.

Bonus: Instead of gluing, have advanced students write the missing numbers on the chart.

3. I Start, You Finish (see introduction to Unit 1, p. C-1)

Variation: Give pairs a ten (i.e., 20, 30, 40) and Player 1 rolls a die to determine the starting point for counting to 50. Both players take turns counting. For example, if you say “30” and Player 1 rolls a 2, the players start at 32 and count to 50.

Extensions
1. Practice writing the numbers from 1 to 50 on scrap paper or BLM Interlined Paper.

2. Students work in pairs to practice recognizing numbers from 1 to 50. Consider pairing students who are competent in recognizing the numbers to 50 with those who are still learning them. Partner 1 either writes a number or points to a number on a number chart from 1 to 50. (Provide a number chart from BLM Number Charts to 50.) Partner 2 reads the number. Then, partners switch roles and repeat.

3. Play bingo for the numbers from 1 to 50. Give each student 50 tokens or counters and a number chart from 1 to 50 from BLM Number Charts to 50. Affix to or project on the board an enlarged version of the number chart on that you can use to mark each number as you call it (for students who are unsure about the numbers). SAY: I will call out numbers. You need to put a token on your chart for each number I call. We will keep playing until you have covered a line of five boxes on your card. Pointing to the number chart on the board, demonstrate a line by marking a horizontal, vertical, and diagonal pattern of five squares. SAY: When this happens, you call “bingo.” After students understand what to do, begin to call out numbers at random or
draw numbers from a paper bag. (If drawing numbers from a bag, you might cut apart a set of numbers from the BLM.)

4. Complete the number charts on BLM Numbers to 50 (2).

(MP.3, MP.8) 5. Have students model each situation with blocks.
   a) There are 5 frogs in the pond. 2 frogs jump out. How many frogs are in the pond now?
   b) There are 5 children at the park. 2 children go home. How many children are at the park now?
   c) There are 5 birds on a tree. 2 birds fly away. How many birds are on the tree now?
   d) If there are 5 of anything and 2 go away, will you always end up with 3? How do you know?
   e) In pairs, have students explain their answers to part d). Do they agree with each other? Have them discuss why or why not.

   Selected answers: a) 3; b) 3; c) 3; d) Yes. If you start with 5 of something and you take away 2, you will always get 3. It doesn’t matter what the things are. I know because all the stories can be shown using the same numbers of blocks.

   NOTE: For part e), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems to guide students.
OAK-35 Acting Out Subtraction within 10

Pages 155–156

Standards: K.OA.A.1

Goals:
Students do “Take From with Result Unknown” subtractions within 10 by acting them out.

Prior Knowledge Required:
Can count to 10
Can subtract from 5

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, take away

Materials:
10 toy animals
scrap paper and colored pencils, crayons, or markers
magazines, scissors, and glue (optional)
10 toy foods or BLM Foods (p. R-36, see Activity Center 1, Extension 4)
BLM Number Cards 0 to 5 (p. R-2, see Extension 1)
BLM Number Cards 6 to 10 (p. R-3, see Extension 1)
toys or finger puppets (see Extensions 2, 4)
BLM Animal Cards (pp. R-6–7, see Extension 3)
BLM Number Cards 11 to 15 (p. R-4, see Extension 4)

Counting practice. As a class, practice counting on to 50 from different starting points (see Introduction, p. A-23). Remind students that when they add 1, they get the next number in counting order. Have them practice adding 1 within 10. You might challenge students to practice adding 1 within 20.

Play “Ten Little Monkeys.” SAY: Let’s play “Ten Little Monkeys.” Everybody hold up your 10 little monkeys. Hold up both of your hands with fingers spread and wiggle your fingers. As you recite the rhyme, move your raised hands up and down to mimic jumping. SAY: Ten little monkeys jumping on the bed. One fell off and bumped his head. Oh no! Pause and ASK: How can we show that one monkey fell off the bed? (put down one finger) Continuing the rhyme, SAY: Mama called the doctor and the doctor said, “No more monkeys jumping on the bed.” ASK: Do the monkeys listen? Do they stop jumping on the bed? (shake your head for “no” to prompt the correct answer) Now how many monkeys are jumping on the bed? How many fingers are up? (9) Count fingers as a class, if necessary.

Repeat the verse for nine. SAY: Nine little monkeys jumping on the bed. One fell off and bumped his head. Mama called the doctor and the doctor said, “No more monkeys jumping on the bed.” Continue the rhyme until there are “No more monkeys jumping on the bed.”
(MP.4) Recall subtraction language. SAY: Every time a monkey falls off the bed, we take away a finger. What other words did we learn for take away stories? (subtract, subtraction, minus) Let’s tell some take away stories. Place six toy zoo animals on a flat surface.

SAY: These animals are outdoors at the zoo. ASK: How many animals are there? (6) Count to verify. SAY: Two animals go inside for a nap. Remove two animals and ASK: How many animals are left? (4) SAY: There are six animals. Then two animals leave. There are four animals left. On the board, write “6 – 2 =.” ASK: What is 6 – 2? (4) Write “4,” and SAY: Six minus two equals four.

Repeat with seven animals minus one animal to get 7 – 1 = 6. Ask a volunteer to write the subtraction on the board.

Practice subtracting and subtraction language through play. Have students tell subtraction stories using up to 10 toy animals. Record or ask a volunteer to record each story as a subtraction on the board. Make sure that the numbers are obvious to all students by counting. Reinforce subtraction language (i.e., minus, subtract, take away, left) at every opportunity.

Drawing pictures of subtraction stories. Draw on the board:

```
    O O O
    O O
```

SAY: I have some apples. I ate some of the apples. The picture shows all of the apples—the ones I did not eat (point to the whole apples) and the ones I ate (point to the eaten apples). ASK: How many apples did I have at the start? (6) What do you count to find out? (all of the apples) Write “6 apples” above the picture. ASK: How many did I eat? (2) Ask a volunteer to point to the eaten apples. Write “2 eaten” above the picture. ASK: How many apples are left? (4) Write “4 apples left” below the picture. ASK: What subtraction does this show? How many did we start with? (6) How many did we take away? (2) What subtraction did we do? (6 – 2) What is 6 – 2? (4) Write the subtraction below the picture, as shown below:

```
6 apples    2 eaten
    O O O
    O O
```

```
4 apples left
```

```
6 – 2 = 4
```

Repeat with eight apples and three eaten to get 8 – 3 = 5.

Activity
(MP.1) Provide students with scrap paper and colored pencils, crayons, or markers. Alternatively, make magazines, scissors, and glue available. Students draw or cut out pictures
from magazines to create their own subtraction stories. For example, they might draw eight ducks on a pond and two ducks flying away to illustrate \( 8 - 2 = 6 \). Encourage students to write the subtraction sentence and tell the subtraction story to a classmate.

(end of activity)

Preparing for the AP pages. Show students AP Book K.2, Unit 12, p. 155. Pointing to the picture in Question 1, SAY: The picture shows some apples. Let’s pretend that Lynn (or a student in your class) ate some apples. How many apples are left? Write the answer here (point to the blank).

Activity Centers

1. Acting Out Subtraction within 10
   Type: Pairs, creative
   Goal: To act out subtraction situations within 10
   Instructions: Provide students with at least 10 toy foods or pictures of food from BLM Foods. They use the food to act out subtraction situations. Students take turns saying how many at the start, how many to take away, and how many are left. For example, Player 1 has 2 apples, 1 banana, and 3 pears. Player 2 takes away the pears and tells a story: There are 6 fruits at the start. I take away 3 fruits. Now there are 3 fruits left.

2. One Potato, Two Potato for 10
   Type: Groups of 3 to 10, active
   Objective: To take away one at a time from up to 10 until none are left
   Instructions: Students play a version of “One Potato, Two Potato” until no fists remain. Students sit in a circle. Everyone puts two fists into the circle. (For groups of six or more, each player puts one fist into the circle.) The leader goes around the circle and touches the top of each fist as everyone says the chant: “One potato, two potatoes, three potatoes, four; five potatoes, six potatoes, seven potatoes, more!” When students say “more!” the student whose fist the leader touches is “out” and takes their fist out of the circle. After each round, students count how many are left. Then they do the chant again starting from the next student and with a different leader. NOTE: There is no winner in this game.

Extensions

1. Form a group of 10 students and pick a storyteller. In advance, prepare a set of number cards from 1 to 10 using BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10 for each group. The storyteller picks two number cards. All of the students decide which number is greater. The storyteller tells a subtraction story starting with the greater number. The other students act out the subtraction story and then decide together how many are left. Students take turns telling stories.

   NOTE: For Extensions 2 to 4, have students work in groups of three or four.

2. Repeat Extension 1 but have students act out subtraction stories using 10 toys or finger puppets, if available.
3. Repeat Extension 1 but have students act out subtraction stories using up to 10 animal cards from BLM Animal Cards.

(MP.1, MP.4, MP.5) 4. I have a big plate and a small plate, and 9 cookies. How can I put the cookies on the plates so that there are always more cookies on the big plate? Encourage students to model the problem using tools of their choice (such as ten-frames, blocks, counters, or colored pencils), and to write the combinations also using addition.

**Answers:** combinations: 9 cookies on the big plate and 0 cookies on the small plate, 8 big and 1 small, 7 big and 2 small, 6 big and 3 small, 5 big and 4 small; addition equations: $9 = 9 + 0$, $9 = 8 + 1$, $9 = 7 + 2$, $9 = 6 + 3$, $9 = 5 + 4$
Goals:
Students do “Take From with Result Unknown” subtractions from 10 by modeling them with objects.

Prior Knowledge Required:
Can act out subtractions from 10
Can subtract within 5

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, take away, ten-frame

Materials:
10 counters per student
ten-frame made from an egg carton with the lid still attached
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons
10 one-centimeter connecting cubes or ones blocks per student
BLM Subtraction Stories about Frogs (1) (p. O-37, see Activity Centers 1, 2)
scrap paper or BLM Making Subtraction Stories (R-37, see Activity Centers 1, 3, Extension 1)
yarn circle per student pair (see Activity Center 3)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 3)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 3)
paper bag (see Extension 1)
blocks or counters (see Extensions 1, 3, 4)

Counting practice. As a class, practice counting on to 50 from different starting points. Then have students practice adding 1 within 20. You might challenge them to practice adding 1 within 50.

Singing “Ten Green and Speckled Frogs.” Sing the first verse of “Five Green and Speckled Frogs” (sometimes called “Five Little Frogs”), substituting 10 for 5. Use hand gestures. (The lyrics and gestures can be found online.)

(MP.2) Modeling subtraction from 10 with a ten-frame. SAY: Let’s tell some subtraction stories starting with 10 frogs. We can use a ten-frame to keep track of 10 frogs. Draw a ten-frame on the board (or use a ten-frame made from an egg carton).

SAY: There are 10 frogs on a log. Write “10 frogs” below the ten-frame and affix 10 counters (representing the frogs) to the ten-frame. SAY: One frog jumps off. ASK: How do we show a frog jumping off? (take away a counter) What sign and number do we write to show take
away one? (− 1) Write “− 1 frog.” SAY: Let’s take away one frog. Remove a counter from the ten-frame and put it beside the frame within view. ASK: How many frogs are left? (9) Write “= 9 frogs,” as shown below:

```
 10 frogs − 1 frog = 9 frogs
```

**Practicing subtraction from 10 with a ten-frame.** SAY: Let’s do another one. This time we start with 10 frogs but 2 jump off. Write “10 frogs − 2 frogs.” Pointing to what you wrote, read “ten frogs minus two frogs.” ASK: What does “minus two frogs” mean? (2 frogs jumped off) ASK: How many frogs are there at the start? (10) How many counters should we put in the ten-frame? (10) Ask a volunteer to affix 10 counters to the frame. ASK: What happens next to the frogs? (2 jump off) How do we show that? (take away 2 counters) Have a volunteer remove two counters. ASK: How many are left? (8) Count to verify. Write “= 8 frogs,” as shown below:

```
10 frogs − 2 frogs = 8 frogs
```

Repeat with 10 frogs − 7 frogs = 3 frogs.

**MP.2) Modeling subtraction from 10 with fingers.** SAY: We can also use our fingers to subtract. On the board, write “10 frogs − 3 frogs.” ASK: How many frogs are there at the start? (10) Where do you see that on the board? (students point to the 10) Hold up your hands with fingers spread to show 10 and SAY: Show me your ten frogs. Have students do so. ASK: How many frogs jump off? (3) How can we show three frogs jumping off using our fingers? (put down three fingers) Put down three fingers and make sure students do the same. ASK: How many frogs are left? (7) Show students how to count seven fingers by bending each finger forward (or tapping each finger on your chin) as you count it. Write “= 7 frogs.” Repeat with 10 frogs − 5 frogs = 5 frogs.

**Practicing subtraction without visuals.** Put 10 counters in a ten-frame made from an egg carton, show the class, and close the lid. ASK: How many counters are in my ten-frame? (10) SAY: I am going to take out two counters. Remove two counters, put them beside the carton within view, and close the lid. SAY: Let’s find how many counters are left in the ten-frame. Use your fingers to show me how many counters we started with. (students hold up 10 fingers) ASK: How many counters did I take out? (2) SAY: Use your fingers to show taking away 2. (students put down two fingers) ASK: How many are left? (8) Open the lid of the egg carton and count to verify. Repeat with other subtractions from 10.

**Activity**

**MP.2) Give each student 10 counters and a ten-frame from BLM Ten-Frames (or one made from an egg carton). Tell more stories about frogs on a log (similar to those in the lesson) to the students, always starting with 10 frogs. Have students model the stories using blocks. They can signal the final answer.**

*(end of activity)*
Preparing for the AP pages. Provide 10 one-centimeter connecting cubes or ones blocks to each student. Students place 10 blocks in the ten-frame (and then remove some) to model each subtraction before writing the answer.

Activity Centers

(MP.2, MP.4) 1. Subtracting with Objects (see introduction to Unit 11, p. N-2)
Variation: Give each student 10 counters, a ten-frame from BLM Ten-Frames (or one made from an egg carton), and BLM Subtraction Stories about Frogs (1). Students use counters and the ten-frame to model each subtraction shown on the BLM. They record the answer on the BLM. (1. 6, 2. 7, 3. 2, 4. 4, 5. 5)
Bonus: Students use scrap paper or BLM Making Subtraction Stories to write stories, such as “10 dogs. 2 dogs leave. How many dogs stay?” Have students find and circle the numbers, subtract, and then write the answer.

(MP.2, MP.4) 2. Subtracting with Objects (see introduction to Unit 11, p. N-2)
Variation: Students use fingers instead of counters to complete BLM Subtraction Stories about Frogs (1).

(MP.2, MP.4) 3. Telling Subtraction Stories (see introduction to Unit 11, p. N-2)
Variations:
1. Provide each student pair with 10 counters, a yarn circle (or a ten-frame from BLM Ten-Frames), and a set of number cards for 1 to 9 made from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10. You might include a number card for 10 for students who can subtract 10 − 10. All stories start with 10. Player 1 chooses a number card at random for how many to subtract and Player 2 models the story to find the answer. Students switch roles.
2. Cut BLM Making Subtraction Stories into strips, one question per strip. Students record their subtraction stories on a strip.

Extensions

1. Students put 10 blocks in a bag and, without looking or counting, they remove some blocks and then count how many blocks are out of the bag. They use subtraction to find how many blocks are in the bag. Students can record their subtraction stories using scrap paper or a strip on BLM Making Subtraction Stories. They can check their work by counting the blocks left in the bag.

(MP.2, MP.4, MP.5) 2. Make up stories that combine addition and subtraction. Students choose tools to model the stories. Students explain the tools they used and their solution to a partner. Have students say (or write, if they can) the final answer as a full sentence. Examples:
a) 7 frogs are on a log. 3 more frogs hop on. Then 2 frogs hop off. How many frogs are on the log now?
b) 8 turtles are on a log. 2 more turtles climb on. Then 3 turtles slide off. How many turtles are on the log now?
c) 5 apples and 5 pears are in a bowl. Josh eats 2 apples. How many fruits are in the bowl now?
d) 9 ducks are in a pond. 5 ducks fly away. Then 3 other ducks fly into the pond. How many ducks are in the pond now?

**Selected sample answers:**
c) I used red and yellow blocks for apples and pears, and a yarn circle for the bowl. I put 5 red blocks in the yarn circle for the 5 apples in the bowl, and 5 yellow blocks for the pears. Then I took out 2 red blocks from the yarn circle to show the 2 apples that Josh eats. I counted 8 blocks in the yarn circle, so there are 8 fruits in the bowl now.
d) I drew 9 happy faces to show ducks in the pond. Then I crossed out 5 for the ducks that fly away. Then I drew 3 new happy faces to show the 3 other ducks that fly into the pond. I counted 7 happy faces that are not crossed out, so there are 7 ducks in the pond now.

3. Make up stories (similar to those in the activity) in which the starting number is greater than 10 and less than 16. Students use blocks or counters to model the subtraction.

**(MP.2)** 4. Students work in pairs. Partner 1 models a subtraction by starting with a certain number of blocks (up to 10), and then removes a certain number of the blocks. Partner 2 makes up a subtraction story for the model. Then they switch roles.

**(MP.3, MP.5)** 5. Lisa has 5 toy cars. She gives 2 cars to Raj. Lisa says she has 7 cars now, because $5 + 2 = 7$.

a) Do you agree with Lisa? Use any tools to explain why or why not.
b) In pairs, have students explain their answers to part a). Do they agree with each other? Have them discuss why or why not.

**Sample answer:** a) I do not agree with Lisa. I used blocks to show toy cars and two yarn circles for Lisa and Raj. I put 5 cars in one circle for Lisa’s cars. Then I moved two cars from Lisa’s circle into the other circle for Raj. Now Lisa has only 3 cars, not 7.

**NOTE:** For part b), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems to guide students.

Whole-class follow-up: What mistake do you think Lisa made? (she added when she should have subtracted)
OAK-37  Subtracting within 10 with Objects

Pages 160–162

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 10 by modeling them with objects.

Prior Knowledge Required:
Can subtract within 5
Can subtract from 10 with objects

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, take away, ten-frame

Materials:
10 counters per student
ten-frame made from an egg carton with the lid still attached
BLM Ten-Frames (p. R-24) or ten-frames made from egg cartons
9 one-centimeter connecting cubes or ones blocks per student
BLM Subtraction Stories about Frogs (2) (p. O-38, see Activity Centers 1, 2)
scrap paper or BLM Making Subtraction Stories (R-37, see Activity Centers 1, 3, Extension 1)
yarn circle per student pair (see Activity Center 3)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 3)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 3)
blocks or counters (see Extensions 1, 2, 5)
paper bag (see Extension 1)
five-frames made from BLM Ten-Frames (see Extension 5)

Counting practice. As a class, practice counting on to 50 from different starting points. Have students practice adding 1 within 20. You might challenge them to practice adding 1 within 50.

Review subtraction from 10. Write on the board:

10 frogs − 4 frogs = ___ frogs

As you did in the previous lesson, use a ten-frame made from an egg carton (or one drawn on the board) and blocks or counters to prompt students to find the answer. (6)

(MP.2) Modeling subtraction within 10 with a ten-frame. Draw a ten-frame on the board. SAY: Let’s tell some subtraction stories starting with other numbers. Let’s say there are eight frogs on a log. Write “8 frogs” below the ten-frame. Have a volunteer affix eight counters to the ten-frame. SAY: Three frogs jump off the log. ASK: How do I use numbers to show that three
frogs jump off? \((-3)\) Write \(\text{“} -3 \text{ frogs}.”\) ASK: How do we use counters to show three frogs jumped off? (take away 3) Have a volunteer remove three counters and put them beside the frame. ASK: How many frogs are left? \((5)\) How many frogs is eight frogs minus three frogs? Have students signal the answer. \((5)\) Write \(\text{“} = 5 \text{ frogs},”\) as shown below:

```
8 frogs − 3 frogs = 5 frogs
```

Repeat with 7 bunnies − 1 bunny = 6 bunnies and 6 apples − 4 apples = 2 apples.

**MP.2 Modeling subtraction within 10 without a ten-frame.** SAY: Let’s do some stories without a ten-frame. I have eight bananas in a bunch. Write “8 bananas” on the board. Affix nine counters in a scattered arrangement on the board. ASK: Do I have eight counters? (answers may vary) SAY: Let’s count to check. Count the counters incorrectly by omitting some and double counting others. Each time that students notice a mistake, count again and make a different mistake. SAY: I am having trouble counting. ASK: What can I do to make it easier? (answers may vary) SAY: I am going to put the counters in one long line. Arrange the counters in a line and count again. SAY: Nine counters are too many. Take away a counter and count again to verify that there are eight. SAY: Emma eats two bananas. Write “\(\text{“} -2 \text{ bananas}”\)” and have a volunteer take away two counters. ASK: How many bananas are left? \((6)\) Write \(\text{“} = 6 \text{ bananas},”\) as shown below:

```
8 bananas − 2 bananas = 6 bananas
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Repeat with 9 pears − 3 pears = 6 pears. This time have volunteers manipulate the counters and write the answer. At the start, suggest arranging the nine counters to form a square. Verify the initial count of nine as a class. Tell students that it is important to double check.

Repeat with 7 balls − 5 balls = 2 balls.

**MP.2 Modeling subtraction within 10 with fingers.** ASK: What else can we use to show subtraction? (answers may vary) SAY: We can use our fingers to subtract even when we don’t start from 10. In this story, there are nine fish and two fish swim away. Write “9 fish − 2 fish” on the board. SAY: Show me nine fish on your fingers. Give students a chance to do so and then hold up nine fingers. You might point out that to show nine, you put one finger down and that it is easiest to put down a thumb. SAY: Two fish swim away. ASK: How do we show that? (put down two fingers) Model putting down the pinky and ring fingers on the hand that has the thumb down already. ASK: How many fish are left? \((7)\) Wave the hand that has all five fingers up and say “5,” then wiggle the other two fingers and SAY: 6, 7. Write \(\text{“} = 7 \text{ fish},”\) as shown below:

```
9 fish − 2 fish = 7 fish
```
Repeat with 7 fish – 3 fish = 4 fish and 8 balls – 4 balls = 4 balls. Remind students how to count fingers by tapping each finger on their chin.

**Practicing subtraction without visuals.** Put nine counters in a ten-frame (made from an egg carton) show the class, and close the lid. ASK: How many counters are in my ten-frame? (9) You might write “9” on the board to help students remember. SAY: I am going to take out two counters. Remove two counters from the ten-frame, place them so they are visible, and close the lid. SAY: Let’s find how many counters are left in the ten-frame. ASK: How many did we start with? (9) SAY: Use your fingers to show me how many counters we started with. (students hold up nine fingers) ASK: How many counters did I take out? (2) SAY: Use your fingers to show taking away two. (students put down two fingers) ASK: How many are left? (7) Count seven fingers together.

Repeat with other subtractions from 9 and then from numbers less than 9.

**Activity (MP.2)** Give each student 10 blocks or counters and a ten-frame from BLM Ten-Frames (or one made from an egg carton). Tell subtraction stories (similar to those in the lesson) starting with 6 to 10 objects, and have students model them with blocks. They can signal the final answer. Have students do some questions without using the ten-frame.

*(end of activity)*

**Preparing for the AP pages.** Provide 9 one-centimeter connecting cubes or ones blocks to each student.

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**Activity Centers (MP.2, MP.4)** 1. **Subtracting with Objects** (see introduction to Unit 11, p. N-2)

*Variation:* Give each student nine ones blocks or counters, a ten-frame from BLM Ten-Frames (or one made from an egg carton), and BLM Subtraction Stories about Frogs (2). Students use blocks and the ten-frame to model each subtraction shown on the BLM and record the answer. (6. 5, 7. 6, 8. 1, 9. 6, 10. 3)

*Bonus:* Students use scrap paper or BLM Making Subtraction Stories to write stories, such as “9 dogs. 3 dogs leave. How many dogs stay?” Have students find and circle the numbers, subtract, and then write the answer.

**Variation:** Students use fingers instead of blocks to complete BLM Subtraction Stories about Frogs (2).

**Variations:**
1. Provide each student pair with nine ones blocks or counters, a yarn circle, and a set of number cards for 1 to 9 made from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10. Player 1 chooses two number cards from 1 to 9, determines which number is greater, and tells the story. Player 2 models the story.
2. Cut BLM Making Subtraction Stories into strips, one question per strip. Students record their subtraction stories on a strip.
3. Students use fingers instead of blocks to tell the stories.

Extensions
1. Students put 6 to 10 blocks in a bag and without looking or counting, they remove some blocks and then count how many blocks are out of the bag. They use subtraction to find how many blocks are in the bag. Students can record their subtraction stories using scrap paper or a strip on BLM Making Subtraction Stories. They can check their work by counting the blocks left in the bag.

(MP.2, MP.4, MP.5) 2. Make up stories that combine addition and subtraction. Students model the stories using tools of their choice. Students explain the tools they used and their solution to a partner. Have students say (or write, if they can) the final answer as a full sentence. Examples:
a) 7 frogs are on a log. 2 more frogs hop on. Then 4 frogs hop off. How many frogs are on the log now?
b) 9 turtles are on a log. 3 turtles slide off. Then 4 other turtles climb on. How many turtles are on the log now?
c) 5 apples and 4 pears are in a bowl. Fred eats 2 fruits. How many fruits are in the bowl now?
Selected sample answer: a) I drew a log on a piece of paper and I used blocks for frogs. I put 7 blocks on the log I drew, and then 2 more blocks, to show all the frogs on the log. Then I took 4 blocks off the page to show the frogs that hop off the log. I counted 5 blocks on the log I drew, so there are 5 frogs on the log now.

(MP.3, MP.8) 3. Make up stories like those in Extension 2, but in which you subtract two and then add two from the starting number. Example: 8 frogs are on a log. 2 frogs hop off. Then 2 other frogs hop on. How many frogs are on the log now? After a few stories, challenge students to guess the answer without adding and subtracting. Have students explain to a partner how they know the answer right away.
Sample answer: Every time I take away two (for example, blocks) and then add two back, I end up with the number I started with.
OAK-38 Subtracting within 10 with Pictures

Pages 163–165

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do “Take From with Result Unknown” subtractions within 10 by modeling them with pictures.

Prior Knowledge Required:
Can count to 10
Can subtract within 5 with pictures
Can subtract within 10 with objects

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, ten-frame

Materials:
scrap paper
erasable board per student (optional)
BLM Making Subtraction Stories (p. R-37, see Activity Centers 1, 2, 4)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 2)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 2)
10 toy animals or BLM Animal Cards (pp. R-6–7, see Activity Center 2)
10 blocks or counters and a paper bag, per student or student pair (see Activity Center 3)
10 plastic bowling pins or empty plastic water bottles and a soft ball, per student pair (see Activity Center 4)

Counting practice. As a class, practice counting on to 50 from different starting points. Remind students that when they add zero, they get the same number. Have them practice adding 0 within 10. You might challenge students to practice adding 0 within 50.

(MP.1) Subtracting within 10 with pictures. Draw on the board:

\[
\begin{array}{c}
10 \text{ apples} \\
\begin{array}{|c|c|c|c|c|}
\hline
\hline
\end{array}
\hspace{1cm} \begin{array}{c}
3 \text{ eaten} \\
\end{array}
\end{array}
\]

SAY: Let’s do this subtraction using pictures. I will draw circles to show apples. ASK: How many should I draw to start? (10) Draw 10 circles. ASK: How do we show subtracting in a picture? (crossing out) How many circles should I cross out? (3) Cross out three circles. ASK: How many are left? (7) Write “10 apples − 3 apples = 7 apples” under the ten-frame.
The final picture should look like this:

10 apples 3 eaten

\[
\begin{array}{ccc}
\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot\\
\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot
\end{array}
\]

10 apples − 3 apples = 7 apples

Repeat with 9 apples and 4 eaten, but have volunteers do the drawing. The final picture should look like this:

9 apples 4 eaten

\[
\begin{array}{ccc}
\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot\\
\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot&\cdot\cdot\cdot\cdot\cdot
\end{array}
\]

9 apples − 4 apples = 5 apples

(MP.1) Subtracting within 10 without a ten-frame. SAY: Let’s do the next one without a ten-frame. Write on the board:

7 spiders 4 spiders go away

Read aloud what you have written. ASK: How many spiders do we need to draw? (7) How should we draw them so that they are easy to count? (answers may vary) SAY: Let’s draw them in a line. Have a volunteer draw seven circles, then count to verify. SAY: Four spiders go away. ASK: How do we show spiders going away? (cross them out) Does it matter which spiders we cross out? (answers may vary) SAY: We can cross out any four spiders. I will cross out from the end so that they are all together. That makes it easier to count. Cross out four circles, as shown below:

\[
\begin{array}{ccc}
\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\bigcirc\\
\end{array}
\]

ASK: How many spiders are left? (3) Write “7 spiders − 4 spiders = 3 spiders.” Read aloud what you have written.

Repeat with 8 cats − 2 cats = 6 cats, but have volunteers do the drawing.

Activity 
(MP.1) As you tell each of the following stories, students use scrap paper to draw and cross out circles to model the story. If students have erasable boards, you can do the activity at the carpet. At the end of the story, students signal the answer.

1. Ten spiders crawl up a wall. Three spiders get washed away by the rain. How many spiders are left? (7)
2. Kim draws eight triangles. Then she colors two triangles. How many triangles are not colored?  (6)

3. Amit has seven raisins on his plate. He eats four raisins. How many raisins are left?  (3)

(end of activity)

Activity Centers

(MP.2, MP.4) 1. Subtracting with Objects  (see introduction to Unit 11, p. N-2)
Variation: Students model subtractions with pictures. Give each student a strip from BLM Making Subtraction Stories with a subtraction sentence filled in by you. Students draw and cross out circles to show the subtraction (e.g., 10 circles and 4 circles crossed out).

(MP.2, MP.4) 2. Telling Subtraction Stories  (see introduction to Unit 11, p. N-2)
Variation: Give each student a set of number cards from 1 to 10 made from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10. Instead of blocks, provide 10 toy animals or cards from BLM Animal Cards that students can use to keep track of their stories. Using scrap paper or a strip from BLM Making Subtraction Stories, students draw and cross out circles to model and record their subtraction stories.

(MP.1) 3. Subtraction Hide and Seek
Type: Individual or pairs
Objective: To use a subtraction picture to find how many are left
Preparation: Distribute a paper bag, 10 blocks or counters, and scrap paper to each student or student pair.
Instructions: Working in pairs, Player 1 places up to 10 blocks or counters in the paper bag and then draws circles on scrap paper to show how many objects are in the bag. Player 2 takes objects from the bag without looking and then crosses out that number of circles on the drawing. For example, Player 1 places eight blocks in the bag and draws eight circles. Player 2 takes three blocks from the bag and crosses out three of the eight circles. Together Players 1 and 2 determine how many blocks are left in the bag. Then they verify the subtraction by looking in the bag. Players switch roles. If students are working individually, they can play both roles.

(MP.2, MP.5) 4. Subtraction Bowling  (see introduction to Unit 11, p. N-2)
Variation: Students play using ten pins. They use a strip from BLM Making Subtraction Stories (with the starting number, 10, filled in by you) and draw and cross out circles to show how many pins were knocked down and how many stayed upright. They then complete the subtraction sentence.

Extensions
1. Students tell a story based on a picture of subtraction that either you or a student draws (e.g., 8 circles and then 2 circles crossed out). Students can also do this in pairs.
2. Subtract.
a) There are 7 bunnies. 3 bunnies hop away. Then 2 more bunnies hop away.
b) There are 7 bunnies. 2 bunnies hop away. Then 3 more bunnies hop away.
ASK: What do you notice about the answers? (they are the same)
**Answers:** a) 2, b) 2

(MP.2, MP.4) 3. There are 10 bunnies. 4 bunnies hop away. Then 3 more bunnies hop away.
Have students draw pictures to model the story.

a) How many bunnies are left?
b) How many bunnies hopped away in all?
c) Have students explain to partner how they found their answers to parts a) and b) and state their answer as a complete sentence.

**Selected sample answer:** c) I drew 10 circles for bunnies. I crossed out 4 circles to show 4 bunnies hopping away. Then I crossed out 3 more circles to show 3 more bunnies hopping away. I counted 3 circles that are not crossed out, so 3 bunnies are left. I counted 7 circles that are crossed out, so 7 bunnies hopped away.

4. Repeat Extension 3 using a different set of numbers within 10.
OAK-39 Subtracting within 10

Pages 166–168

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students do subtractions within 10 using the method of their choice.

Prior Knowledge Required:
Can count to 10
Can subtract from 10 with objects or pictures

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtract, subtraction, ten-frame

Materials:
The Action of Subtraction (Math is Categorical) by Brian P. Cleary
BLM Subtractions within 10 (pp. R-41–44)
scrap paper
10 blocks or counters per student
colored pencils, crayons, or markers
BLM Subtractions within 5 (pp. R-39–40, optional)
BLM I Have ____, Who Has ___? (p. R-8, see Activity Center 1)
BLM Dominoes (pp. R-15–17, see Activity Center 2)
BLM Game Cards (p. R-10, see Activity Center 3)
BLM Number Lines (p. R-23, see Extension 2)
BLM Spinner (p. R-34, see Extension 3)
pencil, paper clip, and 2 two-sided counters or tokens per student pair (see Extension 3)
BLM Hop on the Bunny Trail (p. R-35, see Extension 3)
BLM Number Cards 0 to 5 (p. R-2, see Extension 3)
paper bag (see Extension 3)
BLM Number Charts to 20 (p. R-32, see Extension 3)

Counting practice. As a class, practice counting on to 50. Play “Let’s Compare” using numbers from 1 to 10.

(MP.2) Subtracting with pictures. Write “9 − 2” on the board. ASK: How do we read this? (9 minus 2) Write “=” next to the expression. ASK: How can we find what it equals? What are some ways that we have learned to subtract? (drawing, using fingers, using blocks) SAY: I will draw pictures for this subtraction and use a ten-frame. Draw the ten-frame. ASK: How many things should I draw first to show the subtraction? (9) SAY: I will draw circles. We have not said what we are subtracting. ASK: Does it matter what I draw? Does it have to be circles? (no) SAY: The subtraction is the same no matter what kind of shape I draw. Draw nine circles in the ten-frame. ASK: How do I show subtraction? (crossing out) How many do I cross out? (2) Cross
out two circles. ASK: What is nine minus two? (7) Count to verify. Write “7,” as shown in the diagram below:

\[9 - 2 = 7\]

\[
\begin{array}{c}
\bigcirc \bigcirc \bigcirc \bigcirc \\
\bigcirc \bigcirc \bigcirc \\
\end{array}
\]

SAY: Nine minus two equals seven. ASK: If we drew squares instead of circles, would we get the same answer? (yes) What if we used nine blocks and then took away two blocks, how many blocks would we have left? (7)

Repeat with \(8 - 3\), as shown below, but have a different volunteer do each step.

\[8 - 3 = 5\]

\[
\begin{array}{c}
\bigcirc \bigcirc \bigcirc \bigcirc \\
\X2 \X2 \X2 \\
\end{array}
\]

Repeat with \(6 - 2\) but do not use a ten-frame, as shown below:

\[6 - 2 = 4\]

\[
\bigcirc \bigcirc \bigcirc \bigcirc \X2 \X2 \\
\]

**Reviewing subtracting zero and subtracting all.** Write “7 - 7” on the board. ASK: How many do we start with in this subtraction? (7) How many do we take away? (7) If we take away all seven, how many will be left? (0) SAY: If we take away all, we will have zero left. Have a volunteer draw and cross out circles to show the subtraction and write “= 0.” ASK: What if we start with eight and take away eight, how many will be left? (0) How do you know without drawing? (because we are taking away all so there are none left)

ASK: What if we start with eight and take away zero? Write “8 - 0” on the board and draw eight circles. ASK: How many will we have left? (8) How do you know? I have eight circles on the board so how many should I cross out to check? (0) SAY: Subtracting zero is the same as doing nothing, so I have eight left. Write “= 8.”

**(MP.2, MP.5) Subtracting with fingers.** Write “7 - 2 =” on the board. SAY: We will do this subtraction on our fingers first. Model counting seven fingers by raising one finger at a time. SAY: Show me seven fingers. Make sure everyone has seven fingers raised. SAY: Now put down two fingers. ASK: How many fingers are still up? (5) ASK: What is 7 - 2? (5) SAY: Now let’s do the subtraction with pictures. Have volunteers draw seven circles and then cross out two circles. Ask another volunteer to write “5,” as shown below:

\[7 - 2 = 5\]

\[
\bigcirc \bigcirc \bigcirc \bigcirc \X2 \X2 \\
\]
Repeat with $9 - 3$. Have students subtract on fingers first. ASK: Will we get a different answer if we draw a picture? (no) SAY: Let’s check. Repeat the subtraction using a picture. ASK: Why is the answer the same? (sample answers: we are subtracting the same numbers, the number story is the same) Will the answer change if we use blocks to find the answer? (no)

Read a subtraction story. Read *The Action of Subtraction (Math is Categorical)* by Brian P. Cleary. As you read, students follow the stories on their fingers. For example, when you read “7 angry bulldogs,” students show seven fingers. “When a kitten scares away 3,” students put down three fingers and predict that there are now four bulldogs.

**Activity (MP.5)** SAY: Today you are going to subtract. You can use blocks or counters to subtract. You can draw pictures to subtract. You can use your fingers to subtract. You pick how you want to subtract. Show students a subtraction card from **BLM Subtractions within 10**. SAY: You will pick a subtraction card and write the subtraction on paper. Then use whatever way you like to find how many are left and write the answer.

Give each small group of students a random set of cards from the BLM. Provide scrap paper, blocks or counters, and colored pencils, crayons, or markers.

**NOTE:** Provide students who need practice with subtractions within 5 with cards cut from **BLM Subtractions within 5**.

(end of activity)

**Preparing for the AP pages.** Tell students to use the method of their choice to answer Questions 7–9 in AP Book K.2, Unit 12, p. 168.

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**Activity Centers (MP.2)**

1. **I Have ____, Who Has ____?** (see introduction to Unit 7, p. J-2)

   **Variation:** In advance, make cards using **BLM I Have ____ , Who Has ____ ?** For “I have,” write a subtraction expression within 10 that students can work out in advance. For “Who has,” write a number from 1 to 9. Make sure that each number is represented only once. Example:

<table>
<thead>
<tr>
<th>I have</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 − 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who has</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

2. **Subtraction with Dominoes**

   **Type:** Individual

   **Objective:** To write subtraction expressions shown on a domino and find the answer
Preparation: In advance, gather dominoes with dots that are less than or equal to 10 (on each side), or use dominoes cut out from BLM Dominoes. Give students scrap paper to record their work.

Instructions: Students choose a domino. They count the dots and decide which side has more. They turn the domino so that this side is on the left (this step should be optional for some students). Then they write the subtraction and find the answer.

(MP.2) 3. Matching (see introduction to Unit 7, p. J-3)

Variations:
1. In advance, make nine pairs of matching cards using BLM Game Cards. Use the boxes to write a number from 1 to 9 and a subtraction for each number you wrote (e.g., 4, 7 − 3).
2. Memory. Place the subtraction cards made for Variation 1 face down. Students turn up two cards at a time. If the cards match, students remove the cards from play; otherwise they turn the cards face down again. Students can play independently or co-operatively in pairs. If played in pairs, each player turns over one card per round. Players take turns turning over the first card.

Extensions
1. Tell students that when there are two subtraction signs, they need to subtract the first number and then subtract the second number from the answer. Example:

\[
10 - 3 - 2 \quad 10 - 3 = 7 \quad 7 - 2 = 5 \\
So 10 - 3 - 2 = 5
\]

Subtract.

a) 9 − 1 − 4  b) 8 − 2 − 3  c) 7 − 3 − 3  d) 9 − 1 − 6

Answers: a) 4, b) 3, c) 1, d) 2

2. Subtracting on a Number Line. Give each student BLM Number Lines. SAY: We can use a number line to subtract. Let’s subtract 7 − 2. Just like we did with adding, we start by drawing a dot at the first number. ASK: What is the first number? (7) Draw a dot at 7. SAY: When we add, we jump forward from the number toward the bigger numbers. ASK: What do you think we do when we subtract? (jump back) How many jumps should we draw? (2) Draw two jumps back.

ASK: What is 7 − 2? (5) SAY: We landed on the answer.

Repeat with 8 − 1 and have students work along on their own number line.

Subtract on a number line.

a) 10 − 2  b) 7 − 4  c) 8 − 1  d) 6 − 3

Answers: a) 8, b) 3, c) 7, d) 3
3. Students play **Hop on the Bunny Trail**. In advance, cut out the spinner on **BLM Spinner**. Provide each student pair with a spinner, a pencil, and a paper clip, 2 two-sided counters or tokens, and the game board from **BLM Hop on the Bunny Trail**. Instead of using the spinner, students can pick the numbers 1 to 4 (made from **BLM Number Cards 0 to 5**) from a paper bag. Players start at the number 20 and take turns to spin the spinner and move around the board counting out loud for each box they land on, until they reach the number 1. For an extra challenge, tell students not to move to the box for 1 unless they land on it exactly. Alternatively, students can play on a number chart from **BLM Number Charts to 20** instead of the game board.

**MP.3, MP.5** 4. Ross has 4 stickers. He gives 2 stickers to Mona. Ross says they have 6 stickers altogether, because 4 + 2 = 6.

a) Do you agree with Ross? Use any tools to explain why or why not.

b) In pairs, have students explain their answers to part a). Do they agree with each other? Have them discuss why or why not.

**Selected sample answers:**

- b) • I drew happy faces to show stickers and I drew two circles for Ross and Mona. I drew 4 happy faces in one circle for Ross. Then I crossed out two happy faces in Ross’ circle and I drew two happy faces in Mona’s circle. I counted all the happy faces that are not crossed out, and there are 4, not 6.

- • I used counters to show stickers and I used yarn circles for Ross and Mona. I put 4 counters in one circle for Ross. Then I moved two counters from Ross’ circle into Mona’s circle. I counted all the counters, and there are 4, not 6.

**NOTE:** For part b), encourage partners to ask questions to understand and challenge each other’s thinking (**MP.3**)—see p. A-33 for sample sentence and question stems to guide students.

Whole-class follow-up: What mistake did Ross make? (after he gave two stickers to Mona, he still thought he had 4 stickers) Ross forgot that he has two fewer stickers after giving two away.
OAK-40 Writing Subtractions within 10

Pages 169–172

Standards: K.OA.A.1, K.OA.A.2

Goals:
Students represent subtractions within 10 using equations.

Prior Knowledge Required:
Can count to 10
Can subtract within 10 with objects or pictures
Understands crossing out as representing “take away”

Vocabulary: equal sign (=), equals, left, minus, minus sign (−), subtraction, take away, ten-frame

Materials:
10 counters
BLM I Have ___, Who Has ___? (p. R-8)
scrap paper (see Activity Centers 1–4, Extensions 1, 6)
BLM Making Subtraction Stories (p. R-37, see Activity Centers 1–4)
10 two-sided counters or dried beans painted on one side and a paper cup per student (see Activity Center 1)
10 plastic bowling pins or empty plastic water bottles and a soft ball per student pair (see Activity Center 2)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 4)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 4)
10 blocks per student (see Extension 1)
colored pencils, crayons, or markers of two different colors (see Extension 4)

Counting practice. As a class, practice counting on to 50 from different starting points. Play “Let’s Compare” using numbers from 1 to 10.

(MP.4) Writing subtractions for situations modeled with objects. SAY: Let’s write a subtraction for stories that we show with counters. Eight bunnies are eating carrots. ASK: How many counters do we need to start? (8) Have a volunteer affix eight counters to the board.
ASK: What number does the subtraction start with? (8) Have a volunteer write “8” on the board.
SAY: Two bunnies hop away. ASK: How do we use counters to show two bunnies hopping away? (take away two counters) What sign and number do we write to show two bunnies hopping away (− 2) Have a volunteer take away any two counters and another one write “− 2.”
ASK: How many are left? (6) What do we write to show that there are 6 left? (= 6) Have a volunteer write “= 6,” as shown below:

\[ \begin{array}{cccccc}
\circ & \circ & \circ & \circ & \circ & \circ \\
8 & − & 2 & = & 6
\end{array} \]
Repeat with $10 - 3$, if necessary.

**(MP.4) Writing subtractions for situations modeled with pictures.** SAY: Let’s show a subtraction with pictures this time. There are nine spiders on a wall. Draw a ten-frame on the board. ASK: How many circles do we need to draw? (9) Have a volunteer draw nine circles. ASK: What number does the subtraction start with? (9) Have a volunteer write “9” on the board. SAY: Four spiders are washed away by the rain. ASK: How do we use the picture to show four spiders washed away? (cross out four circles) What sign and number do we write to show four spiders washed away? ($- 4$) Have a volunteer cross out four circles and another one write “$- 4$.” ASK: How many are left? (5) What do we write to show that there are five left? ($= 5$) Have a volunteer write “$= 5$,” as shown below:

```
  9  -  4  =  5
```

Repeat with $6 - 2$.

**(MP.4) Writing subtraction expressions directly from pictures.** Draw on the board:

```
  10  -  4
```

SAY: We can write a subtraction from the picture without telling a story. ASK: What number do we start with? (10) Why 10? Where do you see 10 in the picture? (there are 10 circles) Write “10” as shown below. ASK: Does the picture show adding or taking away? (taking away) What sign do we write to show taking away? (minus sign) Write “$-.$” ASK: How does the picture show taking away? (circles are crossed out) How many circles are crossed out? (4) Write “4” as shown below. Then SAY: The picture shows $10 - 4$ because it has 10 circles and 4 circles are crossed out.

```
  10  -  4
```

Repeat with $7 - 3$, but have volunteers do the writing.

**(MP.4) Writing subtraction equations directly from pictures.** Draw on the board:
Have a volunteer write the subtraction expression “9 − 3.” ASK: How many are left when you start with nine and take away three? (6) SAY: Nine minus three equals six. ASK: How do we write “equals six”? (= 6) Write or have a volunteer write “= 6,” as shown below:

9 − 3 = 6

Repeat with more examples.

Repeat with 6 − 4 but do not use a ten-frame. Draw the picture shown below without the subtraction sentence:

6 − 4 = 2

SAY: This time there is no ten-frame to help us. ASK: Can we still write a subtraction? (yes) What number do we start with? (6) Ask a volunteer to verify by counting and write “6.” ASK: How many do we take away? (4) Have a volunteer count to verify and write “− 4.” ASK: How many are left? (2) Have a volunteer write “= 2.”

Repeat with 8 − 3, as shown below:

8 − 3 = 5

Activity
I Have ___, Who Has ___? (see introduction to Unit 7, p. J-2)
Variation: In advance, make cards using BLM Have ___, Who Has ___. For “I have,” show a representation of a subtraction within 10. For “Who has,” write a subtraction expression within 10. Make sure that the bottom of each card can be matched to the top of another card, and vice-versa. Example:

I have

Who has

7 − 1
Activity Centers

NOTE: For all of the activity centers, students can use scrap paper or BLM Making Subtraction Stories to write subtraction equations. You may also wish to have students draw and cross out circles for any of the activity centers before they write the subtraction.

(MP.2, MP.5) 1. Subtraction with Ten Counters
Type: Individual
Objective: To write the subtraction modeled by two-sided counters
Preparation: Give each student 10 two-sided counters (or 10 dried beans painted on one side), a paper cup, and scrap paper.
Instructions: Students gently tip the counters from the cup onto a table and sort the counters by color. They write the subtraction equation.
Variation: Students use 6 to 9 counters.

(MP.2, MP.5) 2. Subtraction Bowling (see introduction to Unit 11, p. N-2)
Variation: Students play using 10 pins. Have students roll the ball once and then write the subtraction equation for how many pins were knocked down and how many stayed upright.

(MP.2, MP.5) 3. Subtraction with Ten Counters
Variation: Students play in pairs using fingers. Player 1 holds up a number of fingers on both hands. Player 2 counts how many fingers are down and writes the subtraction equation. Players switch roles.

4. Writing Subtraction Equations
Type: Pairs
Objective: To write the subtraction equation for a picture
Preparation: Give each student pair two sets of number cards from 1 to 10 made from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10.
Instructions: Working independently at first, each player takes out two cards from their own set. They each decide which number is greater and draw that number of circles. Then they each use the smaller number to determine how many circles to cross out. Once they are both done, players exchange their work and write the subtraction equation (with final answer) for each other’s pictures.

Extensions
1. a) Give each student five blocks. Students take some blocks away and write the subtraction on scrap paper. Then they use the blocks to make a different subtraction from 5. ASK: How many different subtractions can you write using five blocks?
b) Repeat with 10 blocks. ASK: How many subtractions can you write using 10 blocks?
Answers: a) 6 equations: $5 - 0 = 5$, $5 - 1 = 4$, $5 - 2 = 3$, $5 - 3 = 2$, $5 - 4 = 1$, $5 - 5 = 0$
b) 11 equations: $10 - 0 = 10$, $10 - 1 = 9$, $10 - 2 = 8$, $10 - 3 = 7$, $10 - 4 = 6$, $10 - 5 = 5$, $10 - 6 = 4$, $10 - 7 = 3$, $10 - 8 = 2$, $10 - 9 = 1$, $10 - 10 = 0$
2. What subtraction does the picture show?

Answers: a) $16 - 4 = 12$, b) $15 - 2 = 13$, c) $17 - 5 = 12$

NOTE: Extension 3 is best suited for very advanced students.

3. What subtraction does the picture show?

Answers: a) $90 - 30 = 60$, b) $80 - 50 = 30$

4. Give each student scrap paper and two colors of colored pencils, crayons, or markers. Working in pairs, Student 1 models a double subtraction by drawing ten circles and crossing out some of the circles using two colors. Student 2 records it as a subtraction expression. Then both students work together to find the answer. Students switch roles. You might demonstrate the following example:

Draw 10 circles. Cross out three circles in red. Cross out four circles in blue. Write “$10 - 3 - 4$.” The answer is 3.

5. Tim has 5 pens. He gives 2 pens to Ali. Tim says: “5 minus 2 equals 3, so Ali has 3 pens now.”

a) Do you agree with Tim? Use any tools to explain why or why not.

b) In pairs, have students explain their answers to part a). Do they agree with each other? Have them discuss why or why not.

Selected sample answer: a) I do not agree with Tim. I used blocks to show pens and two pieces of paper to show Tim and Ali. I wrote T on one paper for Tim, and A on the other paper for Ali. I put 5 blocks on Tim’s paper to show the pens Tim starts with. Then I moved two blocks from Tim’s paper to the other paper for Ali. Now Ali has 2 pens, not 3.

NOTE: For part b), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems to guide students.

Whole class follow-up: ASK: What numbers did Tim subtract? (5 minus 2) What answer does that give? (3) What does the 3 tell us in the story? Who is left with 3? (Tim is left with 3 pens after he gives 2 to Ali)
OAK-41 Composing 10

Pages 173–175

Standards: K.OA.A.3, K.OA.A.4

Goals:
Given a number less than 10, students find how many more make 10. They write the answer as an addition equation.

Prior Knowledge Required:
Can count to 10
Can represent addition within 10
Can represent subtraction within 10 on a ten-frame

Vocabulary: addition, equal sign (=), equals, left, plus, plus sign (+), subtraction, ten-frame

Materials:
10 two-sided counters per student
chalk of two different colors (optional)
scrap paper
BLM Game Cards (p. R-10, see Activity Center 1)
BLM Dominoes (1) (p. R-15 see Activity Center 2)
BLM Dominoes (3) (p. R-17, see Activity Center 2)
BLM Making a Number (p. R-14, see Activity Centers 2, 3)
BLM Ten-Frames (p. R-24, see Activity Centers 3, 4)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 4)
BLM Number Cards 6 to 10 (p. R-3, see Activity Center 4)

Counting practice. As a class, practice counting on to 50 from different starting points. Then have students practice adding 1 and 0 within 20. You might challenge them to practice adding 1 and 0 within 50.

Recall decomposing 10. Affix 10 two-sided counters to the board, with four counters showing one color and six counters showing the other color. Alternatively, draw 10 circles, with four in one color and six in another color. ASK: How many counters are there in all? (10) Have a volunteer count to verify. Pointing to the first color and then the second color of counters, ASK: How many are in this color? (4) How many are in that color? (6) Count to verify for each color. ASK: What addition sentence does this picture show? (possible answers: 10 = 4 + 6, 10 = 6 + 4, 4 + 6 = 10, 6 + 4 = 10) Have a volunteer write on the board:

\[ 10 = 4 + 6 \]

Repeat with various other combinations such as 7 + 3, 2 + 8, 5 + 5, and 9 + 1.
(MP.2) Composing 10 with fingers. ASK: Is four less than or greater than 10? (less than) SAY: Let’s find out how many more we need to make 10. Write on the board:

\[4 + \underline{\quad} = 10\]

Demonstrating as you talk, SAY: Hold up all of your fingers on both hands. ASK: How many fingers are you showing? (10) SAY: Now hold up four fingers. ASK: How many more fingers would make 10? PROMPT: How many fingers are down? (6) Write “6” in the blank.

Repeat with some other examples.

(MP.2) Composing 10 with a ten-frame. ASK: What else can help us count to 10? (a ten-frame) Draw a ten-frame on the board and write “3 + \underline{\quad} = 10,” as shown below. SAY: We start with three. Draw three circles in the ten-frame. SAY: I drew the circles for the three. ASK: How can I find how many more make 10? (sample answers: fill the rest of the boxes with circles, count the rest) SAY: The empty boxes are like the fingers on a hand that are down. We can count them to find how many more make 10. Have a volunteer count and write “7” in the blank, as shown below. You may wish to have volunteers write the numbers in the ten-frame:

\[
\begin{array}{cccc}
\text{O} & \text{O} & \text{O} & 1 \ 2 \\
3 & 4 & 5 & 6 & 7 \\
\end{array}
\]

\[3 + 7 = 10\]

Repeat with some other examples.

(MP.2) Composing 10 with pictures. Write “8 + \underline{\quad} = 10” on the board and SAY: Let’s use pictures to find the missing number. We can start by drawing all 10 circles. Draw 10 circles on the board. SAY: I drew the circles in two groups of 5 so it’s a little easier to count. Show students the two groupings. Pointing to the 8, SAY: We can color eight circles. Count aloud as you color in eight circles, as shown below:

\[
\begin{array}{ccc}
\text{O} & \text{O} & \text{O} \\
\text{O} & \text{O} & \text{O} \\
8 + \underline{\quad} = 10 \\
\end{array}
\]

ASK: How many circles are not colored in? (2) Eight plus what makes 10? (2) Point to the empty circles and SAY: Two more makes 10. Write “2” in the blank.

Repeat with some other examples. Consider drawing balloons instead of circles to help prepare students for Questions 7–10 on AP Book K.2, Unit 12, p. 175.
Activity
(MP.2) Give each student scrap paper and 10 two-sided counters. Tell students to place all of the counters so that they show the same color. Write on the board:

2 + ___ = 10

Students turn over two counters to find the missing number. They write the completed addition sentence. Repeat with all of the following examples (in random order):

a) 1 + ___ = 10  b) 3 + ___ = 10  c) 4 + ___ = 10  d) 5 + ___ = 10  
  e) 6 + ___ = 10  f) 7 + ___ = 10  g) 8 + ___ = 10  h) 9 + ___ = 10

Bonus: 10 + ___ = 10

Answers: a) 9, b) 7, c) 6, d) 5, e) 4, f) 3, g) 2, h) 1, Bonus: 0

(end of activity)

Activity Centers
(MP.2, MP.4) 1. Matching (see introduction to Unit 7, p. J-3)

Variations:
1. In advance, make 11 pairs of matching cards using BLM Game Cards. Use the boxes to write a number from 0 to 10 and one addition to 10 with a missing addend for each number you wrote (e.g., 4, 6 + ___ = 10).
2. Memory. Place the subtraction cards made for Variation 1 face down. Students turn up two cards at a time. If the cards match, students remove the cards from play; otherwise they turn the cards face down again. Students can play independently or co-operatively in pairs. If played in pairs, each player turns over one card per round. Players take turns turning over the first card.

2. How Many More Make 10?
Type: Individual
Objective: To find how many more make 10 and write the addition
Preparation: In advance, cut out the half dominoes, in which one side shows up to 9 dots and the other side is blank, from BLM Dominoes (1) and (3). Give each student a set of dominoes.
Instructions: Students draw dots on the blank side of the domino so that there are ten dots altogether. They can write the addition on BLM Making a Number or scrap paper.

3. How Many More Make 10?
Variation: Instead of using dominoes, in advance, prepare BLM Making a Number by writing numbers from 0 to 10 for the first number to be added for the additions. Students use a method of their choice to find the missing number for each addition. Make two-sided counters and ten-frames (from BLM Ten-Frames) available to students.

4. Modified Go Fish (see Introduction, p. A-29)
Variation: Use number cards from 1 to 9 or from 0 to 10 made from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10. Make two-sided counters and ten-frames (from BLM Ten-Frames) available to students.
Extensions
1. Find the missing number.
   a) \(\_\_\_ + 3 = 10\)       b) \(\_\_\_ + 6 = 10\)       c) \(\_\_\_ + 5 = 10\)
   d) \(\_\_\_ + 1 = 10\)       **Bonus:** \(\_\_\_ + 10 = 10\)
   **Answers:** a) 7, b) 4, c) 5, d) 9; Bonus: 0

2. Find the missing number.
   a) \(2 + \_\_\_ = 9\)       b) \(3 + \_\_\_ = 8\)       c) \(5 + \_\_\_ = 7\)
   d) \(0 + \_\_\_ = 7\)       e) \(4 + \_\_\_ = 6\)
   **Answers:** a) 7, b) 5, c) 2, d) 7, e) 2

3. Write a subtraction with the numbers 6, 4, and 10. Now write a different subtraction with 6, 4, and 10.
   **Answers:** \(10 - 6 = 4\) or \(10 - 4 = 6\)

4. Find the missing number.
   a) \(2 + 1 + \_\_\_ = 10\)       b) \(3 + 5 + \_\_\_ = 10\)
   **Answers:** a) 7, b) 2

5. Align addition pairs vertically in two rows as shown below. Ask students to find a pattern that helps them answer the second row of questions.
   \(1 + \_\_\_ = 10\)   \(2 + \_\_\_ = 10\)   \(3 + \_\_\_ = 10\)   \(4 + \_\_\_ = 10\)   \(5 + \_\_\_ = 10\)
   \(9 + \_\_\_ = 10\)   \(8 + \_\_\_ = 10\)   \(7 + \_\_\_ = 10\)   \(6 + \_\_\_ = 10\)   \(5 + \_\_\_ = 10\)
   **Answers:**
   9 8 7 6 5   1 2 3 4 5
   The additions that line up use the same numbers. The first numbers added in the questions in the first row are the answers for the questions in the second row.
## Numbers to 50 (I)

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# Numbers to 50 (2)

**Fill in the missing numbers.**

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Subtraction Stories about Frogs (I)

1. \[10 \quad - \quad 4 \quad = \quad \_ \_ \_ \_ \_ \_ \_ \_ \_ \]

2. \[10 \quad - \quad 3 \quad = \quad \_ \_ \_ \_ \_ \_ \_ \_ \_ \]

3. \[10 \quad - \quad 8 \quad = \quad \_ \_ \_ \_ \_ \_ \_ \_ \_ \]

4. \[10 \quad - \quad 6 \quad = \quad \_ \_ \_ \_ \_ \_ \_ \_ \_ \]

5. \[10 \quad - \quad 5 \quad = \quad \_ \_ \_ \_ \_ \_ \_ \_ \_ \]
Subtraction Stories about Frogs (2)

6.  
9 − 4 =

7.  
8 − 2 =

8.  
7 − 6 =

9.  
q − 3 =

10.  
8 − 5 =
Unit 13 Operations and Algebraic Thinking: Fluency within 5

Mathematical Practices in This Unit
In this unit, you will have the opportunity to assess MP.2 to MP.5, and MP.7. The MP labels in this unit flag both opportunities to develop the mathematical practice standards and opportunities to assess them. Below is a list of where we recommend assessing these standards as well as some examples of how students can show that they have met a standard.

MP.2: OAK-44 Activity Center 3, OAK-46 Activity Center 4
In OAK-44 Activity Centre 3, students reason abstractly and quantitatively when they use addition to represent buying two or more items in a pretend store, and use the result of their addition to pay the correct number of counters (which can represent dollars or cents).

MP.3: OAK-48 Extension 2

MP.4: OAK-44 Activity Center 3 and Extension 4, OAK-45 Extension 2, OAK-46 Activity Center 4
In OAK-44 Extension 4, students model mathematically when they represent and solve real-world problems involving two successive subtractions by using a picture or a concrete model.

MP.5: OAK-44 Extension 4, OAK-45 Extension 2
In OAK-45 Extension 2, students choose between tools such as number lines, counters, yarn circles, colored pencils and paper to solve problems involving addition and subtraction. Students explain to a partner how their tools helped them solve the problem.

MP.7: OAK-42 Extension 4, OAK-47 Extension 1, OAK-48 Extension 2
In OAK-48 Extension 2, students look for structure when they notice that the number 7 is one more than the number 6, and that increasing an addend by one increases the total by one. Students make use of this structure to find the missing addend in an addition with total 7.
Introduction
In this unit, students will develop fluency in addition and subtraction within 5. By this point, they have learned several methods to do each operation and have had practice with small and large numbers. Now that these concepts are more familiar to students, this unit revisits addition and subtraction using smaller numbers. More advanced students will develop speed (without sacrificing accuracy), while students who have not fully grasped the concepts in earlier units will have an opportunity to notice patterns and practice these foundational arithmetic operations. Students will also learn the pattern for the $5 + n$ additions, as shown below:

$$
6 = 5 + 1 \quad 7 = 5 + 2 \quad 8 = 5 + 3 \quad 9 = 5 + 4 \quad 10 = 5 + 5
$$

Materials. In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section R, are used in Unit 13:

BLM Number Charts to 20 (p. R-32)
BLM Interlined Paper (p. R-45)
BLM Hundreds Chart (p. R-1)
BLM Making 5 (p. R-13)
BLM Dominoes (pp. R-15–17)
BLM Additions within 5 (pp. R-19–20)
BLM I Have ____, Who Has ____? (p. R-8)
BLM Number Cards 0 to 5 (p. R-2)
BLM Number Cards 6 to 10 (p. R-3)
BLM Number Cards 11 to 15 (p. R-4)
BLM Additions within 10 (pp. R-25–26)
BLM Subtractions within 5 (pp. R-39–40)
BLM Subtractions within 10 (pp. R-41–44)

Recurring activities. The following activity recurs several times in the unit, with variations.

Practice for Fluency
Type: Pairs
Objective: To develop fluency in adding
Preparation: In advance, gather dominoes with dots that add to 5 or less (or prepare dominoes from BLM Dominoes (1)).
Instructions: Place the dominoes face down between the two players. Player 1 turns over a domino and says how many in all. If Player 2 agrees with the answer, the domino stays face up. Otherwise, Player 1 turns it face down again. Players switch roles. Play continues until all of the dominoes are facing up.
**OAK-42  Counting On to 100**

Pages 177–179

Standards: K.CC.A.1, K.CC.A.2, K.CC.A.3

Goals:
Students count on to 100 starting from any number.

Prior Knowledge Required:
Can count to 100
Can count on to 50 from any number

Materials:
BLM Number Charts to 20 (p. R-32, see Activity Center 1)
BLM Numbers to 100 (1) (p. P-24, see Activity Center 2)
scissors (see Activity Center 2)
glue (see Activity Center 2)
die (see Activity Center 3)
scrap paper or BLM Interlined Paper (p. R-45, see Extension 1)
BLM Hundreds Chart (p. R-1, see Extensions 2, 3)
90 tokens or counters per student (see Extension 3)
overhead projector (see Extension 3)
paper bag (see Extension 3)
BLM Numbers to 100 (2) (p. P-25, see Extension 4)

**Counting to 100.** Practice counting from 1 to 100 as a class. Divide the class into groups and have each group count a set of ten numbers: 1 to 10, 11 to 20, 21 to 30, and so on to 100. (Each group will likely have to count more than one set of 10 numbers.) You might first have groups take turns practicing their sets of numbers and then conduct a counting choir of the numbers from 1 to 100 in order, with one group at a time counting their sets of numbers.

**Counting to 100 with a lead-in.** Explain that you will start counting from a number and that students will finish counting to 100 from where you stopped. Start counting with 91, 92. Repeat with 81, 82, then 71, 72, and then randomly until you start with 1, 2.

**Saying the next number.** Say any number from 51 to 100 and have the class respond with the next number. Do this as a class first and then with individual volunteers. Pay special attention to the teens and numbers ending in 9 and 0.

**Counting on to 100.** Say any number from 51 to 100 and have the class count on from that number to 100. If some students have difficulty with starting the count sequence, encourage them to count up in their head from a reasonable starting point to the given number. Extend to any starting point within 100. Let students pick the starting point to maintain their interest.
Activity Centers
For guidance on selecting and using the activity centers, see Introduction p. A-16.

1. I Start, You Finish (see introduction to Unit 1, p. C-1)
   Variation: Students play in pairs. Player 1 chooses a number from 1 to 20, then Player 2 counts on to 100. Students can choose a number or randomly select a number by pointing to it on a number chart from 1 to 20. Make charts from **BLM Number Charts to 20** available.

2. Completing a Number Chart to 100
   **Type:** Individual
   **Objective:** To complete a partially-filled number chart from 1 to 100
   **Preparation:** In advance, cut out the number sequences (below the number chart) on **BLM Numbers to 100 (1)**. Alternatively, provide students with scissors to cut out the sequences. Provide each student with glue and the chart from the BLM.
   **Instructions:** Students glue each number sequence where it belongs on the number chart.
   **Bonus:** Instead of gluing, advanced students might write the missing numbers on the chart.

3. I Start, You Finish (see introduction to Unit 1, p. C-1)
   Variation: You say a ten (e.g., 20, 30, 40, and so on to 90) and a student rolls a die to determine the starting point for counting to 100. For example, if you say “30” and the student rolls a 2, students start at 32 and count to 100.

---

Extensions
1. Students practice writing the numbers from 51 to 100 on scrap or interlined paper (from **BLM Interlined Paper**).

2. Students work in pairs to practice recognizing numbers from 1 to 100. Consider pairing students who are competent in recognizing the numbers to 100 with those who are still learning them. Partner 1 can either write a number or point to a number on a hundreds chart. (Provide **BLM Hundreds Chart**.) Partner 2 reads the number. Then partners switch roles and repeat.

3. Play bingo for the numbers from 1 to 100. Give each student 90 tokens or counters and a hundreds chart from BLM Hundreds Chart. Affix to or project on the board an enlarged version of the hundreds chart that you can use to mark each number as you call it (for students who are unsure about the numbers). SAY: I will call out numbers. You need to put a token on your chart for each number I call. We will keep playing until you have covered five boxes in a line on your card. Pointing to the number chart on the board, demonstrate a line by marking a horizontal, vertical, and diagonal pattern of five squares. SAY: When this happens, you call “bingo.” After students understand what to do, begin to call out numbers at random or draw numbers from a paper bag. (You might cut apart a set of numbers from the BLM.)

(MP.7) 4. Have students complete the number chart on **BLM Numbers to 100 (2)**.
OAK-43  Adding Small Numbers

Pages 180–183

Standards: K.OA.A.5

Goals:
Students use fixed representations of the numbers 1 to 5 to develop fluency in adding within 5.

Prior Knowledge Required:
Can count to 5
Can add within 5 using objects or pictures
Can recognize up to five objects when presented in an organized way

Vocabulary: add, addition, all, part, total

Materials:
7 cards with a die pattern made using cardstock and markers (see note below)
red and blue chalk or markers
5 to 12 two-sided counters or dried beans painted on one side and a paper cup per student (see Activity Centers 1, 2, Extension 2)
scrap paper or BLM Making 5 (p. R-13, see Activity Center 1, Extension 2)
dominoes with dots that add to 5 or less or BLM Dominoes (1) (p. R-15, see Activity Center 3)
pencils, crayons, or markers of three different colors (see Activity Center 4)
BLM Coloring Dots (1) (p. P-26, see Activity Center 4)
2 dice per student or student pair (see Extension 1)
dominoes or BLM Dominoes (pp. R-15–17, see Extension 3)

NOTE: In advance, use cardstock paper and markers or crayons to make a set of cards with one to five dots arranged like a die face, as shown below on the left. Make two additional cards, one with two dots and the other with three dots, as shown below on the right. Keep the cards for Lesson OAK-44.

Counting practice. As a class, practice counting on to 100 from any number (see Introduction, p. A-23). Consider conducting a counting choir with your class. Divide the class into two groups. Give a starting number and point to Group 1. Group 1 counts in unison until you indicate that they should stop. Then point to Group 2 and have them continue counting from where Group 1 stopped. Continue going back and forth between the groups until you reach 100. For a challenge, have students practice adding 1 to any number within 100.
**Visualizing 1 to 5.** On the board, draw three solid dots (as shown below on the left). ASK: If I draw lines between the dots, what shape will it make? (a triangle) Connect the dots to show the triangle. Repeat with four dots to make a square and two dots to make a line, as shown below:

![Diagram](image1)

One at a time, hold up different die-pattern cards and ask students how many dots there are. Discuss the patterns (e.g., three dots can make a triangle, four dots can make a square). Present the patterns in different orientations. Have students practice making the dot patterns for one to four by pretending their fingertips are dots and holding their fingers to match the dot patterns. Students can use two hands, if needed. (Five dots may be awkward, but you might demonstrate some ways to make the pattern.) Then have students close their eyes as you call out numbers between 1 and 5 and make the patterns with their fingers.

**(MP.1) Adding with dot patterns.** Draw two blue dots on the board, one dot above the other. ASK: If I join the dots, what shape could this make? (a line) Draw a line connecting the dots to illustrate and then erase the line. SAY: If I draw another dot and join the dots, what shape could this make? (a triangle) Draw a red dot, as shown below. Connect the dots to make a triangle and then erase the lines. ASK: How many dots make a triangle? (3) SAY: We started with a line with two dots. Then we added one dot and got a triangle, which has three dots. So, $2 + 1 = 3$. Write the equation on the board:

\[
2 + 1 = 3
\]

SAY: We call how many there are in the whole picture, the *total*. When we add, the total is how many in all. We made the total, 3 (draw a circle, as shown below), from two *parts*, a 2 and a 1. Draw boxes around the two parts, as shown below:

![Diagram](image2)

$2 + 1 = 3$

SAY: We add the parts to make the total. Repeat with $2 + 2 = 4$, $3 + 1 = 4$, and $2 + 3 = 5$. For each one, identify the parts and the total.

**Developing fluency with pictures.** Show two die-pattern cards at a time and have the class call out or signal how many dots in all. (The intention is to develop speed and accuracy for the whole class.) For example, show a 2 and a 3. ASK: How many dots in all? (5) What are the parts? (2 and 3) What is the addition? ($2 + 3 = 5$) Show the 5 card and describe various ways to see it (i.e., $1 + 4$, $3 + 2$, etc.).
Activity Centers

(MP.1) 1. Five Counters (see introduction to Unit 7, p. J-3)
*Variation:* After students sort the counters or beans by color, they rearrange them to show a die pattern and then write the addition on scrap paper or BLM Making 5.
*Bonus:* Students gently tip the counters once onto a table and try to create an addition for each number from 2 to 5. For example, if the counters land as 4 red and 1 blue, a student could produce: 1 red + 1 blue = 2, 2 red + 1 blue = 3, 3 red + 1 blue = 4, and finally, 4 red + 1 blue = 5.

(MP.1) 2. Five Counters (see introduction to Unit 7, p. J-3)
*Variation:* Students play in pairs and take turns calling out the addition equation that the counters show (without rearranging the counters in a die pattern).

3. Practice for Fluency (see unit introduction, p. P-1)

(MP.1) 4. Coloring Dots for Addition
*Type:* Individual
*Objective:* To create and record a die pattern that shows addition
*Preparation:* Give each student two colors of pencils, crayons, or markers and cards cut from BLM Coloring Dots (1).
*Instructions:* For each card, students color up to five dots in two colors and then write the addition equation.
*Bonus:* Students use three colors. In advance, add a third blank and a plus sign to each equation template, or have students do so.

Extensions
1. Give each student or student pair two dice. If playing in pairs, students take turns rolling the dice, ordering the dice so that they start with the higher roll first, and then counting on using the second die to find the total. For example, if they roll 6 and 4, students point to the die with 6 and say “6” and then continue counting as they point to each dot on the die with 4 and say “7, 8, 9, 10.”

2. Repeat the variations for Activity Centers 1 and 2 using any number of counters up to 12.

3. Students play Practice for Fluency (see unit introduction, p. P-1) using all available dominoes in a set or from BLM Dominoes.
OAK-44 Fluency in Addition

Pages 184–186

Standards: K.OA.A.5

Goals:
Students develop fluency in adding within 5 using the method of their choice.
Students apply their fluency in addition to word problems.

Prior Knowledge Required:
Can count to 5
Can add within 5

Vocabulary: add, addition, all, part, total

Materials:
7 cards with a die pattern made using cardstock and markers (see note below)
chalk or markers of two different colors (optional)
scrap paper
manipulatives (e.g., 5 connecting cubes of two colors, optional)
BLM Additions within 5 (pp. R-19–20, see Activity Center 1, Extension 3)
BLM I Have ____, Who Has ____? (p. R-8, see Activity Center 2)
5 stickers or labels, 5 small toys or items, and 10 counters, per group (see Activity Center 3)
BLM Number Cards 0 to 5 (p. R-2, see Activity Centers 4, 5, Extensions 1, 2)
BLM Number Cards 6 to 10 (p. R-3, see Extensions 1, 2)
BLM Number Cards 11 to 15 (p. R-4, see Extension 2)
BLM Additions within 10 (pp. R-25–26, see Extension 3)

NOTE: Gather the die-pattern cards that you made in Lesson OAK-43. If necessary, use cardstock paper to make a new set of cards with one to five dots arranged like a die face, as shown below on the left, and two additional cards—one with two dots and one with three dots, as shown below on the right:

Counting practice. As a class, practice counting on to 100 from any number. Conduct a counting choir by dividing the class into groups, and then alternate between the groups as students count on to 100. Have students practice adding 1 to any number within 100. For a challenge, have students practice adding 2 to any number within 100 by counting the next two numbers.

Practice fluency with pictures. Show two die-pattern cards at a time and have the class call out or signal how many dots in all. (The intention is to develop speed and accuracy for the
(MP.2) Developing fluency without pictures. Call out additions within 5 and have students call out or signal the answers as a class. Once everyone is comfortable participating, address each question to a different student.

(MP.4) Solving addition stories. Write on the board:

2 boys are playing. 2 girls are playing.
How many children in total?

___ + ___ = ___

Read the story aloud. ASK: To find how many children in all, do we add or subtract? (add) What do we add? (2 plus 2) How do you know? (answers will vary) Have a volunteer circle the two numbers in the question. SAY: We add two boys and two girls to find how many in all. Write “2” in the first two blanks. ASK: What is 2 + 2? (4) Draw two dots above each 2. (Do not draw dots if all of your students can add fluently. If they cannot add fluently, you might wish to draw the dots using two colors.) Have a volunteer write “4” in the last blank. The final picture should look like this:

2 boys are playing. 2 girls are playing.
How many children in total?

● ●
● ●
2 + 2 = 4

SAY: The total is four children. The parts are two boys and two girls. Repeat with 3 cats are napping and 1 more cat is napping, as shown below:

3 cats are napping. 1 more cat is napping.
How many cats in total?

● ●
● ●
3 + 1 = 4

Repeat with other stories, if needed. Gradually increase the amount of recording students do for the stories.

(MP.4) Activity
Give each student scrap paper and manipulatives (if necessary). Some students may find it helpful to use two colors of connecting cubes to represent the parts and then connect the cubes
to make the total. SAY: I am going to tell you some stories. I want you to write the addition as I tell the story. Then you will have time to find the answer. Here is the first one. Two fish are swimming. One more fish joins them. (Repeat if necessary.) ASK: What addition did you write? (2 + 1) SAY: The parts in this story are 2 and 1. Make sure that students have written “2 + 1” before proceeding. Next have students write the answer. ASK: How many fish are there in all? (3) SAY: The total is 3. Repeat with the following addition stories:

1. Two frogs jump. Three frogs swim. How many frogs in all? (2 + 3 = 5)

2. One boy reads. Four boys play with a ball. How many boys in all? (1 + 4 = 5)

3. Tony has one apple and one banana. How many fruits in all? (1 + 1 = 2)

(Activity Centers)

1. Practice for Fluency (see unit introduction, p. P-1)
   Variation: Use cards with additions within 5 from BLM Additions within 5 (instead of dominoes). Students pick a card and say how many in all. Provide students who need manipulatives with two colors of connecting cubes, which they can use to represent the parts and then connect to make the total.

   (MP.2)

2. I Have ____, Who Has ____? (see introduction to Unit 7, p. J-2)
   Variation: In advance, make cards using BLM I Have ____, Who Has ____? For “I have,” write a number from 1 to 5. For “Who has,” write an addition expression within 5. Make sure that each number is represented only once. Example:

   ![I have 4, Who has 3 + 2]

   (MP.2, MP.4)

3. Adding at the Store
   Type: Pairs or groups of 3, creative
   Objective: To add the cost of two items that students “buy”
   Preparation: Provide each group with five stickers or labels, five small toys or classroom items (e.g., erasers, pencils), and 10 counters (representing dollars or cents).
   Instructions: Students work together to write a number from 1 to 5 (representing dollars or cents) on each label and then attach a label to each item. Students take turns being the shopper and the shopkeeper. The shopper buys two items and the shopkeeper finds the total. The shopper then pays the shopkeeper for the items using counters.
   Variations:
   1. Make the labels using dot patterns instead of numbers.
   2. Students who are very fluent adding within 5 can buy more than two items.
4. **Modified Go Fish** (see Introduction, p. A-29)

*Variation:* Use a target number of 5. Provide students with number cards from 1 to 5 or cards from **BLM Number Cards 0 to 5.**

(MP.1) 5. **Addition Peace**

*Type:* Pairs

*Objective:* To add the numbers on two cards drawn at random

*Preparation:* Give each student a set of cards numbered from 1 to 5 (or cards from BLM Number Cards 0 to 5).

*Instructions:* Each player places a pile of five shuffled cards face down in front of them. Each player turns over the top card from their pile. The player who has the card with the greater number adds the two cards, gives the answer, and then discards the cards. Play continues with the next two cards.

---

**Extensions**

*NOTE:* For Extensions 1 and 2, provide number cards from BLM Number Cards 0 to 5, **BLM Number Cards 6 to 10,** and **BLM Number Cards 11 to 15,** as needed.

1. Repeat Activity Center 5 using cards numbered from 0 to 10.

2. Students play **Modified Go Fish** (see Introduction, p. A-29) for target numbers up to 12.

3. Students play **Practice for Fluency** (see unit introduction, p. P-1) using cards with additions within 10 from BLM Additions within 5 and **BLM Additions within 10** (instead of dominoes).

(MP.4, MP.5) 4. Have students use tools of their choice to find the answer. Students explain to a partner how they used their tools to find the answer.

a) 5 bunnies are eating carrots. 2 bunnies hop away. Then 1 more hops away. How many bunnies are left?

b) 4 spiders are crawling up a wall. 3 spiders fall down. Then 1 more spider falls down. How many spiders are left?

*Sample answers:*

a) I drew 5 circles for bunnies. Then I crossed out 2 to show the two that hopped away. Then I crossed out 1 more for the other one that hopped away. There were 2 circles not crossed out, so there are 2 bunnies left.

b) I counted 4 blocks for spiders. I took away 3 blocks to show the spiders that fell down. Then I took away 1 more block to show the other spider that falls down. There were no blocks left. So there are 0 spiders on the wall.
OAK-45 Subtracting Small Numbers

Pages 187–189

Standards: K.OA.A.5

Goals:
Students use fixed representations of the numbers 1 to 5 to develop fluency in subtracting within 5.

Prior Knowledge Required:
Can count to 5
Can subtract within 5 using objects or pictures

Vocabulary: left, part, subtract, subtraction, take away, total

Materials:
5 counters
5 to 10 two-sided counters or dried beans painted on one side and a paper cup per student (see Activity Centers 1, 2, Extension 3)
scrap paper (see Activity Center 1, Extensions 2, 3)
colored pencils, crayons, or markers (see Activity Center 3)
BLM Coloring Dots (2) (p. P-27, see Activity Center 3, Extension 1)
2 dice per student or student pair (see Extension 2)
dominoes or BLM Dominoes (pp. R-15–17, see Extension 4)

Counting practice. As a class, practice counting on to 100 from any number. Conduct a counting choir by dividing the class into groups, and then alternate between the groups as students count on to 100. Have students practice adding 1 to any number within 100. For a challenge, have students practice adding 2 to any number within 100 by counting the next two numbers.

(MP.1) Many ways to take one away. Affix to the board five counters in the die pattern. Have a volunteer take away one counter. ASK: How many are left (4) Is that the only way to take away 1 from 5? (no) Replace the counter and have a volunteer take away a different counter. ASK: How many counters are left? (4) Do the counters that are left make the same shape as before? (no) Does it matter? (no) Repeat with one or two other volunteers.

(MP.1) Subtracting with dot patterns. Draw on the board:

●

● ●

ASK: If I draw lines between the dots, what shape will it make? (a triangle) How many dots are there? (3) Write “3” below the picture. SAY: I’m going to take away one dot. Erase a dot and...
write “− 1.” SAY: I want to show that we started with three dots and took one dot away, so I'm going to draw it like this. Draw an empty dot. The picture should look like this:

\[
\begin{array}{c}
\bullet \\
\bullet \quad \circ \\
3 - 1
\end{array}
\]

SAY: This picture shows how many dots we started with. We started with a total of three dots. The empty dot shows the part that we took away. ASK: How do we usually show taking away? (crossing out) Cross out the empty dot. Pointing to the solid dots, SAY: These dots show the part that is left. In a subtraction, we start with the total. We take away one part and the other part is left. ASK: How many are left? (2) Write “= 2.” SAY: \(3 - 1 = 2\).

Draw on the board:

\[
\begin{array}{c}
\bullet \\
\circ \quad \circ \\
\bullet \quad \circ
\end{array}
\]

ASK: How many dots in all? What is the total in this picture? (5) Write “5” below the picture. ASK: How many dots in the part we take away? (3) Outline the part taken away (see below) and write “− 3.” SAY: We usually show taking away by crossing out. This time we will use empty dots to show taking away. We take away one part and the other part is left. ASK: How many dots are left? (2) Outline the two dots that are left (as shown below) and write “= 2.” The final picture should look like this:

\[
\begin{array}{c}
\bullet \\
\circ \\
\bullet
\end{array}
\]

\[5 - 3 = 2\]

Repeat with \(4 - 1 = 3\) and \(5 - 4 = 1\). For each one, identify the parts and the total.

**Developing fluency with pictures.** Draw more subtraction pictures using dots and have students call out the subtractions. For example, draw four dots with three dots empty. ASK: How many dots in total? (4) How many dots in the part we take away? (3) How many dots in the part that is left? (1) What is the subtraction? (\(4 - 3 = 1\))

**Preparing for the AP pages.** For **Questions 5–20** on AP Book K.2, Unit 13, pp. 188–189, students who have difficulty with subtracting can cross out circles to show the part they take away.
Activity Centers

(MP.1) 1. Five Counters (see introduction to Unit 7, p. J-3)

*Variation:* Students choose one color to represent the subtracted part. After students sort the counters or beans by color, they rearrange them to show a die pattern and then write the subtraction equation on scrap paper.

(MP.1) 2. Five Counters (see introduction to Unit 7, p. J-3)

*Variation:* Students play in pairs and take turns calling out the subtraction equation that the counters show (without rearranging the counters in a die pattern).

(MP.1) 3. Coloring Dots for Subtraction

*Type:* Individual

*Objective:* To create and record a die pattern that shows subtraction

*Preparation:* Give each student a colored pencil, crayon, or marker and cards cut from BLM Coloring Dots (2).

*Instructions:* For each card, students color or outline up to five dots and then write the subtraction equation.

Extensions

1. Students play Practice for Fluency (see unit introduction, p. P-1) using dominoes with at most five dots on each side or BLM Dominoes. Players subtract the smaller number from the larger one.

   **NOTE:** This is an extension because subtraction with dominoes does not work as well visually as addition does.

(MP.4, MP.5) 2. Make the following tools available for students: number lines from BLM Number lines, blocks, counters, yarn circles, paper, and colored pencils. Have students choose tools to solve the problem and then explain their solution to a partner.

   a) There were 8 dogs at the park. 3 dogs ran away from the park. 1 dog came back. How many dogs are at the park?

   b) Rani has 7 red apples and 2 green apples. She gives 4 red apples to Zara. How many apples does Rani have now?

   **Sample answers:**

   a) I used a number line. I started at 8, then I counted back 3 to show 3 dogs that left and I landed at 5. Then I counted forward 1 to show 1 dog that came back and I landed at 6. There are 6 dogs at the park.

   b) I used paper and pencils. I drew 7 red apples and 2 green apples. Then I crossed out 4 red apples for the apples Rani gave to Zara. I counted the apples that are not crossed out. Rani has 5 apples.
OAK-46 Fluency in Subtraction

Pages 190–192

Standards: K.OA.A.5

Goals:
Students develop fluency in subtracting within 5 using the method of their choice.
Students apply their fluency in subtraction to word problems.

Prior Knowledge Required:
Can count to 5
Can subtract within 5 using objects or pictures

Vocabulary: left, part, subtract, subtraction, take away, total

Materials:
scrap paper
manipulatives (e.g., 5 connecting cubes, optional)
BLM Subtractions within 5 (pp. R-39–40, see Activity Center 1, Extension 3)
BLM I Have ___, Who Has ___? (p. R-8, see Activity Center 2)
2 dice per student pair (see Activity Center 3)
5 stickers or labels, 5 small toys or items, and at least 5 counters, per group (see Activity Center 4)
play money (see Activity Center 4)
BLM Number Cards 0 to 5 (p. R-2, see Activity Center 5, Extensions 1, 2)
BLM Number Cards 6 to 10 (p. R-3, see Extension 1)
BLM Subtractions within 10 (pp. R-41–44, see Extension 3)
dominoes or BLM Dominoes (pp. R-15–17, see Extension 4)

Counting practice. As a class, practice counting on to 100 from any number. Conduct a
counting choir by dividing the class into groups, and alternate between the groups as students
count on to 100. Have students practice adding 1 to any number within 100. For a challenge,
have students practice adding 2 to any number within 100 by counting the next two numbers.

Practice fluency with pictures. Draw on the board:

● ●
● ○

ASK: How many in total? (4) How many taken away? (1) How many left? (3) What is the
subtraction? (4 − 1 = 3) Repeat with other subtractions within 5. When students are comfortable,
simply ASK: What subtraction does the picture show? You may wish to keep several subtraction
pictures on the board at the same time and revisit them until students are fast and accurate.
(MP.2) Developing fluency without pictures. Erase the images. Call out subtractions within 5 and have students call out or signal the answers as a class. If not all students are able to subtract without pictures or manipulatives, remind them how to subtract on their fingers. Once everyone is comfortable participating (with or without fingers), address each question to a different student.

(MP.4) Solving subtraction word problems. Write on the board:

5 children are playing. 2 children go home. How many children are playing now?

\[ \_ \quad - \quad \_ \quad = \quad \_ \]

Read the story aloud. ASK: To find how many children are playing now, do we add or subtract? (subtract) What do we subtract from? How many children are there at the start? (5) How do you know? (answers will vary) Have a volunteer circle the “5” in the question. ASK: How many do we take away? (2) Have another student circle the “2.” SAY: We take two away from five to find how many are left. Write “5” and “2” in the first two blanks. SAY: We write 5 – 2 to show five take away two. ASK: What is 5 – 2? (3) Draw five solid dots above the equation, then replace two of them with empty dots. (Do not draw dots if all of your students can subtract fluently). Have a volunteer write “3” in the last blank. The final picture should look like this:

5 children are playing. 2 children go home. How many children are playing now?

\[ \_ \quad - \quad \_ \quad = \quad \_ \]

SAY: The total is five children. The parts are two children who go home and three children who stay to play. Repeat with 3 cats are sleeping and 1 cat wakes up, as shown below:

3 cats are sleeping. 1 cat wakes up. How many cats are sleeping now?

\[ \_ \quad - \quad \_ \quad = \quad \_ \]

Repeat with other stories, if needed. Gradually increase the amount of recording students do for the stories.
**Activity**

Give each student scrap paper and manipulatives (if necessary). Some students may find it helpful to join up to five connecting cubes to represent the total and then remove the part being subtracted. SAY: I am going to tell some more stories. I want you to write the subtraction as I tell the story. Then you will have time to find the answer. Here is the first one: Two fish are swimming together. One fish swims away. (Repeat if necessary). ASK: What subtraction did you write? \(2 - 1\) Make sure that everyone has written “\(2 - 1\)” before proceeding. Next have students write the answer. ASK: How many fish are there now? (1) What is the total in this story? (2) How many in the parts? (1 and 1) Repeat with the following subtraction stories:

1. Four frogs hop on a log. Then three frogs hop off the log. How many frogs stay? \(4 - 3 = 1\)

2. Five girls play tag. Three girls go home for lunch. How many girls are playing tag now? \(5 - 3 = 2\)

3. Nina has four peaches. She eats one peach. How many peaches does she have left? \(4 - 1 = 3\)

(end of activity)

**Activity Centers**

1. **Practice for Fluency**
   
   Variation: Instead of dominoes, use cards with subtractions within 5 from [BLM Subtractions within 5](#). Students pick a card and say how many are left. Provide students who need manipulatives with 5 connecting cubes, which they can join to make the total and then remove the part being subtracted. Alternatively, students can draw the subtraction on scrap paper.

2. **I Have ___, Who Has ___?** (see introduction to Unit 7, p. J-2)
   
   Variation: In advance, make cards using [BLM I Have ___, Who Has ___?](#) For “I have,” write a number within 5. For “Who has,” write a subtraction expression within 5. Make sure that each number is represented only once. Example:

<table>
<thead>
<tr>
<th>I have</th>
<th>Who has</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5 - 4</td>
</tr>
</tbody>
</table>

3. **Subtracting with Dice**
   
   Type: Pairs
   
   Objective: To do the subtraction shown on two dice
   
   Preparation: Provide each student pair with two dice.
   
   Instructions: Each student in the pair rolls a die, and together partners subtract the smaller number rolled from the larger one. As an option, they can record the subtraction equation on scrap paper.
4. Subtracting at the Store

Type: Pairs or groups of 3, creative

Objective: To subtract the cost of an item that students “buy”

Preparation: Provide each group with five stickers or labels, five small toys or classroom items (e.g., erasers, pencils), and five counters.

Instructions: Students work together to write a number from 1 to 5 (representing dollars or cents) on each label and then attach each label to an item. They take turns being the shopper and the shopkeeper. The shopper buys one item and pays the shopkeeper using five counters (representing five dollars). The shopkeeper finds how much money is left and gives the shopper the change.

Variations:
1. Make the labels using dot patterns instead of numbers.
2. Students use play money. The shopper uses a five-dollar bill and the shopkeeper makes change using dollar bills.
3. Students who are very fluent with subtracting within 5 can buy more than two items and start with more than five counters.

5. Subtraction Peace

Type: Pairs

Objective: To subtract the numbers on two cards drawn at random

Preparation: Give each student a set of cards numbered from 1 to 5 (or cards from BLM Number Cards 0 to 5).

Instructions: Each player places a pile of five shuffled cards face down in front of them. Each player turns over the top card from their pile. The player who has the card with the greater number subtracts the number on the other player’s card and gives the answer. Play continues with the next two cards.

Extensions

NOTE: For Extensions 1 and 2, provide number cards from BLM Number Cards 0 to 5 and BLM Number Cards 6 to 10, as needed.

1. Repeat Activity Center 5 using cards numbered from 0 to 10 or greater.

2. Students play Modified Go Fish (see Introduction, p. A-29) with a target number of 5. Players must find the pair for their card that makes 5. For example, if Player 1’s chosen card is a 3, he asks Player 2 for a 2.

3. Students play Practice for Fluency (see unit introduction, p. P-1) using cards with subtractions within 10 from BLM Subtractions within 10 (instead of dominoes).

4. Students play Practice for Fluency (see unit introduction, p. P-1) using any dominoes from BLM Dominoes. Players subtract the smaller number from the larger one.
OAK-47 Number Families

Pages 193–196

Standards: K.OA.A.3, K.OA.A.5

Goals:
Students use visual representations of the numbers 1 to 5 to develop fluency in addition and subtraction within 5.

Prior Knowledge Required:
Can count to 5
Can add and subtract within 5 using objects or pictures

Vocabulary: add, all, left, part, subtract, subtraction, total

Materials:
red and blue chalk or markers
pencils, crayons, or markers of two different colors
die face with 5 dots or BLM Coloring Dots (pp. P-26–27)
scrap paper
5 to 12 two-sided counters and a paper cup (see Activity Center 1, Extension 2)
5 plastic bowling pins or empty plastic water bottles and a soft ball per student or student pair (see Activity Center 2)
BLM Additions within 5 (pp. R-19–20, see Activity Center 3)
BLM Subtractions within 5 (pp. R-39–40, see Activity Center 3)
BLM Additions within 10 (pp. R-25–26, see Extension 3)
BLM Subtractions within 10 (pp. R-41–44, see Extension 3)

Counting practice. As a class, practice counting on to 100 from any number. Conduct a counting choir by dividing the class into groups, and alternate between the groups as students count on to 100. Have students practice adding 1 to any number within 100. For a challenge, have students practice adding 2 to any number within 100 by counting the next two numbers.

(MP.7) Finding the total. Use blue (for dark dots) and red (for gray dots) to draw the patterns shown below on the board:

Pointing to the first pattern with two red dots and three blue dots, ASK: How many dots in all? (5) What do we call how many there are in all? (the total) Write “5” below and to the left of the first picture in order to leave room for the rest of the equation. Do the same for the remaining two drawings.
(MP.7) Finding and adding the parts. SAY: The total in each picture has two parts, a red part and a blue part. Ask a volunteer to circle the two parts in the first picture. SAY: If we add the parts, we get the total. Write “=” after the 5. ASK: How many dots are in the red part? (2) How many dots in the blue part? (3) Write “2 + 3” to complete the number sentence. SAY: We make the total by adding the two parts. Repeat for the remaining drawings, as shown below. Gradually allow volunteers to complete more of the work.

\[
\begin{align*}
5 &= 2 + 3 \\
3 &= 2 + 1 \\
4 &= 3 + 1
\end{align*}
\]

(MP.7) Subtracting a part. SAY: We can take a part away from the total to subtract. We usually show the part we subtract by drawing empty dots. Here we will subtract the red dots instead. ASK: How do we start a subtraction, with the total or one of the parts? (the total) Point to the first picture and ASK: What is the total in this picture? (5) Write “5” under the number sentence on the board. ASK: We will subtract the red part, so how many do we subtract? (2) Write “− 2” next to the “5.” ASK: How many are left? (3) Write “= 3.” Repeat with the other two pictures, as shown below, and gradually allow volunteers to do more of the work. Then erase the pictures.

\[
\begin{align*}
5 &= 2 + 3 \\
3 &= 2 + 1 \\
4 &= 3 + 1 \\
5 - 2 &= 3 \\
3 - 2 &= 1 \\
4 - 3 &= 1
\end{align*}
\]

(MP.7) Adding and subtracting together. Draw on the board:

\[
\begin{align*}
5 &= 4 + 1 \\
5 - 4 &= 1 \\
4 &= 2 + 2 \\
4 - 2 &= 2 \\
3 &= 0 + 3 \\
3 - 0 &= 3
\end{align*}
\]
(MP.7) Activity
Divide the class into groups of three or four. Give each student two colors of pencils, crayons, or markers, a die face with five dots (or use the patterns cut from BLM Coloring Dots), and scrap paper. Each student colors a die face with up to five dots in two colors and writes the addition and subtraction equations for their pattern on scrap paper. Then students exchange their patterns with members of their group and write the equations for each other’s patterns.
(end of activity)

Activity Centers
(MP.7) 1. Five Counters (see introduction to Unit 7, p. J-3)
Variation: Students choose one color to represent the subtracted part. After they tip out their cups, they leave the counters where they land or rearrange them to show a die pattern and then write the addition and subtraction equations on scrap paper.

(MP.7) 2. Bowling for Number Families
Type: Individual or pairs, active
Objective: To write the addition and subtraction equations modeled by five bowling pins (some upright, some knocked over)
Preparation: Set up a bowling lane using plastic pins or empty plastic water bottles per student or student pair. Provide individuals or pairs with a soft ball.
Instructions: Set up five pins. Students roll the ball once and then write the addition and subtraction equations on scrap paper for how many pins were knocked down and how many stayed upright.

(MP.7) 3. Matching (see introduction to Unit 7, p. J-3)
Variation: Use addition and subtraction cards from BLM Additions within 5 and BLM Subtractions within 5. Begin with six pairs of matching cards and have students write the answer on each card before playing. Two cards match if all of the same numbers appear on both cards. For example, 2 + 3 = 5 (or 3 + 2 = 5) matches with 5 − 3 = 2 (or 5 − 2 = 3).
Bonus: Students match all four cards that use the same numbers.

Extensions
(MP.7) 1. Write “5 3 2” on the board. Students add an equal sign and a plus sign or minus sign to make a number sentence that makes sense. For example, 5 = 3 + 2. ASK: How many number sentences can you make? Use different number families within 10 with other arrangements of numbers.
2. Repeat Activity Center 1 using up to 12 counters.
3. Repeat Activity Center 3 using cards from BLM Additions within 10 and BLM Subtractions within 10.
OAK-48 Adding Numbers to 5

Pages 197–198

Standards: K.OA.A.3

Goals:
Students develop fluency in adding to 5.
Students explore the $5 + n$ patterns for the numbers between 5 and 10.

Prior Knowledge Required:
Can count to 10
Can add within 10 using objects or pictures

Vocabulary: add, addition, counting, total

Materials:
box to hold 5 counters (or a five-frame made from an egg carton with the lid still attached)
10 counters
2 dice per student pair (see Activity Center 1, Extension 1)
dominoes or BLM Dominoes (pp. R-15–17, see Activity Center 2)
BLM Additions within 10 (pp. R-25–26, see Activity Center 3)

Counting practice. As a class, practice counting on to 100 from any number. Conduct a counting choir by dividing the class into groups, and alternate between the groups as students count on to 100. Have students practice adding 1 to any number within 100. For a challenge, have students practice adding 2 to any number within 100 by counting the next two numbers.

Making 5 to 10 with counters. Place five counters in a box or a five-frame made from an egg carton. ASK: How many counters are in the box? (5) Place two counters beside the box. ASK: How many counters do you see in total, inside and outside the box? (7) Count to verify. Change the number of counters outside the box and repeat. Then turn the box around so that students cannot see the counters (or close the lid if using an egg carton). ASK: How many counters are in the box? (5) Place one counter outside the box. ASK: How many counters in total, inside and outside the box? (6) Can we count to check? (answers may vary) Can we check without looking in the box? (yes) How do you know? (because there are 5 in the box) Pointing to the box, SAY: Five. Then pointing to the additional counter, SAY: Six. Repeat with other numbers from 6 to 10.

(MP.7) Making 5 to 10 on fingers. Have students hold up all of their fingers on one hand. ASK: How many fingers are you holding up? (5) Do you have to count to check? (no) Have students show you 6 on their fingers. ASK: You have five fingers up on one hand. How many on the other hand? (1) So 6 is 5 plus what? (1) Write “6 = 5 + 1” on the board. ASK: If you show six fingers, do you have to count your fingers? (no, I can hold up one hand and one extra finger) Repeat for 7 and then write the addition for 7 below the addition for 6. Practice holding up six or
seven fingers without counting. Repeat for 8, 9, and 10. Then ASK: Five plus what is 5? (0) Add the addition to the top of the list, as shown below:

\[
\begin{align*}
5 &= 5 + 0 \\
6 &= 5 + 1 \\
7 &= 5 + 2 \\
8 &= 5 + 3 \\
9 &= 5 + 4 \\
10 &= 5 + 5
\end{align*}
\]

Point to the numbers down the left side and SAY: These numbers are the totals. Have students read them out loud going from top to bottom. ASK: What are we doing when we say these numbers? (counting) Do you see any other numbers that show counting? (the numbers being added: 0, 1, 2, 3, 4, 5) Why do you think they both show counting? (answers may vary) SAY: Each time the total gets bigger because the number we add to 5 gets bigger too.

Practice saying additions for the numbers from 5 to 10. Show each addition on your fingers and have students repeat the addition and the total.

(MP.7) Making 6 to 10 on dominoes. Draw on the board:

Pointing to the left side of the domino, ASK: How many dots are on this side? (5) How many dots do we need to add to make 6? (1) Have a volunteer add a dot on the right side to make 6. Repeat for 7 to 10 by drawing a new domino for each one.

Making 6 to 10 with dots. SAY: Let’s use a different way to show the additions. We can draw dots in lines like a ten-frame. I will draw five dots. Draw five dots on the board. SAY: Then we can draw the extra dots below. I can show 6 by drawing one more dot. Add a dot to the board, as shown below:

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• • • • •
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Erase the board. For each of the numbers 6 to 10, have students draw dots either from memory, by counting, or by first showing the number on their fingers and adding as many extra dots as there are extra fingers.

(MP.7) Making 6 to 10 by adding to 5. Write “6 = 5 + ___” on the board. Have a volunteer complete the sentence. Have different volunteers recreate all of the additions for 6 to 10.
(MP.7) Adding to 5. Erase the equations and SAY: This time, let’s start with the addition. Write on the board:

\[
\begin{align*}
5 + 0 = {} & \quad \quad 5 + 3 = {} & \quad \quad 5 + 1 = {} & \quad \quad 5 + 4 = {} & \quad \quad 5 + 2 = {} \\
\end{align*}
\]

Have students signal the answer for each one and then have a volunteer write the answer.

---

Activity Centers  
(MP.7) 1. Dice  
_Type:_ Pairs  
_Objective:_ To determine the number shown on two dice  
_Preparation:_ Give each student pair two dice.  
_Instructions:_ Students place one die so that it shows the 5. Player 1 rolls the second die and says the total. Player 2 verifies. Players switch roles and repeat.

2. _Practice for Fluency_ (see unit introduction, p. P-1)  
_Variation:_ Use dominoes that have 5 on one side or use dominoes from _BLM Dominoes_.

3. _Practice for Fluency_ (see unit introduction, p. P-1)  
_Variation:_ Use cards with additions that have a 5 from _BLM Additions within 10_ (instead of dominoes).

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Extensions  
1. Repeat Activity Center 1, but instead of showing the number 5, students change the number showing on the first die to practice other additions and decompositions.

(MP.3, MP.7) 2. Write “6 = 5 + 1” and “7 = 5 + 2” on the board. ASK: If 6 = 3 + 3, then 7 = 3 + __? Have students write their answer independently, and then explain to a partner how the first equation helped them find the missing number in the second equation. Do partners understand and agree with each other’s thinking? Have them discuss why or why not.  
_Sample answer:_ I know that 7 is one more than 6. Since 6 = 3 + 3, we need one more to make 7, so 7 = 3 + 4.

Encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems to guide students.

3. For very advanced students:  
a) 5 + 5 = 10 so 5 + 6 = ?  
b) 10 + 10 = 20 so 10 + 11 = ?  
_Answers:_ a) 11, b) 21
## Numbers to 100 (I)

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Numbers to 100 (2)

- Fill in the missing numbers.

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Coloring Dots (I)

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____ + ____ = ____

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Coloring Dots (2)

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Unit 14  Measurement and Data: Measurement

Mathematical Practices in This Unit
In this unit, you will have the opportunity to assess MP.2, MP.3, and MP.6 to MP.8. The MP labels in this unit flag both opportunities to develop the mathematical practice standards and opportunities to assess them. Below is a list of where we recommend assessing each standard as well as some examples of how students can show that they have met a standard.

MP.2: MDK-6 Extensions 3–4
In MDK-6 Extension 4, students reason abstractly and quantitatively when they use the number of scoops needed to fill containers to determine which container from a collection holds the most and which holds the least, and when they recognize that a larger number of scoops corresponds to a larger capacity.

MP.3: MDK-6 Extension 5, MDK-8 Extension 7, MDK-10 Extension 4, MDK-11 Extension 7
In MDK-10 Extension 4, students construct a viable argument when they explain why certain rectangles are larger than others, even though the smaller rectangle might be taller or longer. Students also analyze and critique the reasoning of a partner.

MP.6: MDK-6 Activity Centers 1–3, MDK-7 Activity Centers 1–2, MDK-9 Activity Centers 1–2, and Extensions 1–2 and 6, MDK-10 Extensions 1, and 3–4, MDK-11 Activity 1
In MDK-11 Activity 1, students attend to precision when they correctly use the names of shapes (such as squares, triangles, and hexagons) and the positions of the shapes (above, below, beside) to describe the designs they create with pattern blocks.

MP.7: MDK-11 Extensions 1, 3, and 5–6.

MP.8: MDK-6 Extension 5, MDK-8 Extension 7, MDK-9 Extension 5, MDK-11 Extension 7
In MDK-9 Extension 5, students work with cubes on a pan balance. Students look for and express regularity in repeated reasoning when they notice that a larger number of cubes always corresponds to a heavier side of the pan balance, and that subtracting or counting up from the smaller number of cubes allows them to find the number of cubes needed to make both sides of the pan balance the same number and the same weight.
Unit 14  Measurement and Data: Measurement

Introduction
In this unit, students will learn to directly compare objects by capacity, height, length, and weight. They will describe a container as holding more than, less than, or the same amount as another one, and describe an object as being taller than, longer than, heavier than, shorter than, lighter than, or having the same height, length, or weight as another object.

Students will also learn to distinguish several measurable attributes of an object or a pair of objects, including cases where one object has more of one attribute while the other object has more of the other attribute. For example, students will compare first the length and then the weight of a long, light feather and a short, heavier marker, and describe the feather as longer and lighter, and the marker as shorter and heavier.

Finally, building on their experience of measurement (especially of length and height), students will further explore composing shapes by solving more pattern block puzzles, going beyond the level they attained at the end of Unit 3.

Materials. The following materials will be needed.

- Pan balances. Two lessons call for a pan balance (a balance scale with two pans). If you don’t have a pan balance, you can make one using a clothes hanger with hooks and two clear plastic bags with handles. See the picture below:

  ![Pan Balance](image)

  To use the balance, hang one bag from each hook, and hang the clothes hanger somewhere so that it can move freely. Place the items you want to compare or balance inside the bags.

- Containers. Collect a variety of containers. You might ask students to bring some empty, washed, non-breakable containers from home.

- Pattern blocks. The last lesson calls for pattern blocks. It would be ideal to have at least one classroom set of commercial pattern blocks. If you do not have a commercial set, cut out shapes from BLM Pattern Blocks. For this option, create more sturdy and durable shapes by either using thicker paper (such as, card stock or cardboard) or laminating the shapes before
cutting. If possible, use colored paper that matches the colors of commercial pattern blocks: triangle (green), square (orange), trapezoid (red), hexagon (yellow), larger rhombus (blue), smaller rhombus (tan). (You can omit the tan rhombus.)

When using paper shapes for demonstration or display purposes, you can use BLM Large Pattern Blocks (pp. Q-34–36) so that students can see the shapes clearly. For colored shapes, you can print BLM Large Pattern Blocks using colored paper (matching the colors of the pattern blocks) or color the shapes cut out from the BLM.

In addition to the BLMs provided at the end of this unit, the following Generic BLMs, found in section R, are used in Unit 14:
BLM Squares of Different Sizes (p. R-28)
BLM Rectangles of Different Sizes (p. R-29)
BLM Triangles of Different Sizes and Types (p. R-30)
BLM Pattern Blocks (p. R-31)
MDK-6 Capacity

Pages 199–200

Standards: K.MD.A.1, K.MD.A.2

Goals:
Students decide which of two containers holds more and which holds less by observing which one is larger (when one of the containers is clearly larger).
Students decide which of two containers holds more and which holds less by transferring the contents from one container into the other one.

Prior Knowledge Required:
Understands the concepts of more, less, and the same as for discrete objects

Vocabulary: bigger, less, more, same amount, smaller

Materials:
empty water jugs and containers of different sizes and shapes
measuring cups of different sizes and shapes
water, uncooked rice, or sand
plastic tub or large bowl
funnel (optional)
pairs of containers of different sizes, colors, and shapes
tray to catch spills (see Activity Centers 1–3, Extensions 1–3)
5 or 6 containers of different sizes and shapes (see Activity Centers 1–3, Extensions 1–3)
bag (see Activity Centers 1–3, Extensions 1–3)
2 clear containers of the exact same size and shape (see Extension 1)
1-cup measuring scoop (see Extensions 2, 3)
scrap paper (see Extension 3)

Counting practice. Practice counting to 100 as a class (see Introduction, p. A-23). Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

NOTE: For ease of pouring back and forth between containers, avoid containers with a narrow neck or mouth, or use a funnel. In advance, you might label the various containers using the letters A, B, C, and so on, so that you can distinguish between them as you refer to the containers.

Which container can hold more? Hold up an empty water jug and ASK: What is this? (a jug) Hold up an empty measuring cup that is obviously smaller than the jug, and ASK: What is this? (a cup) Hold up the jug in one hand and the cup in the other, and SAY: The cup and the jug are both containers. ASK: Which container is bigger? (the jug) Which one do you think can hold...
more water? (the jug) SAY: Let’s see if your guess is correct. Fill the cup with water. You might work over a plastic tub or a large bowl to avoid spilling.

**NOTE:** If you do not have convenient access to a sink or if you want to avoid the risk of spilling water, you might use uncooked rice or sand, instead of water. Using two or more of these options will help students see that the substance used doesn’t matter: a container that holds more water will also hold more rice, and so on.

**(MP.3)** After you fill the cup, ASK: Is the cup full? (yes) Prompt students by asking whether there is any more space in the cup to put more water in. Pour all the water from the cup into the jug. ASK: Did all the water from the cup fit into the jug? (yes) Is the jug full? (no) Again, prompt students by asking if there is more space in the jug to put more water in. ASK: Which holds more, the cup or the jug? (the jug) How do you know? (when you empty the cup into the jug, there is still space in the jug to hold more water) Which holds less, the cup or the jug? (the cup) Have students repeat the following sentences as a class: The jug holds more; the cup holds less. Point out that although the water in the jug looks like a smaller amount than when it was in the cup, it is the same amount of water.

**(MP.3)** Fill the jug completely with water. ASK: Is the jug full? (yes) Pour from the jug into the empty cup until the cup is full. ASK: Is the cup full? (yes) Is there still more water in the jug? (yes) So, which holds more, the cup or the jug? (the jug) How do you know? (after you fill the cup with water from the jug, there is still more water in the jug) Which holds less, the cup or the jug? (the cup) Have students repeat the following sentences as a class: The jug holds more. The cup holds less.

Repeat the exercise with various pairs of containers. For each pair, have students signal their guess for which container will hold more, and then test the guess as done above. Begin with pairs of containers in which one is obviously larger than the other, and then proceed to less obvious examples in which one container is taller but the other one is wider. Eventually show some examples of two containers that hold the same amount—first use two containers of exactly the same size and shape but of different colors, and then proceed to using containers of exactly the same capacity but of different shapes. For these cases, explain that the containers hold the same amount. Have students repeat the sentence as a class (for example, the bottle and the carton hold the same amount).

**Activity Centers**
For guidance on selecting and using the activity centers, see Introduction, p. A-16.

**NOTE:** The activity centers involve comparing capacity directly, using rice, sand, and water. The sand and water options may be more practical outdoors. Alternatively, you can provide dried beans or dried peas instead of rice, sand, or water. Choose containers with openings that are suitable for pouring rice, sand, and water. Have students use two or more substances to help them understand that the kind of substance used does not affect capacity. For example, a container that holds more water will also hold more rice.
1. **Comparing Capacities of Containers Directly**

*Type:* Small groups, active

*Objective:* To compare the capacities of pairs of containers using rice

*Preparation:* Provide students with a collection of five or six containers of different sizes and shapes labeled as A, B, C, and so on (all containers should be of sizes that are manageable for students), a bag containing enough uncooked rice to fill the largest container, and a tray to catch spills.

*Instructions:* One student chooses two containers. Each student guesses which of the two containers holds more and which holds less. Another student fills one container with rice. A third student pours rice from the filled container into the empty container, which is on the tray, until either the source container is empty or the target container is full. (If rice spills onto the tray, students can scoop it up and put it where it belongs.) Students then determine which container holds more rice and which holds less. Each student must state their answer using the words more, less, or same amount. They repeat several times, switching roles each time.

2. **Comparing Capacities of Containers Directly**

*Variation:* Use sand instead of rice.

3. **Comparing Capacities of Containers Directly**

*Variation:* Use water instead of rice.

---

**Extensions**

1. Provide pairs or small groups of students with a collection of five or six containers (labeled with the letters A, B, C, and so on), a bag of uncooked rice, a tray to catch any spills, and two identical, clear containers (larger than the other containers). Place these large containers side by side. A student chooses two containers from the collection; for example, A and B. Students determine which one holds more by filling A and B with rice, and then emptying A into one clear, large container and B into the other clear, large container. (The labeled container that fills the clear container to the higher level holds more. See the example below.) Students say which labeled container holds more and which holds less. You may wish to include two containers in the collection that hold the same amount.

| ![Image](image1.png) |

2. Provide pairs or small groups of students with a collection of containers (labeled with the letters A, B, C, and so on), a bag of uncooked rice, a tray to catch any spills, and a scoop for measuring exactly 1 cup of rice. Use containers that measure whole numbers of cups. A student chooses a container from the collection; for example, container A. Students guess how many scoops of rice will be needed to fill the container. They check their guesses by repeatedly filling...
the scoop with rice, emptying the scoop into container A, and counting out loud the number of scoops as they go, until container A is full.

**MP.2** 3. Students repeat Extension 2, but this time, they record their answers on scrap paper by writing the letter for the container beside the number of scoops that fit inside. Students take turns choosing two containers; for example, B and D. Students determine which container holds more and which holds less by looking at the number of scoops that fit inside each one.

**MP.2** 4. After students have completed Extensions 2 and 3, explain that the container that holds the most is the one that holds more than all of the others, and the container that holds the least is the one that holds less than all of the others. Have students find which container holds the most and which holds the least.

**MP.3, MP.8** 5. Make up stories in which you first subtract 1, and then add 2. For example: 8 frogs are on a log. 1 frog hops off. Then 2 other frogs hop on. How many frogs are on the log now? For each new story, change the starting number, subtract 1, and then add 2. After a few stories, challenge students to guess the answer without adding and subtracting. Have students explain to a partner how they know the answer right away.

**Sample answer:** Every time I take away one block and then add two more, I end up with one more than the number I started with.
MDK-7 Height

Pages 201–203

Standards: K.MD.A.1, K.MD.A.2

Goals:
Students directly compare the heights of two people, objects, or pictures, and describe the relative heights using the words “taller,” “shorter,” or “same height.”

Prior Knowledge Required:
Understands the concepts of more, less, and same amount for discrete objects

Vocabulary: height, same height, short, shorter, tall, taller

Materials:
pencils sharpened to different lengths
drinking straws cut to different lengths
objects of different heights and shapes (e.g., marker, paintbrush)
straightedge (e.g., 12-inch ruler)
connecting cubes of different colors, at least 10 per student (see Activity Centers 2, 3, Extensions 2, 4, 5, 6)
15 ones blocks per student (see Extension 1)
BLM Heights of Rectangles (p. Q-31, see Extension 1)
blank sheets of paper (see Extensions 3, 4)

Counting practice. Practice counting to 100 as a class by playing I Start, You Finish (see introduction to Unit 1, p. C-1) for the numbers from 50 to 100, and then from 1 to 100. Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

Comparing heights of students. Have a volunteer (for example, Sam) stand beside you. ASK: Whose head is higher up, mine or Sam’s? (the teacher’s head) SAY: Since the top of my head is higher up than Sam’s, we say that I am taller than Sam. Since the top of Sam’s head is lower down, we say that Sam is shorter than me. Repeat with two volunteers, one of whom is clearly taller than the other. Have them stand back to back, and use your hand to highlight the level of heights. Have students repeat the sentences (for example, Randi is taller than Fred, Fred is shorter than Randi). Repeat with several pairs of volunteers. For each pair, ensure one volunteer is taller than the other.

Tall and short. ASK: If I go outside and stand beside the school building, which will be higher up, the top of my head or the top of the building? (the top of the building) So, which is taller, the school or me? (the school) Is anyone taller than the school? (no) SAY: Since the school is taller than all of us, we say the school building is tall. ASK: If I stand beside an ant on the ground, which will be higher up, the top of the ant or the top of my head? (the top of your head) Which
one is taller, the ant or me? (you) Are you taller than an ant? (yes) SAY: The ant is shorter than all of us. So, we say that the ant is short. Repeat with other examples of tall things, such as a tall tree, and short things, such as a small flower.

(MP.3) Tall and short are relative. ASK: If I stand beside the ant, do I look short or tall? (tall) SAY: I look tall because I am taller than the ant. ASK: If you stand beside the ant, do you look tall or short? (tall) SAY: You look tall because you are taller than the ant. ASK: If you stand beside the school building, do you look tall or short? (short) SAY: You look short because you are shorter than the building. So, we look tall when we’re standing beside something short, but we look short when we’re standing beside something tall.

The words “height” and “same height.” SAY: The word height is the math word for how tall something is. Have two students who are the same height (for example, Jin and Kate) stand back to back. ASK: Is Jin taller than Kate? (no) Is Kate taller than Jin? (no) SAY: Jin is just as tall as Kate. Kate is just as tall as Jin. So, we say that Kate and Jin are the same height. Have students repeat the sentence as a class.

Ask a volunteer of about average height to stand up. ASK: Who thinks they are taller than [volunteer]? Choose a second volunteer who thinks they are taller than the first volunteer. ASK: How can we check who is taller? (have the two volunteers stand back to back) Repeat with volunteers who think they are shorter than the first volunteer.

(MP.3, MP.6) Sometimes people look taller but they are not. Choose two volunteers (for example, Sandy and Raj), one of whom is clearly taller than the other. Compare their heights back to back, as done before. ASK: Who is taller? (Sandy is taller than Raj) Who is shorter? (Raj is shorter than Sandy) Have the taller volunteer sit on the floor. ASK: Now who looks taller, Raj or Sandy? (Raj) ASK: Is Raj really taller or does he just look taller now? (he just looks taller) SAY: To see who is really taller, both people have to stand up straight on the floor. Repeat with more pairs of volunteers.

Comparing heights of objects. Hold up vertically two pencils of different lengths, one in each hand, with the bottoms aligned so that the taller pencil sticks up farther than the shorter one, as shown below:

ASK: Which pencil is taller? Move the pencil in your left hand forward, and ASK: Is this one taller? Repeat with the pencil in your right hand. Have students signal thumbs up for yes or thumbs down for no.

(MP.6) Hold two pencils, one in each hand, so that the bottoms of the pencils are hidden in your hands and the shorter pencil sticks up higher than the taller pencil. ASK: Which pencil do you
think is taller? Students signal the answer as before. Open your hands to reveal the trick. Then, hold the pencils with the bottoms aligned and ask again—you might place the pencils vertically on the top of a table or desk so that students can clearly see that the bottoms are aligned. SAY: The shorter pencil looked taller because I held it up higher. To see which pencil is taller, you need to make sure the pencils start at the same place. Then, the one that goes higher up is the taller one.

Repeat with drinking straws cut to different lengths and then with pairs of different objects, such as a marker and a paintbrush, first with the bottoms not aligned and then with the bottoms aligned. Be sure that students use the words “taller” and “shorter.” Include examples where the objects are the same height.

(MP.6) Comparing heights in pictures. On the board, draw a picture of two stick people in which one is taller than the other and the feet are aligned. Use a straightedge to draw a straight horizontal line to represent the ground, as shown below:

![Stick people](image)

Point to each picture as you ask who is taller and who is shorter. Repeat with simple pictures of trees, flowers, houses, and buildings. Include examples where one object is wider, but the other is taller. Then, do examples where the pictures are the same height.

Activity Centers

(MP.6) 1. Comparing Heights of Students
Type: Groups of four or five, active
Objective: To compare the heights of students by having them stand back to back
Instructions: One student chooses two other students from the group and asks them to stand back to back. The remaining students determine who is taller, who is shorter, or if they are about the same height. Each student in the group states their answer as a full sentence using the words taller, shorter, or same height. Students switch roles and repeat several times.

(MP.6) 2. Heights of Towers
Type: Small groups (two to five)
Objective: To build towers that are taller, shorter, or the same height as a given tower
Preparation: Provide each student in the group with 10 connecting cubes. If possible, give each student their own color.
Instructions: The leader builds a tower using fewer than 10 connecting cubes. The other students build towers that are taller than the leader’s tower, then shorter than the leader’s tower, and, finally, the same height as the leader’s tower. Each student expresses a comparison of their tower and the leader’s tower with full sentences using the words taller, shorter, or same
height. Students repeat the activity with a different leader, until everyone in the group has had a
turn to lead.

**Bonus:** The leader makes two towers using all 10 connecting cubes so that one is taller than the
other. The other students then build a tower that is taller than one of the leader's towers, but
shorter than the other one. Students switch roles and repeat.

(MP.6) 3. Finding Taller and Shorter Objects Around the Classroom

**Type:** Pairs, active

**Objective:** To find objects around the classroom that are taller or shorter than a given object

**Preparation:** Provide each pair of students with 10 connecting cubes.

**Instructions:** Partner 1 builds a tower using some or all of the 10 connecting cubes. Partner 2
then finds an object in the classroom that is taller than Partner 1’s tower. Encourage students to
hold the tower of cubes next to the object, with both starting at the same place, to make sure the
object is taller than the tower. Next, Partner 2 finds an object that is shorter than Partner 1’s
tower. Finally, Partner 2 finds an object that is the same height as Partner 1’s tower. Partners
switch roles and play again.

**Bonus:** Partner 1 uses all 10 connecting cubes to make two towers so that one is taller than the
other. Partner 2 then finds an object in the classroom that is taller than one of Partner 1’s
towers, but shorter than the other one. Partners switch roles and repeat.

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**Extensions**

1. Provide each student with 15 ones blocks to help them complete **BLM Heights of Rectangles**. Use standard linking ones blocks that measure 1 cm in each dimension. Students link ones blocks together to find how many fit inside each rectangle. They write the number in the blank below each rectangle. Then, in pairs, one partner chooses two of the rectangles. The other partner says which of the two is taller and which is shorter. Ask students to think about which rectangles can fit more ones blocks, the taller rectangles or the shorter ones.

**Bonus:** Explain that the tallest rectangle is the one that is taller than all of the other rectangles and the shortest rectangle is the one that is shorter than all of the others. Have students find which rectangle is the tallest and which one is the shortest.

**Answers:** A: 3, B: 8, C: 10, D: 7, E: 13, F: 9; Bonus: E is the tallest, A is the shortest

2. Students make three chains (or towers) of connecting cubes in different colors and lengths;
for example, a white chain with two cubes, an orange chain with four cubes, and a blue chain
with seven cubes. Ask students to stand up the chains like towers. Explain that the tower that is
taller than all of the other towers is called the tallest. The tower that is shorter than all of the
other towers is called the shortest. Ask students to put the towers in order, from shortest
to tallest.

**Bonus:** Repeat with four different colors and heights of towers.

3. Give each pair of students a few sheets of blank paper with a vertical line drawn down the
middle of each page. On one side of the line, Partner 1 draws a simple picture of an object (e.g.,
a tree, house, person, or flower), and on the other side of the line, Partner 2 draws a picture of a
different object that is taller than the one beside it. Partners switch roles and repeat. Students
repeat the activity by drawing objects that are shorter and then that are the same height.
4. Provide each student with 10 connecting cubes and a few blank sheets of paper. Students build a chain of five connecting cubes and draw or trace a line or a ladder that is as tall as the chain. Students repeat the activity with a different number of cubes in the chain.

5. Provide each pair of students with 10 connecting cubes. Partner 1 finds an object in the classroom that is shorter than a tower of 10 connecting cubes. Partner 2 guesses how many connecting cubes will make a tower of about the same height as the object. Partner 2 then checks by building a tower of about the same height. Partners switch roles and repeat the activity several times.

6. On the board, draw two simple trees far away from each other so that neither the bottom nor the top ends are aligned. Make the first tree the exact height of a chain of eight connecting cubes and the second tree the exact height of nine connecting cubes, but don’t reveal these measurements to students. Ask students to guess which tree is taller. Then, ask how they could check their guess. SAY: We cannot move the trees beside each other, but we can use connecting cubes to check which tree is taller. Make a chain of five connecting cubes, and place it alongside the first tree. ASK: Is the tower as tall as the tree? (no) Add two more cubes. ASK: Is the tower as tall as the tree now? (no) Repeat the question after you add one more cube. Guide students to count how many cubes you used. Write “8” below the first tree. Repeat the process for the other tree, and then write “9.” SAY: The first tree is as tall as a tower of eight cubes. The second tree is as tall as a tower of nine cubes. ASK: Which tree is taller? (the second tree) How do you know? (9 is more than 8) Repeat with several similar examples.
MDK-8 Length

Pages 204–206

Standards: K.MD.A.1, K.MD.A.2, K.G.B.4

Goals:
Students directly compare the lengths of two objects or pictures, and describe the relative lengths using the words “longer,” “shorter,” or “same length.”

Prior Knowledge Required:
Understands the concepts of more, less, and same amount for discrete objects
Understands the concepts of taller, shorter, and same height

Vocabulary: height, length, long, longer, same, same height, same length, short, shorter, tall, taller

Materials:
pencils sharpened to different lengths
drinking straws cut to different lengths
 crayons of different lengths
 objects of different lengths and shapes (e.g., marker, paintbrush)
yardstick
short eraser
8-inch piece of string
pattern blocks or BLM Squares of Different Sizes (p. R-28), BLM Rectangles of Different Sizes (p. R-29), and BLM Triangles of Different Sizes and Types (p. R-30)
connecting cubes of different colors, at least 10 per student (see Activity Centers 2, 3, Extensions 2, 4, 5, 6)
15 ones blocks per student (see Extension 1)
BLM Lengths of Rectangles (p. Q-32, see Extension 1)
blank sheets of paper (see Extensions 3, 4)
BLM Number Lines (p. R-23, see Extension 7)

Counting practice. Practice counting to 100 as a class, having students jump as they count. Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

Review height. Hold up vertically two pencils of different lengths, one in each hand, with the bottoms aligned so that the taller pencil sticks up farther than the shorter one. Ask: Which pencil is taller? Move the pencil in your left hand forward, and Ask: Is this one taller? Repeat with the pencil in your right hand. Have students signal thumbs up for yes or thumbs down for no. Ask: Which pencil is shorter? Repeat with two straws of different lengths and then a pencil and straw that are the same length, holding all objects vertically each time. Ask: Is the pencil taller than the straw? (no) Is the straw taller than the pencil? (no) Say: Remember that height is
the math word for how tall something is. The pencil is just as tall as the straw. The straw is just as tall as the pencil. So, we say the pencil and straw are the same height.

**Introduce length.** Hold a long pencil and a short crayon of the same thickness horizontally, one in each hand, so that the two objects are at the same height. ASK: When I hold the crayon and the pencil sideways like this, does one stick up higher than the other one? (no) Does this mean the crayon and the pencil are the same size? (no) Hold the pencil and the crayon with the ends aligned, as shown below:

![Image of aligned pencil and crayon](image)

SAY: When I hold the crayon and pencil like this, they start at the same place. ASK: Which one sticks out farther? (the pencil) SAY: Since the pencil sticks out farther, we say the pencil is longer than the crayon. Since the crayon doesn’t stick out as far as the pencil, we say the crayon is shorter than the pencil. Have students repeat the following sentences as a class: The pencil is longer than the crayon; the crayon is shorter than the pencil. Repeat with several pairs of objects, of which one object is longer than the other, such as a marker and a paintbrush. For some pairs, at first hold the two objects so that they are not aligned or they are in different orientations; for example, hold a paintbrush vertically and a marker horizontally. Have students guess which one they think is longer. Next, hold both objects horizontally with left ends aligned (from the students’ perspectives), and for each object, ask if the object is longer (signal thumbs up for yes or down for no) or shorter (signal thumbs up for yes or down for no) than the other one. Then, have all students say the sentences as a class—for example, the paintbrush is longer than the marker, the marker is shorter than the paintbrush.

**Long and short.** Hold up a yardstick, and ASK: Does anyone know what this is called? Give students a chance to offer answers. SAY: This is called a yardstick. Hold a pencil and the yardstick sideways so that their left ends are aligned. ASK: Which is longer, the pencil or the yardstick? (the yardstick) Repeat with more examples of crayons and pencils. ASK: Are any of these pencils or crayons longer than the yardstick? (no) Are they all shorter than the yardstick? (yes) Is the yardstick longer than all of them? (yes) SAY: Since the yardstick is longer than all of the pencils, we say the yardstick is long. Hold up a short eraser that is clearly shorter than all of the crayons and pencils. ASK: Is this eraser shorter than all of the pencils and crayons? (yes) The eraser is shorter than all of the things we are looking at. So, we can say that the eraser is short.

**(MP.3) Long and short are relative.** ASK: Which do you think is longer, the yardstick or the road in front of the school? (the road) If I hold the yardstick beside the road, does the yardstick look long or short? (short) SAY: The yardstick looks short because it is much shorter than the road. ASK: If I hold the yardstick beside the eraser, does the yardstick look long or short? (long) SAY: The yardstick looks long because it is longer than the eraser. So something, like a yardstick, looks long if it is beside something short, but a yardstick can also look short if it is beside something long.
The terms “length” and “same length.” SAY: The word length is the math word for how long something is. Hold up horizontally a crayon and a straw that are the same length, one above the other, so that the left and right ends are aligned. ASK: Is the crayon longer than the straw? (no) Is the straw longer than the crayon? (no) SAY: The crayon is just as long as the straw. The straw is just as long as the crayon. So, we say the crayon and the straw are the same length. Have students repeat the sentence as a class. Repeat with more pairs of objects that are the same length.

Comparing lengths in pictures. Draw on the board:

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ASK: Which rectangle is longer? While pointing to each one, ASK: Is this one longer? Students signal their answers. Repeat with more pairs of rectangles and then other simple pictures, such as lines, pencils, crayons, and arrows. Include some examples where the pictures are the same length.

(MP.6) Conservation of length. Cut a string to a length of 8 inches. Then, use a ruler to draw an 8-inch horizontal line on the board. With the help of a volunteer, hold the string below the line on the board so that the endpoints are aligned. ASK: Is the string the same length as the line? (yes) Bend the string, and ASK: Does the string look shorter than the line now? (yes) SAY: The string looks shorter, but it really is not shorter. I just need to straighten the string to see that the length did not change. Straighten out the string and align it with the line on the board again. ASK: Is the string still the same length as the line? (yes) Repeat once again, but this time, roll the string into a small ball.

Activities 1–2
(MP.6) 1. Longer, shorter, and same length with straws. Distribute straws cut to different lengths so that each student has one. Hold up an object, such as a crayon, and SAY: Each of you has a straw. Your straw might be shorter or longer than this crayon. Or your straw might be about the same length as this crayon. ASK: Who thinks their straw is longer than this crayon? Students raise their hands. Go around and help students check their guesses by holding the crayon and each straw next to each other, with the left ends aligned. ASK: Who thinks their straw is shorter than this crayon? Repeat the process of checking. Finally, repeat the process for students who think their straws are the same length as the crayon. Play again using a different object, such as a pencil, marker, or paintbrush of different length than the crayon.

(MP.6) 2. Longer, shorter, and same length with sides of shapes. Show students how to compare the sides of two shapes by holding the shapes together so that the sides touch, with left or right endpoints aligned. You can use pattern blocks or paper shapes cut out from BLM Squares of Different Sizes, BLM Rectangles of Different Sizes, and BLM Triangles of Different Sizes and Types. Give each pair of students a few shapes with sides of different lengths. Partner 1 chooses two shapes and a side from each shape. Partner 2 needs to hold
the two sides beside each other with left or right endpoints aligned to find which of the two sides is longer or if the two sides are the same length. Then, partners switch roles and repeat several times.

(end of activities)

Activity Centers

(MP.6) 1. Comparing Sides of Shapes
Type: Pairs
Objective: To compare the side lengths of flat shapes
Preparation: Provide each pair of students with four or five shapes with sides of different lengths, using pattern blocks or paper shapes from BLM Squares of Different Sizes, BLM Rectangles of Different Sizes, and BLM Triangles of Different Sizes and Types.
Instructions: Partner 1 chooses two shapes and a side from each shape. Partner 2 needs to hold the two sides beside each other with left or right endpoints aligned to find which of the two sides is longer or if the two sides are the same length. Then, partners switch roles and repeat several times.

NOTE: Activity Center 1 is similar to Activity 2, which was done by the whole class. Many students will benefit from extra practice with this activity.

(MP.6) 2. Lengths of Chains
Type: Small groups (two to five)
Objective: To build chains that are longer, shorter, or the same height as a given chain
Preparation: Provide each student in the group with 10 connecting cubes. If possible, give each student their own color.
Instructions: The leader builds a chain using fewer than 10 connecting cubes. The chain should rest horizontally on the table or floor, not upright. The other students build chains that are longer than the leader’s chain, then shorter than the leader’s chain, and, finally, the same length as the leader’s chain. Students repeat the activity with a different leader, until everyone in the group has had a turn to lead.
Bonus: The leader makes two chains using all of his cubes, with one longer than the other. The other students then build a chain that is longer than one of the leader’s chains but shorter than the other one. Students switch roles and repeat.

(MP.6) 3. Finding Longer and Shorter Objects Around the Classroom
Type: Pairs, active
Objective: To find objects around the classroom that are longer or shorter than a given object
Preparation: Provide each pair of students with 10 connecting cubes.
Instructions: Partner 1 builds a chain using some or all of the 10 connecting cubes. Partner 2 then finds an object in the classroom that is longer than Partner 1’s chain. Encourage students to hold the chain of cubes next to the object, with both starting at the same place, to make sure the object is longer than the chain. Next, Partner 2 finds an object that is shorter than Partner 1’s chain. Finally, Partner 2 finds an object that is the same length as Partner 1’s chain. Partners switch roles and play again.
Bonus: Partner 1 makes two chains using all 10 connecting cubes with one chain longer than the other. Partner 2 then finds an object in the classroom that is longer than one of Partner 1’s chains, but shorter than the other one. Partners switch roles and repeat.

(MP.6) 4. Comparing Lengths of Feet (or Shoes)
Type: Groups of four or five, active
Objective: To compare the lengths of students’ feet (or shoes)
Instructions: The leader chooses two other students from the group to stand with one of their feet beside the other student’s foot, with the heels aligned. Students can keep their shoes on or remove them. The remaining students determine whose foot is longer and whose foot is shorter, or if their feet are about the same length. Repeat several times with a different leader each time.

Extensions
1. Provide each student with 15 ones blocks to help them complete BLM Lengths of Rectangles. Use standard linking ones blocks that measure 1 cm in each dimension. Students link ones blocks together to find how many fit inside each rectangle. They write the number in the blank beside each rectangle. Then, in pairs, one partner chooses two of the rectangles. The other partner says which of the two is longer and which is shorter. Ask students to think about which rectangles can fit more ones blocks, the longer rectangles or the shorter ones.
Bonus: Explain that the longest rectangle is the one that is longer than all of the other rectangles and the shortest rectangle is the one that is shorter than all of the others. Have students find which rectangle is the longest and which is the shortest.
Answers: A: 4, B: 9, C: 11, D: 6, E: 14, F: 5; Bonus: E is the longest, A is the shortest

2. Students make three chains of connecting cubes in different colors and lengths; for example, a white chain with two cubes, an orange chain with four cubes, and a blue chain with seven cubes. Ask students to place the chains horizontally on the table or floor, not upright. Explain that the chain that is longer than all of the other chains is called the longest. The chain that is shorter than all of the other chains is called the shortest. Ask students to put the chains in order, from shortest to longest.
Bonus: Repeat with four different colors and lengths of chains.

3. Give each pair of students a few sheets of paper with a horizontal line drawn across the middle of each sheet. Above the line, Partner 1 draws a picture of an object (e.g., a road, pencil, crayon, or rectangle) and then below the line, Partner 2 draws a picture of another object that is longer than the one above it. Partners switch roles and repeat. Students repeat the activity by drawing pictures of objects that are shorter in length and then pictures of objects that are the same length.

4. Provide each student with 10 connecting cubes and a few blank sheets of paper. Students build a chain of five connecting cubes and draw or trace a line or a road that is as long as the chain. Students repeat the activity with a different number of cubes in the chain.

5. Provide each pair of students with 10 connecting cubes. Partner 1 finds an object in the classroom that is shorter than a chain of 10 connecting cubes. Partner 2 guesses how many
Connecting cubes will make a chain of about the same length as the object. Partner 2 then checks by building a chain of about the same length. Partners switch roles and repeat several times.

6. On the board, draw two horizontal lines far away from each other, so that neither the left nor the right endpoints are aligned. Make the first line the exact length of a chain of 11 connecting cubes and the second line the exact length of 10 connecting cubes, but don’t reveal these measurements to students. Ask students to guess which line is longer. Then, ask how they could check their guess. SAY: We cannot move the lines beside each other, but we can use connecting cubes to check which one is longer. Make a chain of six connecting cubes, and place it alongside the first line. ASK: Is the chain as long as the line? (no) Add three more cubes. ASK: Is the chain as long as the line now? (no) Repeat the question after you add two more cubes. Guide students to count how many cubes you used. Write “11” beside the line. Repeat the process for the other line, and then write “10” beside the second line. SAY: The first line is as long as a chain of 11 cubes. The second line is as long as a chain of 10 cubes. ASK: Which line is longer? (the first line) How do you know? (11 is more than 10) Repeat with several similar examples.

(MP.3, MP.8) 7. Provide students with BLM Number Lines.
a) Draw jumps on number lines to show 7 – 3, 8 – 3, 9 – 3, and 10 – 3.
b) Look at your answers to part a). How do the answers change as the starting number goes up by 1?
c) If you know 10 – 3 = 7, how can you find 11 – 3 without subtracting?
d) In pairs, have students explain their answers to part c). Do they agree with each other? Have them discuss why or why not.

Selected answers: b) the answer goes up by 1 too; c) it’s one more than 7, so it’s 8; d) 11 is 1 more than 10, so moving back 3 spaces will end up at 8 instead of at 7

NOTE: For part d), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems.
MDK-9  Weight

Pages 207–208

Standards: K.MD.A.1, K.MD.A.2

Goals:
Students compare the weights of two objects or pictures, and describe the relative weights using the words “heavier,” “lighter,” or “same weight.”

Prior Knowledge Required:
Understands the concepts of more, less, and same amount for discrete objects
Understands the words “longer” and “shorter”

Vocabulary: heavy, heavier, light, lighter, same weight, weight

Materials:
2 closed boxes of the same size, one filled with books, the other with cotton balls
objects of different sizes and weights (e.g., pencil, balloon, tennis ball, beach ball, stapler, long feather, marker)
big, heavy book and small, light book
pan balance per student pair
connecting cubes of two different colors
scrap paper (see Extension 5)

NOTE: If a pan balance is not available for the lesson or student activities, you can make one (see unit introduction, p. Q-1).

Counting practice. Practice counting to 100 as a class, having volunteers lead the count. Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

Introduce heavy and light. Show students a small closed box of books, and demonstrate lifting it with exaggerated difficulty. SAY: This box is hard to lift. ASK: What word do we use to describe things that are hard to lift? (heavy) SAY: If something is hard to lift, we say it is heavy. Ask students to guess what might be in the box that makes it so heavy. Accept several guesses. Show a same-sized closed box full of cotton balls and repeat the process, but this time, use the phrase “easy to lift” instead of “hard to lift.” SAY: If something is easy to lift, we say it is light. Tell students that one box contains books and the other box contains cotton balls. ASK: Do you think the heavy box is filled with books or cotton balls? (books) Do you think the light box is filled with books or cotton balls? (cotton balls) Have a volunteer check by opening the boxes.

NOTE: You might wish to point out that the word “light” can mean different things. For example, when you turn on a lamp, you see light, or when you are drawing, you might use markers that are dark blue or light blue.
**Heavier and lighter.** Remind students that a pencil that is “more long” than another pencil is called longer. **ASK:** What should we call a box that is “more heavy” than another box? (heavier) While pointing to the box filled with books, **SAY:** This box is harder to lift than the box with cotton balls. The box that is harder to lift is called heavier.

Repeat for two books, with one book clearly heavier than the other one. While pointing to the heavier book, **SAY:** The book that is harder to lift is heavier. While pointing to the lighter book, **SAY:** This book is easier to lift than the other book. The book that is easier to lift is called lighter.

Hold up a pencil in one hand and a book in the other one. **ASK:** Which do you think is heavier, the book (students signal thumbs up or thumbs down) or the pencil (students signal thumbs up or thumbs down)? **SAY:** We can find out by holding one in each hand. The heavier one is harder to lift. It pulls your hand down more. Demonstrate and exaggerate by holding the hand with the book noticeably lower than the hand with the pencil. Repeat this process with several pairs of objects. Have volunteers try to compare weights of objects in the same way. Start with pairs of objects of which one object looks obviously heavier than the other one, and then progress to harder examples in which the heavier object is smaller than the lighter one; for example, a balloon and a tennis ball, a beach ball and a stapler, or a feather and a marker.

**(MP.3) Heavy and light are relative.** Hold up a big, heavy book and a small, light book. The big book should look obviously heavier than the light book. **ASK:** Which of these two books would you call heavy? (the big book) Which one would you call light? (the small book) Hold up the smaller book and a pencil, and **ASK:** Now which one would you call heavy, the small book or the pencil? (the small book) **SAY:** When I hold the small book beside the big book, we call the small book light. But, when I hold the small book and the pencil, we call the small book heavy.

**Using a seesaw to introduce a balance.** **ASK:** Do you think that I am heavier or lighter than you are? (heavier) How could we check to be sure? What have you seen in a park (or in the schoolyard) that we could use to check? (a seesaw) Draw a picture of a seesaw or go outside if there is one available. Ask students which way the seesaw will go if no one pushes up from the ground and you sit on one end and a student sits on the other end. Explain that when two people sit on a seesaw and no one pushes off the ground, the side with the heavier person will go down and the side with the lighter person will go up.

**Balances.** Show students a pan balance and explain that it works like a seesaw. The heavier side goes down and the lighter side goes up. Use the balance to compare the weights of different pairs of objects. Each time, ask students which of the two objects they think will be heavier before checking by using the balance. After determining which object is heavier, have students say the two related sentences as a class (e.g., the book is heavier than the paintbrush; the paintbrush is lighter than the book).

**The words “weight” and “same weight.”** **SAY:** The word weight is the math word for how heavy something is. Place a red connecting cube on one side of the balance and a blue connecting cube on the other side. The balance should not tip to either side. **ASK:** Is the red cube heavier than the blue cube? (no) Is the blue cube heavier than the red cube? (no) **SAY:** The red cube is just as heavy as the blue cube. The blue cube is just as heavy as the
red cube. So, we say the blue cube and the red cube have the same weight. Have students repeat the sentence as a class. SAY: When the pan balance does not tip to either side, it means that neither side is heavier. So, the objects are the same weight. Repeat with more pairs of objects that are the same weight.

Activity Centers
(MP.6) 1. Comparing Weights of Objects
Type: Pairs
Objective: To compare the weights of two objects by lifting and holding one in each hand.
Preparation: Provide each pair of students with a collection of objects of different sizes and weights (e.g., book, pencil, paintbrush, balloon, tennis ball, feather, leaf, connecting cube).
Instructions: Partner 1 chooses two objects from the collection. Partner 2 guesses which object is heavier, which one is lighter, or if they have (about) the same weight. Then, each partner takes a turn lifting and holding the objects at the same time, one in each hand, to check Partner 2’s guess. Remind students that if one object is harder to lift, it is heavier. Both partners express the comparisons with full sentences using the words heavier, lighter, or the same weight. Then, partners switch roles and repeat several times.

(MP.6) 2. Comparing Weights of Objects
Variation: Instead of using their hands to compare the weights of two objects, students use a pan balance.

(MP.6) 3. Finding Heavier and Lighter Objects Around the Classroom
Type: Pairs, active
Objective: To find objects around the classroom that are heavier or lighter than a given object.
Instructions: Partner 1 chooses any object in the classroom that she can lift. Partner 2 then finds an object in the classroom that is heavier than Partner 1’s chosen object. Encourage students to try lifting both objects to make sure that Partner 2’s object is actually harder to lift. Next, Partner 2 finds an object that is lighter than Partner 1’s chosen object and, finally, an object that has about the same weight as Partner 1’s object. Partners switch roles and play again.

Extensions
(MP.6) 1. Student pairs repeat Activity Center 1, except that they need to determine which object is the heaviest and which is the lightest. Explain that the heaviest object is the one that is heavier than all of the others and the lightest object is the one that is lighter than all of the others. Both partners state their answers using the words heaviest and lightest.

(MP.6) 2. Student pairs repeat Extension 1 using a pan balance.

3. Provide each pair of students with a pan balance, a collection of objects to use on the balance, and many connecting cubes. Remind students that when the balance does not tip to either side, the objects on each side of the balance have the same weight. Students determine how many connecting cubes balance with each object in their collection. Students might record
the results by drawing a picture of each object and then writing the number of connecting cubes beside each picture.

4. Place three connecting cubes on one side of a pan balance and five connecting cubes on the other side. The balance should tip down on the side of the five connecting cubes. Guide students to count how many cubes are on each side. While pointing to the side with three cubes, ASK: How many more cubes should we add to this side so that the two sides are the same weight? (2) Demonstrate how to add two cubes so that there are five cubes on each side; the balance should not tip to either side. Have students count how many cubes are on each side. Repeat with similar examples.

(MP.8) 5. After completing Extension 4, have students work in pairs to answer the following questions.
   a) If there are 6 cubes on one side of the balance and 8 cubes on the other side, which side will be heavier?
   b) How many blocks would you add to the lighter side to make sides the same weight?
   c) How can you use the number of cubes to find out which side is heavier?
   d) How can you use the number of cubes to find out how many cubes you need to add to make the sides the same weight?

   **Answers:** a) the side with 8 cubes; b) I would add 2 blocks; c) the side with the larger number of cubes will be heavier
   **Sample answer:** d) I can count up from the smaller number (on the lighter side) to the larger number (on the heavier side); I can subtract

   Redirecting students: If students struggle with part c), encourage students to write the number of cubes on each side of the pan balance and circle the number for the side that is heavier. ASK: What do you notice about the numbers you circled in each case? (the number circled is always the bigger number)

(MP.6) 6. On scrap paper, students draw a picture of two objects, one light and one heavy. They tell a partner which object is lighter and which one is heavier.

   **Bonus:** Students exchange their pictures with a partner. Students draw a picture of an object that is lighter than the heavy object but heavier than the light object that their partner drew.

   Look for students to use full sentences and the words heavier and lighter precisely (MP.6) when they talk with their partners about the drawn objects.

7. Very advanced students can repeat Extension 3, except they determine indirectly which of two objects is heavier. You might demonstrate with a pair of objects. Explain that you want to find out which object is heavier. Use connecting cubes to balance each object and then explain that the heavier object is the one that needed more connecting cubes to balance. Have Partner 1 choose two objects, such as an eraser and a marker. Partner 2 finds how many connecting cubes balance with each object. Both partners then decide which object is heavier.
MDK-10  Many Ways to Be Bigger or Smaller

Pages 209–211

Standards: K.MD.A.1, K.MD.A.2, K.G.B.4

Goals:
Students describe several measurable attributes (capacity, height, length, weight) of a single object.
Students compare objects using two or more measurable attributes.

Prior Knowledge Required:
Can compare the capacities of two containers using the words “more,” “less,” or “same amount”
Can compare the heights of two objects using the words “taller,” “shorter,” or “same height”
Can compare the lengths of two objects using the words “longer,” “shorter,” or “same length”
Can compare the weights of two objects using the words “heavier,” “lighter,” or “same weight”

Vocabulary: heavier, height, length, lighter, longer, same height, shorter, taller, weight

Materials:
2 containers of different heights and capacities (e.g., tall bottle with small capacity, shorter pot with large capacity)
water
2 objects of different lengths and weights (e.g., long, light feather, shorter, heavier marker)
objects of different heights, lengths, and weights (see Activity Centers 1, 3, Extensions 2, 4, 5)
bag of uncooked rice, a cup, and a tray to catch spills (see Activity Center 2, Extensions 3, 5)
containers of different heights and capacities (e.g., drinking cup, measuring cup, plastic bottle, small jug) (see Activity Center 2, Extensions 3, 5)
20 ones blocks per student (see Extension 1)
BLM Bigger and Smaller Rectangles (p. Q-33, see Extensions 1, 6)

Counting practice. Practice counting to 100 as a class, having students march as they count. Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

(MP.6) Height and length. Draw on the board:
For the following questions, point to each house in turn and have students signal thumbs up or down. Trace your finger vertically along the height of each house. ASK: Which house goes higher up? (the one on the right) So, which house is taller? (the one on the right) Trace your finger along the length of each house. ASK: Which house stretches farther from side to side? (the one on the left) So, which house is longer? (the one on the left) Emphasize that the first house is longer because it stretches farther from side to side and the second house is taller because it stretches farther up and down.

(MP.3) While pointing to the house on the left, SAY: Ross says this house is bigger. Nina says this house (point to the one on the right) is bigger. ASK: Who is correct, Ross or Nina? SAY: Both Ross and Nina are correct, in a way. One house is longer and the other is taller.

Repeat the exercise with more examples of two pictures in which one is taller and the other is longer; for example, a long train and a tall, narrow building, a long fence and a tall tree, and two rectangles, with one longer and the other one taller.

(MP.6) Capacity and height. Show students two containers of different heights and capacities. Choose containers so that the shorter container holds more; for example, a tall, thin bottle and a short, wide pot. Place the containers on a table. ASK: Which one is taller? (the bottle) Which one is shorter? (the pot) Ask students which container they think holds more. After taking students’ guesses, fill the bottle with water. ASK: How can we check which one holds more? (pour the water from the bottle into the pot) Pour the contents of the bottle into the pot. SAY: I poured the water from the bottle into the pot. I still have lots of space for more water in the pot. Ensure students can see this. ASK: So, which holds more, the bottle or the pot? (the pot)

(MP.3) SAY: Emma says the bottle is bigger. Peter says the pot is bigger. ASK: Who is correct, Emma or Peter? SAY: Both Emma and Peter are correct in a way. The bottle is taller and the pot can hold more. ASK: Which one is shorter, the bottle or the pot? (the pot) Which one holds less? (the bottle)

(MP.6) Length and weight. Repeat the above exercise, but this time compare length and weight of, for example, a long, light feather and a shorter, heavier marker. Hold the objects with the left endpoints aligned to compare the lengths, and then hold the objects, one in each hand, to compare the weights. Show the marker pulling down that hand more. Then, have volunteers check the weights of the two objects. Have students describe the feather as longer and lighter and the marker as shorter and heavier.

Activity Centers

(MP.6) 1. Height and Length
Type: Small groups
Objective: To compare the height and length of two objects
Preparation: Provide each group of students with a collection of objects of different heights and lengths (e.g., book, empty tissue box, glue stick, empty pencil case).
Instructions: Student 1 chooses two objects from the collection. All students guess which of the two objects is taller and which one is longer. Note that some objects will be both taller and
longer than the other objects. Then, students take turns placing the objects side by side to compare the heights and one above the other to compare the lengths. Remind students that the objects have to start at the same place. Students say which object is taller and which one is longer. Students switch roles and repeat several times.

(MP.6) 2. Height and Capacity
Type: Small groups
Objective: To compare the height and capacity of two containers
Preparation: Provide each group of students with a bag of uncooked rice, a cup for pouring rice, a tray to catch any spills, and a collection of containers of different capacities and heights (e.g., drinking cup, measuring cup, plastic bottle, small jug).
Instructions: Student 1 chooses two containers from the collection. All students guess which of the two is taller and which one holds more. Note that some containers will be both taller and hold more than the other containers. Next, students take turns placing the containers side by side on a table to compare the heights. Students say which container is taller and which one is shorter. Then, Student 2 uses rice to fill one of the two containers. Remind students to keep the containers on the tray while pouring rice. Student 3 pours rice from the filled container into the empty container until either the source container is empty or the target container is full. If rice does spill onto the tray, students can scoop up the rice and put it where it belongs. Students determine which container holds more and which one holds less. Students switch roles and repeat several times.

(MP.6) 3. Length and Weight
Type: Small groups
Objective: To compare the length and weight of two objects
Preparation: Provide each group of students with a collection of objects of different lengths and weights (e.g., pencil, marker, paintbrush, balloon, sheet of paper, tennis ball, beach ball, feather, tree leaf, connecting cube).
Instructions: Student 1 chooses two objects from the collection. All students guess which of the two is longer and which one is heavier. Note that some objects will be both longer and heavier than the other objects. Next, students take turns placing the objects one above the other to compare the lengths. Remind students that the objects have to start at the same place. They say which object is longer and which one is shorter. Then, students take turns holding the two objects, one in each hand, to determine which one is heavier. They say which object is heavier and which one is lighter. Students switch roles and repeat several times.

(MP.6) 4. Height and Hair Length
Type: Small groups, active
Objective: To compare the height and hair length of two students
Instructions: Student 1 chooses two other students in the group. The two students stand back to back, and the remaining group members determine who is taller, who is shorter, or if the students are about the same height. Then, group members check which of those two students have longer hair. Students switch roles and repeat several times.
Extensions

(MP.6) 1. Provide each student with 20 ones blocks to help them complete BLM Bigger and Smaller Rectangles. Use standard linking ones blocks that measure 1 cm in each dimension. Students link ones blocks together to find how many fit inside each rectangle. For two of the rectangles, they will need more than one chain of ones blocks. They write the number in the blank near each rectangle. Working in pairs, one partner chooses two of the rectangles. The other partner says which of the two rectangles is longer and which of the two is taller.

Answers: A: 10, B: 20, C: 12, D: 12

2. Students repeat Activity Center 1, except they find the object that is the tallest and the one that is the longest. Explain that the tallest object is the one that is taller than all of the others, and the longest object is the one that is longer than all of the others. Similarly, students can then repeat Activity Centers 2 and 3, except they find the container that is tallest and the one that holds the most, or the object that is the longest and the one that is the heaviest.

(MP.6) 3. In pairs, students compare three or four measurable attributes of two objects. For example, provide a tall, light paper cup and a short, heavy measuring cup, and have students compare the height, weight, and capacity of the two containers. As another example, provide a long, narrow, light open box and a taller, heavier bottle, such as a thermos, and have students compare the height, length, weight, and capacity of the two objects. For comparing capacity, provide a bag of uncooked rice, a cup for pouring rice, and a tray to catch any spills. Students can hold the objects beside each other to compare height, one object above the other to compare length, and one object in each hand to compare weight. Finally, students use rice, as done during Activity Center 2, to compare capacity. Each time students use precise language to compare the objects in as many ways as they can.

(MP.3, MP.6) 4. Students can refer to their work in Extension 1 to answer the questions that follow. Before they do, explain that the biggest rectangle is the one that can fit more ones blocks than all of the other rectangles. The smallest rectangle is the one that fits fewer ones blocks than all of the other rectangles.

a) Ed says C is the biggest rectangle. Do you agree with Ed? Explain why or why not.
b) Jen says that rectangle C is bigger than rectangle D, but rectangles C and D are the same size too. Can you help Jen explain what she means?
c) In pairs, have students explain their answers to a) and b). Do they agree with each other? Have them discuss why or why not.

Sample answers: a) I do not agree with Ed. C is the tallest rectangle, but B is the biggest rectangle because B fits the most ones blocks; b) Jen means that rectangle C is taller than D, but rectangles C and D can fit the same number of ones blocks.

Redirecting students: If students struggle, have them consider the following questions: Which rectangle is the biggest? (B) Which rectangle is the smallest? (A) Is the biggest rectangle also the tallest one? Explain. (no, B is the biggest and C is taller than B) Is the biggest rectangle also the longest one? Explain. (no, B is the biggest and A is longer than B) Which two rectangles look different but fit the same number of ones blocks? (C and D)

Encourage partners to ask questions to understand and challenge each other’s thinking (MP.3) and use of math words (MP.6)—see p. A-33 for sample sentence and question stems to guide students.
MDK-11  More Combining Shapes

Pages 212–214

Standards: K.MD.A.2, K.G.B.6

Goals:
Students compare side lengths of shapes.
Students combine simple shapes with matching side lengths to create larger shapes.
Students consider side length to fill in simple puzzles using several shapes.
Students intuitively consider angle size to fill in simple puzzles using several shapes.

Prior Knowledge Required:
Is familiar with pattern block shapes (square, triangle, hexagon, trapezoid, rhombus)
Can compare the lengths of two objects
Understands the words “above,” “below,” and “beside”

Vocabulary: corner, length, longer, pattern blocks, rectangle, same length, shorter, side, square, triangle

Materials:
BLM Large Pattern Blocks (pp. Q-34–36)
pattern blocks or BLM Pattern Blocks (p. R-31), at least 4 of each shape per student
colored pencils, crayons, or markers
 glue (optional)
scrap paper (see Extension 1)
BLM Squares of Different Sizes (p. R-28, see Extension 4)
BLM Rectangles of Different Sizes (p. R-29, see Extension 4)
BLM Pattern Block Person (p. Q-37, see Extension 6)

Counting practice. Practice counting to 100 as a class by playing I Start, You Finish (see introduction to Unit 1, p. C-1) for the numbers from 50 to 100, and then from 1 to 100. Ask various addition questions within 5. Have students signal the answers by holding up the correct number of fingers.

NOTE: Students are exposed to hexagons, trapezoids, and rhombuses when they use pattern blocks. However, you need not require students to fully learn these words. Instead of using the names of the shapes, you may decide to use the colors of the pattern blocks to identify the shapes. You may wish to exclude the smaller, tan rhombus altogether. Moreover, for demonstrations, you may wish to use large versions of the pattern blocks, such as paper pattern blocks in the standard colors cut out from BLM Large Pattern Blocks, so that students can easily see the shapes.

Review pattern blocks. Hold up a set of pattern blocks, one of each shape, and ASK: What are these shapes called? (pattern blocks) SAY: These are pattern blocks. While holding up each
shape in turn, ask students what the shape is called. Begin with the square and the triangle. You may need to help students recall the names of the trapezoid, hexagon, and rhombus.

**Compare side lengths.** Hold up a large pattern block triangle, and tap one of the corners. ASK: Is this part of the triangle called a corner or a side? (a corner) Repeat with the other corners. Then, run your finger along a side and ASK: Is this a corner or a side? (a side) Repeat with the other two sides. Repeat for a large pattern block square.

Affix the large pattern block triangle and square to the board. ASK: Which do you think is longer, this side of the triangle (point to one of the sides of the triangle) or this side of the square (point to one of the sides of the square)? After giving students a chance to make guesses, ASK: How can we check to see which side is longer? SAY: We can check by putting the two sides beside each other. The sides need to start at the same place. Demonstrate by aligning one side of the triangle with one side of the square. ASK: Does one of the sides stick out farther or are they the same length? (same length) Repeat using the same side of the triangle, but compare it to the other sides of the square. Then, compare one side of the square to the four sides of the trapezoid pattern block. Students should see that the long side of the trapezoid is longer than the chosen side of the square, but the other sides of the trapezoid are the same length as the square. Before each comparison, have students guess which side they think is longer and shorter (or if the sides are the same length).

**Review combining pattern blocks.** SAY: Let’s put shapes beside each other to make a larger shape. Affix a large paper hexagon (cut out from BLM Large Pattern Blocks) to the board. SAY: This is a hexagon. Let’s put another shape beside the hexagon. Hold up a large square pattern block and affix it beside the hexagon. Repeat with another hexagon to make the shape shown below:

![Hexagon and Square](image)

Trace your finger around the external edges of the composite shape. SAY: When you put pattern blocks together, it makes a new shape. It might look like an animal or a spaceship or something else, or it might just look like an interesting shape or pattern.

Repeat with a few more examples.

**MP.6 Filling in puzzles.** Use thick lines to trace a composite shape formed by two large pattern blocks affixed to the board. Be sure to draw the internal line (in other words, the edge where the two shapes touch) after removing the paper pattern blocks from the board, as shown below:

![Composite Shape](image)

ASK: How many shapes did I use to make the bigger shape? (2) While pointing to one of the outlines, ASK: What shape fits here? After students have identified the correct shape, position
the shape incorrectly, so that it doesn’t fit perfectly in the outline. ASK: Does the shape fit like this? (no) Position the shape incorrectly once more before placing the shape perfectly inside the outline. Remind students that the shape needs to fit perfectly inside the outline, so that the outline is completely covered and no part of the shape sticks outside of the outline. Repeat with the other shape. Then, repeat with other combinations of pattern blocks, gradually increasing the challenge by increasing the number of pattern blocks used in the design. Each time, show the internal lines.

**(MP.7) Considering side length and angle size when filling in puzzles.** Continue to use thick lines to trace the outlines of composite shapes formed by large pattern blocks taped to the board, but do not show the internal lines. Start with simple shapes using only two pattern blocks, and then progress to shapes involving more pattern blocks.

As you solve the puzzles together as a class, guide students to consider the length of the sides of the pattern blocks, as well as how “pointy” the corners are (in other words, an early notion of angle size). For example, for the puzzle below, after placing a hexagon in the middle, try to place a trapezoid in the bottom section of the puzzle, where the larger blue rhombus belongs.

![Puzzle](image)

ASK: Does the trapezoid fit here like this? (no) Why not? (it sticks out; it’s too long) Try rotating the trapezoid several times, and repeat the questions. Point out that the long side of the trapezoid is too long. After placing the blue rhombus correctly in its spot, try placing a blue rhombus in the top section of the puzzle, where the square belongs. ASK: Does the blue rhombus fit here? (no) While pointing to the narrow corners of the rhombus, SAY: These corners are too pointy, so they do not match the corners on the puzzle. Rotate the rhombus and ASK: Does the blue rhombus fit here? (no) While pointing to the wide corners of the rhombus, SAY: These other corners are not as pointy as the corners on the puzzle. ASK: What shape do you think will fit here? (the square) Do the corners on the square match the corners on this part of the puzzle? (yes) Repeat with similar composite shapes.

**Activities 1–2**

**NOTE:** For the activities, provide each student with at least four of each type of pattern block or colored paper shapes cut out from **BLM Pattern Blocks**.

**(MP.6) 1. Exploring with pattern blocks.** Students make shapes and designs by putting together two or more pattern blocks. In pairs, students tell each other about the shapes they used and their designs.
2. **Identifying shapes in a puzzle.** Provide students with colored pencils, crayons, or markers. Using AP Book K.2, Unit 14, p. 212, have students find shapes in **Questions 1–2**. Students first color the triangles green, then they color the hexagons yellow, and finally students color the trapezoids red.

*(end of activities)*

**Preparing for the AP pages.** Provide students with at least four of each type of pattern block to help them complete AP Book K.2, Unit 14, pp. 212–214. Some students may find **Question 5**, which has multiple solutions, to be challenging, since the internal lines are not shown.

**NOTE:** You may want a record of students’ work on pattern blocks in the AP Book (or BLM) pages. If so, after students have completed the puzzles, assign one of the following tasks:
- Remove the pattern blocks one by one. Then, use the same colors as the pattern blocks to color inside the outlines (i.e., yellow for hexagons, green for triangles, and so on). Note that students will have done this for **Questions 1–2** of the AP Book as part of Activity 2.
- Provide students with glue and paper pattern blocks cut out from BLM Pattern Blocks. Students paste paper pattern blocks in the correct positions on the shapes of the AP Book (or BLM) pages.

**Extensions**

**(MP.7)** 1. Students construct their own outline puzzle using at least one of each type of shape. To do so, students make a design with pattern blocks on scrap paper and then trace around their design. They remove the pattern blocks from the paper to reveal the outline puzzle. Student pairs then exchange puzzles and solve each other’s puzzle by placing pattern blocks correctly to cover the outline. Remind students to consider how long the sides are and how pointy the corners are in the puzzles.

**Bonus:** After the partners solve each other’s puzzles, students find a different way to complete their own puzzle using a different combination of pattern blocks.

2. Students count the number of triangles used in **Questions 1–4** on AP Book K.2, Unit 14, pp. 212–213. They repeat for the squares, hexagons, trapezoids, and rhombuses.

**Bonus:** Students count how many hexagons they used for **Question 5** on p. 214. Then, they try covering the shape using a different number of hexagons.

**Answers:** Triangles: 1. 1, 2. 3, 3. 1, 4. 0; squares: 1. 0, 2. 0, 3. 2, 4. 1; hexagons: 1. 1, 2. 1, 3. 1, 4. 1; trapezoids: 1. 1, 2. 4, 3. 0, 4. 2; rhombuses: 1. 0, 2. 0, 3. 4, 4. 3; **Bonus:** Answers may vary.

**(MP.7)** 3. Provide each pair of students with pattern blocks—at least four of each type, but more would be better. Partner 1 makes a design using two pattern blocks with sides fully touching. Using a different combination of pattern blocks, Partner 2 places pattern blocks on top of these two pattern blocks to cover the bottom design perfectly. Then, partners switch roles.

**Bonus:** Partners try to find how many different ways they can cover each other’s designs.

4. Provide students with two identical paper squares and two identical paper rectangles (that are not squares). You can use **BLM Squares of Different Sizes** and **BLM Rectangles of Different Sizes**. Students check that all sides of a square are the same length in the following way: they
choose one side from the first square and compare it, in turn, to each of the sides of the second, identical square. If all of the sides of the second square are the same length as the chosen side of the first square, it means that all of the sides of the second square are the same length as each other. Students then follow a similar process to find out that the rectangle does not have all sides of the same length; it has shorter sides and longer sides. Have students repeat with more pairs of identical squares and identical rectangles of different sizes.

(MP.7) 5. Provide each student with a set of pattern blocks—at least two hexagons, four trapezoids, six larger (blue) rhombuses, and six triangles. Students cover a hexagon using only trapezoids. ASK: How many do you need? (2) Repeat covering the hexagon using larger rhombuses (3), and then triangles (6). Repeat the activity by providing one pattern block or two connected pattern blocks for students to cover with different combinations of pattern blocks.

(MP.7) 6. Very advanced students can complete BLM Pattern Block Person by making the shape with pattern blocks. After they solve the puzzle, you might challenge them to use a different combination of blocks to solve it.

(MP.3, MP.8) 7. a) Partner A: Draw circles and cross some out to show 7 − 5. Then change your picture just enough to show 8 − 5. Use a different color to show the change. Partner B: Draw circles and cross some out to show 8 − 4. Then change your picture just enough to show 9 − 4. Use a different color to show the change. Partners A and B: Talk about what you did that is the same as each other.
b) Use 9 − 3 = 6 to find 10 − 3.
c) In pairs, explain your answers to part b). Do you agree with each other? Discuss why or why not.

Sample answers:
a) we both just had to add a circle; we didn’t have to cross any more out
b) 9 − 3 is 6, so 10 − 3 is 7
c) I added 1 because the total is one more and the same number are crossed out, so there’s one more that’s not crossed out for 10 − 3

NOTE: In part e), encourage partners to ask questions to understand and challenge each other’s thinking (MP.3)—see p. A-33 for sample sentence and question stems.
Heights of Rectangles

☐ How many **ones blocks** fit inside?
☐ Write the number on the line.
Lengths of Rectangles

☐ How many **ones blocks** fit inside?
☐ Write the number on the line.

A

B

C

D

E

F
Bigger and Smaller Rectangles

☐ How many **ones blocks** fit inside?
☐ Write the number on the line.

A

B

C

D
Large Pattern Blocks (I)
Large Pattern Blocks (2)
Large Pattern Blocks (3)
Pattern Block Person

☐ Use pattern blocks to cover the shape.
# Hundreds Chart

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Number Cards 0 to 5

2

5

\[\begin{array}{c}
- \\
4
\end{array}\]

0

3
Number Cards 6 to 10

8
7
6
9
10
Number Cards 11 to 15

13
12
11
14
15
Number Cards 16 to 20

18
17
20
16
19
11
17
20
6
9
19
6
Animal Cards (I)
Animal Cards (2)

- Zebra
- Giraffe
- Polar Bear
- Fish
- Cow
- Horse
- Beaver
- Rabbit
- Snake
I Have _____, Who Has _____?
Addition Story Blanks

___ + ___ = ___

___ + ___ = ___

___ + ___ = ___
Game Cards
Pets (I)
Pets (2)
Making 5

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______

5 = _______ + _______
Making a Number

\[
\begin{array}{c}
\quad \quad = \quad \quad + \\
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\quad \quad = \quad \quad +
\end{array}
\]
Dominoes (I)
Dominoes (2)
Dominoes (3)
Addition

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Additions within 5 (I)

\[
\begin{array}{cc}
1 + 1 & 1 + 2 \\
1 + 3 & 1 + 4 \\
2 + 1 & 2 + 2 \\
2 + 3 & 3 + 1 \\
3 + 2 & 4 + 1 \\
\end{array}
\]
Additions within 5 (2)

<p>| | |</p>
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<td>0 + 4</td>
<td>0 + 5</td>
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</tbody>
</table>
Adding Three Numbers (I)

1. \[ 1 + 2 + 2 = \]
2. \[ 2 + 1 + 3 = \]
3. \[ 2 + 2 + 2 = \]
4. \[ 3 + 4 + 1 = \]
5. \[ 2 + 3 + 2 = \]
6. \[ 3 + 3 + 3 = \]
7. \[ 2 + 3 + 4 = \]
8. \[ 1 + 2 + 5 = \]
Adding Three Numbers (2)

9. \(1 + 2 + 0 = \)  
10. \(2 + 3 + 0 = \)  

11. \(2 + 2 + 0 = \)  
12. \(0 + 4 + 3 = \)  

13. \(0 + 1 + 4 = \)  
14. \(0 + 3 + 3 = \)  

15. \(2 + 0 + 3 = \)  
16. \(1 + 0 + 5 = \)
Number Lines

0 1 2 3 4 5 6 7 8 9 10

0 1 2 3 4 5 6 7 8 9 10

0 1 2 3 4 5 6 7 8 9 10

0 1 2 3 4 5 6 7 8 9 10
Ten-Frames
Additions within 10 (I)

6 + 1  
6 + 2  
6 + 3  
6 + 4  
7 + 1  
7 + 2  
7 + 3  
8 + 1  
8 + 2  
9 + 1  
5 + 3  
2 + 5
Additions within 10 (2)

1 + 6
1 + 7
3 + 6
3 + 7
2 + 6
2 + 7
4 + 6
4 + 7

1 + 8
2 + 8
3 + 8
4 + 5
5 + 5
6 + 5
Circles of Different Sizes
Squares of Different Sizes
Rectangles of Different Sizes
Triangles of Different Sizes and Types
Pattern Blocks

---

[Drawings of various geometric shapes: triangles, squares, parallelograms, and hexagons]
Number Charts to 20

<table>
<thead>
<tr>
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# Number Charts to 50

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<td>46</td>
<td>47</td>
<td>48</td>
<td>49</td>
<td>50</td>
</tr>
</tbody>
</table>
Spinner

☐ Use a pencil and a paper clip.
☐ Hold the paper clip with the pencil tip in the center.
☐ Spin the paper clip.
Hop on the Bunny Trail

20  19  18  17  16

11  12  13  14  15

10  9   8   7   6

1   2   3   4   5
Foods

- Banana
- Apple
- Pear
- Tomato
- Pepper
- Cucumber
- Peach
- Cheese
- Bread
Making Subtraction Stories

_________   ___________   =   _________

_________   ___________   =   _________

_________   ___________   =   _________
Circles and Squares
Subtractions within 5 (I)

\[
\begin{align*}
5 - 1 & \quad 5 - 2 \\
5 - 3 & \quad 5 - 4 \\
4 - 3 & \quad 4 - 2 \\
4 - 1 & \quad 3 - 2 \\
3 - 1 & \quad 2 - 1
\end{align*}
\]
Subtractions within 5 (2)

5 - 5

5 - 0

4 - 4

4 - 0

3 - 3

3 - 0

2 - 2

2 - 0

1 - 1

1 - 0
Subtractions within 10 (I)

6 - 1
6 - 2
6 - 3
6 - 4
6 - 5
7 - 1
7 - 2
7 - 3
7 - 4
7 - 5
## Subtractions within 10 (2)

<table>
<thead>
<tr>
<th>7 - 6</th>
<th>8 - 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 - 2</td>
<td>8 - 3</td>
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<td>8 - 5</td>
</tr>
<tr>
<td>8 - 6</td>
<td>8 - 7</td>
</tr>
<tr>
<td>9 - 1</td>
<td>9 - 2</td>
</tr>
</tbody>
</table>
Subtractions within 10 (3)

\[
\begin{align*}
9 - 3 & \quad 9 - 4 \\
9 - 5 & \quad 9 - 6 \\
9 - 7 & \quad 9 - 8 \\
10 - 1 & \quad 10 - 2 \\
10 - 3 & \quad 10 - 4 \\
\end{align*}
\]
Subtractions within 10 (4)

10 - 5
10 - 6
10 - 7
10 - 8
10 - 9
10 - 10
10 - 0
9 - 9
8 - 0
6 - 6
1 cm Grid Paper
# Unit 10: Number and Operations in Base Ten

**Assessment Checklist**

AC: Activity Center  
AP: Assessment & Practice Book  
✓ Check when student has demonstrated associated skill.

## The Numbers 11 to 20

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Represents a number of objects with a written numeral.</td>
<td>11, 12, 13</td>
<td>NBTK-2: AC 3</td>
</tr>
<tr>
<td></td>
<td>14, 15, 16</td>
<td>NBTK-5: AC 3</td>
</tr>
<tr>
<td></td>
<td>17, 18, 19</td>
<td>NBTK-8: AC 3</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>NBTK-11: AC 3</td>
</tr>
<tr>
<td>Counts up to 20 objects in an organized display.</td>
<td>11, 12, 13</td>
<td>NBTK-2: AC 2</td>
</tr>
<tr>
<td></td>
<td>14, 15, 16</td>
<td>NBTK-5: AC 2</td>
</tr>
<tr>
<td></td>
<td>17, 18, 19</td>
<td>NBTK-8: AC 2</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>NBTK-11: AC 2</td>
</tr>
<tr>
<td>Counts out up to 20 objects from a larger set.</td>
<td>11, 12, 13</td>
<td>NBTK-2: AC 5 or 6</td>
</tr>
<tr>
<td></td>
<td>14, 15, 16</td>
<td>NBTK-5: AC 5 or 6</td>
</tr>
<tr>
<td></td>
<td>17, 18, 19</td>
<td>NBTK-8: AC 5 or 6</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>NBTK-11: AC 5 or 6</td>
</tr>
</tbody>
</table>

Summative: NBTK-11: AC 1 or AP p. 121

Notes:
### Unit 10: Number and Operations in Base Ten

**Assessment Checklist**

**Ten Ones and Some More Ones**

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understands teen numbers as ten ones and some more ones.</td>
<td>11, 12, 13 NBTK-3: AP p. 96</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>14, 15, 16 NBTK-6: AP p. 106</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17, 18, 19 NBTK-9: AP p.116</td>
<td></td>
</tr>
<tr>
<td>Understands teen numbers as ten plus a number less than ten.</td>
<td>11, 12, 13 NBTK-4: AC 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14, 15, 16 NBTK-7: AC 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17, 18, 19 NBTK-10: AC 3</td>
<td></td>
</tr>
</tbody>
</table>

**Summative:** NBTK-11: AC 3

**Notes:**
# Unit 11: Operations and Algebraic Thinking

**Assessment Checklist**

AC: Activity Center  
AP: Assessment & Practice Book  
✓ Check when student has demonstrated associated skill.

## Subtraction within 5

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Represents “Take From with Result Unknown”</td>
<td>OAK-28: Activity or AC 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>subtractions within 5.</td>
<td>OAK-29: Activity or AP p. 141</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OAK-32: AC 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summative: OAK-31: Activity or AP pp. 145–147

**Notes:**
### Unit 11: Operations and Algebraic Thinking

**Assessment Checklist**

#### Composing 5

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composes 5 as pairs of smaller numbers using pictures and equations.</td>
<td>OAK-33: AC 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summative:** n/a

**Notes:**
### Unit 12: Operations and Algebraic Thinking

**Assessment Checklist**

AC: Activity Center  
AP: Assessment & Practice Book  
✓ Check when student has demonstrated associated skill.

#### Subtraction within 10

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Represents “Take From with Result Unknown” subtractions within 10.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With objects</td>
<td>OAK-37: Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With pictures</td>
<td>OAK-38: Activity or AC 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With equations</td>
<td>OAK-40: AP pp. 170–172</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summative: OAK-39: Activity or AC 2

Notes:
### Composing 10

<table>
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<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composes 10 from pairs of smaller numbers using objects, pictures, and equations.</td>
<td>OAK-41: Activity or AC 3</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

**Summative:** n/a

**Notes:**
# Unit 13: Operations and Algebraic Thinking

**Assessment Checklist**

**AC**: Activity Center  
**AP**: Assessment & Practice Book  
✓Check when student has demonstrated associated skill.

## Fluent Arithmetic within 5

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>✔️</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adds within 5 with accuracy and sometimes without manipulatives.</td>
<td>OAK-44: AC 1</td>
<td></td>
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</tbody>
</table>

| Subtracts within 5 with accuracy.                                      | OAK-46: AC 1 |               |    |

**Summative**: OAK-47: AP pp. 194–196

**Notes:**
### Unit 13: Operations and Algebraic Thinking

#### Assessment Checklist

**Adding to 5**

<table>
<thead>
<tr>
<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes numbers 6 to 10 as 5 and some extra ones.</td>
<td>OAK-48: AC 2</td>
<td></td>
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</table>

Summative: n/a

Notes:
# Unit 14: Measurement and Data

**Assessment Checklist**

AC: Activity Center  
AP: Assessment & Practice Book  
✓ Check when student has demonstrated associated skill.

## Measuring

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<th>Look For</th>
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<th>Date Assessed</th>
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</thead>
<tbody>
<tr>
<td>Compares two or more objects to determine which is smaller and which is larger.</td>
<td>Capacity MDK-6: AC 1</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Height MDK-7: AC 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length MDK-8: AC 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight MDK-9: AC 2</td>
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</tbody>
</table>

| Uses appropriate comparative vocabulary. | More, less MDK-6: AC 1 | |
| | Shorter, taller MDK-7: AC 1 | |
| | Shorter, longer MDK-8: AC 2 | |
| | Lighter, heavier MDK-9: AC 3 | |

**Summative:** MDK-10: AC 2 or 3

**Notes:**
## Unit 14: Measurement and Data

### Assessment Checklist

#### Combining Shapes

<table>
<thead>
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<th>Look For</th>
<th>In Lesson</th>
<th>Date Assessed</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Uses lengths of sides to help in solving shape puzzles.</td>
<td>MDK-11: AP p. 214</td>
<td></td>
<td>✓</td>
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</table>

**Summative:** n/a

**Notes:**
## Kindergarten Common Core State Standards Curriculum Correlations

### Domain

- **CC** Counting and Cardinality
- **OA** Operations and Algebraic Thinking
- **NBT** Number and Operations in Base Ten
- **MD** Measurement and Data
- **G** Geometry

### Cluster

#### K.CC  Counting and Cardinality

**K.CC.A** Know number names and the count sequence.

<table>
<thead>
<tr>
<th>K.CC.A.1 Count to 100 by ones and by tens.</th>
<th>JUMP Math Kindergarten Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part</strong></td>
<td><strong>Unit</strong></td>
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<td>1</td>
<td>2</td>
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<tr>
<td>1</td>
<td>3</td>
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<td>1</td>
<td>4</td>
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<td>1</td>
<td>5</td>
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<td>6</td>
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<td>7</td>
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<td>8</td>
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<td>9</td>
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<td>11</td>
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<td>12</td>
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<td>2</td>
<td>13</td>
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</tbody>
</table>
K.CC.A.2  Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>CCK-15</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>GK-1</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>CCK-25</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>CCK-36</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>MDK-1</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>OAK-2</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>OAK-13, 14</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-15</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>NBTK-1 to 11</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>OAK-34</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>OAK-42</td>
</tr>
</tbody>
</table>

K.CC.A.3  Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>CCK-2, 3, 5, 7 to 14</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>CCK-20, 22 to 24</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>GK-1</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>CCK-25 to 35</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>CCK-36, 38, 39</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>MDK-1</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>OAK-3, 4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>OAK-13, 15, 16, 17 to 19</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-15</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>NBTK-1 to 12</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>OAK-34</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>OAK-42</td>
</tr>
</tbody>
</table>

K.CC.  Counting and Cardinality

K.CC.B  Count to tell the number of objects.

K.CC.B.4  Understand the relationship between numbers and quantities; connect counting to cardinality.

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>CCK-17 to 22</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>CCK-27, 30, 33, 35</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>CCK-37 to 41</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>NBTK-2 to 12</td>
</tr>
<tr>
<td>K.CC.B.4a</td>
<td>When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.</td>
<td>Part</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

| K.CC.B.4b | Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. | Part | Unit | Lessons |
| --- | --- | --- | --- | --- | --- |
| | | 1 | 1 | CCK-5, 8, 11, 14 |
| | | 1 | 4 | CCK-26, 29, 32 |

| K.CC.B.4c | Understand that each successive number name refers to a quantity that is one larger. | Part | Unit | Lessons |
| --- | --- | --- | --- | --- | --- |
| | | 1 | 2 | CCK-24 |
| | | 1 | 5 | CCK-40, 41 |

| K.CC.B.5 | Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects. | Part | Unit | Lessons |
| --- | --- | --- | --- | --- | --- |
| | | 1 | 1 | CCK-5, 6, 8, 11, 14 |
| | | 1 | 3 | GK-2 to 4, 6 to 12, 14 |
| | | 1 | 4 | CCK-26, 27, 29, 30, 32, 33 |
| | | 1 | 6 | MDK-2 to 5 |
| | | 2 | 9 | GK-16, 17, 19 |
| | | 2 | 10 | NBTK-2 to 12 |

### K.CC Counting and Cardinality

**K.CC.C Compare numbers.**

| K.CC.C.6 | Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. | Part | Unit | Lessons |
| --- | --- | --- | --- | --- | --- |
| | | 1 | 2 | CCK-16 to 22, 24 |
| | | 1 | 5 | CCK-37 to 41 |
| | | 1 | 6 | MDK-2 to 4 |

| K.CC.C.7 | Compare two numbers between 1 and 10 presented as written numerals. | Part | Unit | Lessons |
| --- | --- | --- | --- | --- | --- |
| | | 1 | 2 | CCK-20, 22, 24 |
| | | 1 | 5 | CCK-38 to 41 |
| | | 1 | 6 | MDK-2 to 4 |
### K.OA Operations and Algebraic Thinking

<table>
<thead>
<tr>
<th>K.OA.A</th>
<th>Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.</th>
<th>JUMP Math Kindergarten Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>K.OA.A.1</td>
<td>Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.</td>
<td><strong>Part</strong> Unit   Lessons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    7   OAK-3 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    8   OAK-15 to 23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    11  OAK-26 to 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    12  OAK-35 to 40</td>
</tr>
<tr>
<td>K.OA.A.2</td>
<td>Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.</td>
<td><strong>Part</strong> Unit   Lessons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    7   OAK-4 to 11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    8   OAK-16 to 22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    11  OAK-26 to 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    12  OAK-36 to 40</td>
</tr>
<tr>
<td>K.OA.A.3</td>
<td>Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).</td>
<td><strong>Part</strong> Unit   Lessons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    7   OAK-9, 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    8   OAK-20, 21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    11  OAK-33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    12  OAK-41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    13  OAK-47, 48</td>
</tr>
<tr>
<td>K.OA.A.4</td>
<td>For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.</td>
<td><strong>Part</strong> Unit   Lessons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    8   OAK-20, 24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    12  OAK-41</td>
</tr>
<tr>
<td>K.OA.A.5</td>
<td>Fluently add and subtract within 5.</td>
<td><strong>Part</strong> Unit   Lessons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    7   OAK-9, 11, 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    11  OAK-31, 33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2    13  OAK-43 to 47</td>
</tr>
</tbody>
</table>
### K.NBT  Number and Operations in Base Ten

<table>
<thead>
<tr>
<th>K.NBT.A</th>
<th>Work with numbers 11–19 to gain foundations for place value.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K.NBT.A.1</strong></td>
<td>Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as (18 = 10 + 8)); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10</td>
<td>NBTK-2 to 12</td>
</tr>
</tbody>
</table>

### K.MD  Measurement and Data

<table>
<thead>
<tr>
<th>K.MD.A</th>
<th>Describe and compare measurable attributes.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K.MD.A.1</strong></td>
<td>Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>14</td>
<td>MDK-6 to 10</td>
</tr>
</tbody>
</table>

| K.MD.A.2 | Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter. |

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>14</td>
<td>MDK-6 to 11</td>
</tr>
</tbody>
</table>

### K.MD  Measurement and Data

<table>
<thead>
<tr>
<th>K.MD.B</th>
<th>Classify objects and count the number of objects in each category.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>K.MD.B.3</strong></td>
<td>Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>MDK-2 to 5</td>
</tr>
</tbody>
</table>
## K.G  **Geometry**

### K.G.A  Identify and describe shapes.

**K.G.A.1** Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind, and next to.*

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>GK-2 to 4, 7, 8, 11 to 14</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-16 to 20</td>
</tr>
</tbody>
</table>

**K.G.A.2** Correctly name shapes regardless of their orientations or overall size.

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>GK-2 to 4, 7 to 9, 14</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-16 to 18</td>
</tr>
</tbody>
</table>

**K.G.A.3** Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>9</td>
<td>GK-16 to 18</td>
</tr>
</tbody>
</table>

### K.G.B  Analyze, compare, create, and compose shapes.

**K.G.B.4** Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>GK-5, 6, 9, 10, 14</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>GK-5</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-18</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>MDK-8, 10</td>
</tr>
</tbody>
</table>

**K.G.B.5** Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>GK-5, 6, 9, 12</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-21</td>
</tr>
</tbody>
</table>

**K.G.B.6** Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

<table>
<thead>
<tr>
<th>Part</th>
<th>Unit</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>GK-14</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>GK-21</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>MDK-11</td>
</tr>
</tbody>
</table>