Topic B

Decompositions of 6, 7, and 8 into Number Pairs

K.OA.3, K.OA.1, K.OA.4

Focus Standard: K.OA.3

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).

Instructional Days: 6

Coherence -Links from: GPK–M5

Numerals to 5, Addition and Subtraction Stories, Counting to 20

Topic B carries forward the work of Topic A, building students’ skill with number pairs for 6, 7, and 8, which is cultivated and maintained throughout Topics B and C during Fluency Practice. In the first three lessons of this topic, students decompose 6, 7, and 8. These decompositions are modeled as put together situations and represented as addition expressions (C = ___ + ___), as opposed to the take from decomposition type (C – B = ___), which will be taught in Topic D.

Lessons 7–9 provide intensive work with decomposing 6, 7, and 8 into number pairs. Students identify all of the pairs using story situations, objects, sets, arrays, and numerals.

In Lessons 10 and 11, students use linking cube sticks to again model the decompositions of 6, 7, and 8 in order to explore the patterns that emerge (pictured below). Throughout, they work with different configurations of the number bond model to support flexible thinking moving from part to whole and whole to part, composition to decomposition.
Lesson 12 explores the important 5 + n pattern in 5-groups for 6, 7, and 8 (pictured below). Understanding and usage of the 5-group is foundational for students moving from Level 1 (counting all) to Level 2 (counting on) addition and subtraction strategies.

By the end of this topic, students should have a solid understanding of the relationships between numbers 1–8 and be ready for more formal work with addition and subtraction. Due to the length of this module, there is the option to take a day and a half to administer Topics A and B of the mid-module assessment at the end of Lesson 12. This will identify students who may need more support and allow more time to re-assess these students throughout the module.

### A Teaching Sequence Towards Mastery of Decompositions of 6, 7, and 8 into Number Pairs

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Lesson 7

Objective: Model decompositions of 6 using a story situation, objects, and number bonds.

Suggested Lesson Structure

- Fluency Practice (14 minutes)
- Application Problem (3 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)
- Total Time (50 minutes)

Fluency Practice (14 minutes)

- Number Bond Flash K.OA.5 (5 minutes)
- 5-Group on the Dot Path K.CC.2 (4 minutes)
- Make 6 Matching Game K.OA.1 (5 minutes)

Number Bond Flash (5 minutes)

Materials: (T) Magnetic shapes or dry erase markers (S) Personal white boards

Note: This is a maintenance activity to support fluent understanding of the relationships between numbers to 5 through number bonds.

T: (Show 3 red squares and 1 yellow square.) How many squares do I have?
S: 4 squares.
T: How many are yellow?
S: 1.
T: How many are red?
S: 3.
T: 1 and 3 are the parts. 4 is the whole. Draw a number bond to tell about my squares. Lift up your board when you are done.
S: (Write number bonds using drawings or numerals. Lift board to signal completion.)
T: Nice job.

Repeat with 2 + 2, 4 + 1, 2 + 3. As students show mastery, stop naming the parts and whole before they draw.
Lesson 7

5-Group on the Dot Path (4 minutes)

Materials: (S) Dot path placed inside a personal white board

Note: This activity helps students gain flexibility in grouping 5 and starting to count on from 5 pictorially. This will help students think about 6 as 5 and 1 more in preparation for the day's lesson.

T: Touch and count the dots on your dot path.
S: 1, 2, 3, ...10.
T: What do you notice about the dot path?
S: There are 10 dots. → There are two different colors of dots. → The color changes after 5.
T: Yes. I'm going to ask you to circle a group of dots. Use the color change after 5 to count and circle them as fast as you can. Ready? Circle 5.
S: (Circle a group of 5 dots.)
T: How did you do that so fast?
S: I just circled all the light ones, and I knew it was 5.
S: (Circle a group of 6 dots.)
T: How did you count 6?
S: I counted all of the dots until I got to 6. → I counted 1 more than 5.

If students are starting to count on, let them share their thinking with the class. Continue the process with numbers to 10. Deviate from a predictable pattern as students show mastery.

Make 6 Matching Game (5 minutes)

Materials: (S) Picture cards 0–6 (1 picture of each quantity) per pair (use Fluency Template B and the cards from GK–M4–Lesson 1)

Note: Reviewing the hidden partners of 6 will help students recall familiar relationships between numbers 1–6, preparing them to depict those relationships using the number bond model.

1. Shuffle and place the cards face up from 0 to 6 in one equal row.
2. Partner A chooses 2 cards that make 6.
3. If the total of the numbers on both cards is 6, then she collects both cards. If not, then Partner A puts them back in their place.
4. Repeat for Partner B

Have early finishers repeat the game, but this time put the cards in order from 0 to 6 to see if they notice that they can take the cards from either end, 0 and 6, 1 and 5, etc.
Lesson 7

Application Problem (3 minutes)

Materials: (T) Bell or other gentle noisemaker or instrument

Close your eyes and count each time that I clap. (Clap 5 times; pause, and then clap 1 more time.) Open your eyes. How many claps did you hear? (Allow time for students to answer.) Let’s do it 1 more time. (Repeat.) How many claps did you hear? What is 1 more than 5?

Repeat this exercise several times, using claps and instrument sound parts of 4 and 2, 3 and 3, 2 and 4, and 1 and 5.

Now, try the game with your partner! Take turns clapping different number partners for 6.

Note: This exercise will help the students to focus on the decomposition of 6 in preparation for today’s lesson.

Concept Development (25 minutes)

Materials: (S) Linking cube 5-stick, loose cubes, personal white boards

Put the loose cubes in between students so that there are enough for each student to choose 1 additional cube.

Draw a blank number bond on the board in any configuration.

T: I’m going to tell you a story. Show me the story with your cubes as I go.

T: A squirrel collected 6 nuts for the fall. With your cubes, show me a linking cube stick as long as her 6 nuts. Begin with your 5-stick.

T: She buried 4 nuts in the ground and stored the other 2 nuts in a tree. Break your stick and hold up the piece that shows me how many nuts were in the ground. How many?

S: (Hold up a 4-stick.) 4!

T: Hold up the stick that shows how many nuts were stored in the tree.

S: (Hold up a 2-stick.) 2!

T: Yes! She took her 6 nuts and made sets of 4 and 2. Let’s show what the squirrel did in this number bond. (Guide students to help you place the numbers representing the whole and the parts in the number bond.) Our number bond shows us that 6 is the same as...

S: 4 and 2!

T: (Write 6 = 4 + 2.) 6 is 4 and 2.
Lesson 7: Model decompositions of 6 using a story situation, objects, and number bonds.

Lesson Objective: Model decompositions of 6 using a story situation, objects, and number bonds.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.
You may choose to use any combination of the questions below to lead the discussion.

- Share with a partner how you sorted the birds. Did your partner do it differently than you?
- Look with a partner at the numbers you put in both of your number bonds. Which numbers are the same? Why? Which numbers are different? Why?
- When I told my story, how did you know which number to put in which circle in the first number bond?
- How did it change when you split up the squirrel’s nuts in different ways?
- Did the total number of nuts ever change?
- What are some of the ways you found to make 6?
Look at the birds. Make 2 different number bonds. Tell a friend about the numbers you put in one of the bonds.

Color some squares green and the rest yellow. Write numbers in the bonds to match the colors of your squares.
Look at the presents. Make 2 different number bonds. Tell an adult about the numbers you put in the number bonds.

On the back of your paper, draw 6 presents and sort them into 2 groups. Make a number bond and fill it in according to your sort.
Lesson 7: Model decompositions of 6 using a story situation, objects, and number bonds.

Date: 11/12/13
Lesson 7: Model decompositions of 6 using a story situation, objects, and number bonds.

Date: 11/12/13

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Lesson 7: Model decompositions of 6 using a story situation, objects, and number bonds.

Date: 11/12/13

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Lesson 8

Objective: Model decompositions of 7 using a story situation, sets, and number bonds.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (5 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)
- Total Time (50 minutes)

Fluency Practice (12 minutes)

- Say Ten Push-Ups K.NBT.1 (3 minutes)
- Snap K.OA.3 (5 minutes)
- Comparing Towers K.MD.2 (4 minutes)

Say Ten Push-Ups (3 minutes)

Note: This activity reviews students’ understanding of numbers to 10 for the work of this module and extends to teen numbers in anticipation of Module 5.

Conduct activity as outlined in GK–M4–Lesson 2, continuing to 20.

Snap (5 minutes)

Materials: (S) 5-stick of linking cubes per student

Note: This fast-paced game will serve as a very concrete review of the composition and decomposition of numbers to 5. It also supports the part-whole thinking needed in the upcoming lesson.

1. Partner A shows Partner B her 5-stick, and then puts it behind her back.
2. When Partner B says, “Snap!” Partner A quickly breaks her stick into two parts.
3. Partner A shows Partner B one part.
4. Partner B tries to guess the hidden part.
5. Partner A shows the hidden part and checks Partner B’s guess.

Partners take turns, continuing with the 5-stick. If time permits, students can also play with a 4-stick, 3-stick, etc.
Comparing Towers  (4 minutes)

Materials:  (S) Die and 14 linking cubes per pair

Note: This fluency activity again relates length with number. It also encourages students to explore how many fewer cubes are needed to make the towers the same length and number. The focus is on decompositions of 7 to prepare for the Concept Development.

Continue play like in GK–M4–Lesson 4, except that one partner starts with a 7-stick. The other partner rolls a die and creates a tower using the number shown on the die. Students compare towers and make a less than or more than statement. Then the students take cubes from the 7-stick so it is the same height as the shorter tower.

Application Problem  (5 minutes)

Materials:  (S) Small ball of clay

Ming had 5 raisins. Represent her raisins with the clay. Dan had 2 raisins. Represent his raisins, too. How many raisins are there in all?

- Put Ming’s raisins into a 5-group. Now, put Dan’s raisins in a row underneath Ming’s raisins like this. Do you still have 7 raisins?
- Hide the bottom two raisins. How many raisins do you see now?
- Talk about the raisins with your friend.
- (If time allows, include the following.) Draw a number bond to represent Ming and Dan’s raisins.

Note: Representing 7 as 5 and 2 will serve as the anticipatory set for today’s lesson.

Concept Development  (25 minutes)

Materials:  (S) Personal white boards, 1 bucket of shapes with multiple variations of squares, triangles, hexagons and circles per table (construction paper cutouts can be used, if desired)

T: Find 4 shapes with three straight sides and three corners and put them in front of you. You have a set of 4...
S: Triangles!
T: Now find 3 shapes with no corners and put them in front of you. You have a set of 3...
S: Circles!
T: Push both of your sets together. How many shapes are in front of you?
S: 7.
T: You have 7 shapes. Let’s count them together to be sure.
S: 1, 2, 3, 4, 5, 6, 7.
T: Sort your shapes into two sets again. (Draw number bond template on the board.) Let's make a number bond about what you just did. Point to where I should put the number that tells the total number of shapes. As you point, loudly say “whole!”
S: (Students point and speak. You might playfully point to the wrong one so they can correct you.)
T: Point to where I should write the numbers that tell how many triangles and squares. As you point, whisper “two parts!”
S: (Students point and speak.)
T: Write the number bond on your personal board.
T: Great job! You took your 7 shapes and sorted them into 3 circles and 4 triangles. You made two parts! Read with me while I write the number sentence: 7 = 3 + 4.
S: 7 is the same as 3 and 4.
T: Put your shapes back in the bucket. Now find 1 shape with six sides and put it in front of you. What do you see?
S: A hexagon!
T: Find 6 shapes with four straight sides and put them in front of you. What do you see?
S: I see 6 squares.
T: Make a set of all of your shapes. How many do you have all together? Let’s count.
S: 1, 2, 3, 4, 5, 6, 7.
T: You have 7 shapes. Sort them into two groups again. How many are in each of your new groups?
S: There are 6 squares and 1 hexagon.
T: Let’s make a new number bond for our new sets. (Draw a new number bond in a different configuration.) Where should I put the 7? Where should I put the number of squares and the number of hexagons? (Allow students to guide you in creating the new number bond.) Draw your new number bond on your white board.
T: We can’t forget our number sentence—say it with me. (Write 7 = 6 + 1.)
S: 7 is the same as 6 and 1.

T: Put your attribute blocks back. I wonder if there are any other ways to make a 7?

S: You can use 4 squares and 3 triangles. You could use 2 circles and 5 hexagons.

T: Great ideas. Let’s make your sets and then make the number bonds and sentences to go with them. I’m going to give you some time to work on this with your partner. Take turns finding different sets of shapes to make 7. Each time that you do, write the new number bond on your white board.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes.

Student Debrief (8 minutes)

Lesson Objective: Model decompositions of 7 using a story situation, sets, and number bonds.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- What are some of the ways you found to make a 7? Let’s put them in a list!
- How did you find all of those different ways? How did you know that you had found a way to make 7?
- In the Problem Set, what does the number 5 represent? How about the number 2? And the number 7?
- Did the story you and your partner told match the amount you put in each circle of the number bond?
- Why do we have to color all the cubes in the stick in the Problem Set?
Lesson 8:
Model decompositions of 7 using a story situation, sets, and number bonds.

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In each stick, color some cubes orange and the rest purple. Fill out the number bond to match. Tell a story about one of your number bonds to a friend.

Draw a 7-stick and use 2 colors to make 7. Make a number bond and fill it in.
Lesson 8: Model decompositions of 7 using a story situation, sets, and number bonds.

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Draw a set of 4 circles and 3 triangles. How many shapes do you have?

Fill in the number sentence and number bond.

\[
\begin{array}{c}
\square \quad \square \quad \square \\
\text{is} \quad \text{and} \quad \square
\end{array}
\]

Color the cubes to match the number bond.

Color some cubes red and the rest blue. Fill out the number bond to match.

On the back of your paper, draw a set of 7 squares and circles. Make a number bond and fill it in. Now write number sentence like the sentence above that tells about your set.
Lesson 9

Objective: Model decompositions of 8 using a story situation, arrays, and number bonds.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (5 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)
- Total Time (50 minutes)

Fluency Practice (12 minutes)

- Making 8 with Squares and Beans K.OA.3 (6 minutes)
- Hidden Numbers K.OA.3 (6 minutes)

Making 8 with Squares and Beans (6 minutes)

Materials: (S) 8 beans, 2 paper or foam squares per student

Note: This fluency activity extends students’ familiarity with squares and the number 4 and applies it to the number 8. This activity also anticipates the use of arrays in the day’s lesson.

T: Let’s put one bean on each corner of our squares. Count each bean as you put it down.
S: 1, 2, 3, 4, 5, 6, 7, 8.
T: How many beans did you count?
S: 8 beans!
T: Let’s count the corners of the squares. As you count each corner, move the bean a little off the corner so you can remember which ones you already counted.
S: 1, 2, 3, 4, 5, 6, 7, 8.
T: Our job is to make 8. Move 7 beans on the corners of your squares. Leave the other one where it is. Count how many beans are on your corners. Wait for the signal to tell me. (Allow time to count, then signal.)
S: 7.
T: How many beans are not on a corner?
S: 1.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Some advanced students may not need to count the corners again. They may know that there are 8 corners because they matched 1 bean to each corner. If this happens, ask the students to explain how they knew there were 8 corners without counting.
Continue with all of the number combinations, including 8 and 0.

**Hidden Numbers (6 minutes)**

Materials: (S) Fluency template from GK–M4–Lesson 2 inserted into personal white boards

Note: Finding embedded numbers continues the work of this module by developing part–whole thinking.

T: Touch and count the fish on your mat. Raise your hand when you know how many. (Wait for all hands to go up, and then give the signal.) Ready?

S: 10.

T: Put X’s on 2 of the fish. Pretend they swam away!

S: (Cross out 2 fish.)

T: Circle a group of 7 from the fish who didn’t swim away.

T: How many fish are left?

S: 1.

T: Let’s circle that 1. How many did you circle all together?

S: 8.

Repeat the process. This time, have 2 fish swim away again but circle 5 fish, then another 3 fish, and ask how many are circled. Repeat with other combinations equal to 8 as time allows. Pause occasionally to allow students to explain efficient ways of locating the groups.

**Application Problem (5 minutes)**

Materials: (S) Two linking cube 5-sticks, 1 each of 2 colors

Take one of your 5-sticks. Add 1 more cube. How many cubes are in your stick now? (6.) Add 1 more cube. How many are in your stick now? (7.) Add another cube. Now how many cubes are in your stick? (8.) Take your 8-stick apart. Work with your partner to make two rows of cubes out of your stick. Make sure you have the same number of cubes in each row. How many cubes are in each row? (4.) Yes, you took your 8 and made 2 rows of 4!

Now take your cubes and make a tiny row of 2. Make another tiny row of 2 underneath. Keep going until all of your cubes are used up. How many cubes are in each row? (2) How many tiny rows do you have? (4). You made your 8 into 4 rows of 2! You made your 8 into 2 columns. Talk to your partner about the ways you made your 8 look.

Note: Reviewing the array formations of 8 from GK–Module 1 will serve as an anticipatory set for the decomposition work with 8 in today’s lesson.
Lesson 9:
Model decompositions of 8 using a story situation, arrays, and number bonds.

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Concept Development (25 minutes)

Materials: (S) Personal white boards

T: Draw a row of 8 crackers on your personal board. (Demonstrate.) Let’s pretend you want to share them between two friends. How many crackers should we give your first friend?

S: (Example.) Let’s give her 3!

T: O.K., we will give her 3. Let’s draw a line after the first three crackers to show the ones she will get. Draw the line on your white board like this. (Demonstrate.)

T: I’m going to put an empty number bond on the board. Who can help me fill in the numbers that would tell about your drawing?

S: There are 8 crackers, so put that in the whole. ➔ There are 3 for one friend and 5 for the other friend. ➔ Put 3 and 5 in the parts.

T: You took your 8 crackers and divided them into groups of 3 and 5. Help me with the number sentence: (write) 8 = 3 + 5.

S: 8 is the same as 3 and 5.

T: Could we share your crackers another way?

S: (Example) I want to give them all away except 1 for me!

T: Draw another row of 8 crackers and draw a line in the row to show that idea. (Demonstrate.) Let’s make another number bond to show that story. (Guide students to assist in the creation of the new number bond.) This time you took your 8 crackers and made groups of 7 and 1. Let’s write the number sentence: (write) 8 = 7 + 1.

S: 8 is the same as 7 and 1!

T: Does anyone have other ideas? Work with your partner to make other number bonds equal to eight.

Encourage students to draw and experiment with several different partners for 8, always following up with a number bond and a number sentence. Make sure that the number bonds are shown in a variety of configurations.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:
If you have below grade level students who are still confused about where to place the whole and the parts of decomposed numbers, have them practice the activity introduced in Lesson 1 of this module where students begin in a hoop representing the whole and have to walk along the path to arrive at different hoops representing the parts. Continue practicing until students understand the relationship represented between the whole and the parts in the number bond.

MP.2
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes.

Student Debrief (8 minutes)

Lesson Objective: Model decompositions of 8 using a story situation, arrays, and number bonds.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Look at the dots on the second page of the Problem Set. Compare with your neighbor where you drew your line to make two parts. Are they the same or different?
- Look at the dots again. Why do you think some are white and some are gray?
- How did the Application Problem connect to today’s lesson?
- In our lesson, how did you decide which ways to divide the crackers?
- Did you notice any patterns?
- What are some of the partners you found to make 8?
Name ___________________________ Date ________________

Fill in the number bond to match the picture.

Draw some more dots to make 8 dots in all and finish the number bond.

Draw 8 dots, some blue the rest red. Fill in the number bond.

Blue Dots  Red Dots
Draw a line to make 2 groups of dots. Fill in the number bond.
Complete the number bond to match the dot picture.

Draw a line to make 2 groups of dots. Fill in the number bond.

On the back of your paper:
- Draw a number bond for 4. Fill in the number bond.
- Draw a number bond for 5. Fill in the number bond.
- Draw a number bond for 6. Fill in the number bond.
- Draw a number bond for 7. Fill in the number bond.
Lesson 10

Objective: Model decompositions of 6–8 using linking cube sticks to see patterns.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (5 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)
- Total Time (50 minutes)

Fluency Practice (12 minutes)

- Sprint: Make 6 K.OA.5 (12 minutes)

Sprint: Make 6 (12 minutes)

Materials: (S) 2 copies of the Make 6 Sprint per student

Note: This Sprint focuses on composing 6 in anticipation of the Content Development.

T: It’s time for a Sprint! (Briefly recall previous Sprint preparation activities, and distribute Sprints facedown.) Take out your pencil and one crayon, any color. For this Sprint, you are going to circle the number that will make 6. (Demonstrate the first problem as needed.)

Continue to follow the Sprint procedure as outlined in GK–M4–Lesson 3. Have students work on the Sprint for a second time (they will soon work on two different Sprints on a single day). Continue to emphasize that the goal is simply to do better than the first time and celebrate improvement.

Application Problem (5 minutes)

Materials: (S) 6-stick of linking cubes per pair of students, personal whiteboards

Time for a game of Snap! Hold your 6-stick behind your back. When your partner says, “Snap!” break your 6-stick into two parts. Show your friend one of the parts and see if she can guess the other part. If she can’t guess, show her the missing piece. On your white board, draw the number bond about your game. Then

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Encourage students, especially your English language learners, to use the math vocabulary you have taught them by extending the game, asking them to tell their partner, e.g., “8 is 7 and 1,” after they have guessed the missing part at every turn.
it will be your turn. Try it again with a 7-stick and then a 8-stick!

Note: The Application Problem today will serve as a review for today’s lesson.

**Concept Development (25 minutes)**

Materials: (S) Linking cube 5-stick and 5 loose linking cubes of another color

T: Add one cube to the end of your 5-stick. How many cubes are in your stick now?
S: 6.
T: Take off 1 cube and put it on the table. Tell me what the partners are right now.
S: 5 and 1.
T: (Write $6 = 5 + 1$.) Say the number sentence with me. Rather than saying “is the same as” let’s say “equals.”
S: 6 equals 5 and 1.
T: Take off another cube and add it to the cube on the table to make a 2-stick. What are the partners now?
S: 4 and 2.
T: (Write $6 = 4 + 2$ underneath the first equation.) Say it with me.
S: 6 equals 4 and 2!

Continue with the exercise until the students are left holding only one cube.

S: 6 equals 1 and 5!

T: Did anyone notice any patterns?
S: The 6 is always the same. $\rightarrow$ The number in the middle is getting one smaller each time. $\rightarrow$ The number on the end gets one bigger every time.

T: You are right! There is a pattern. Let’s put our 6-stick back together and then add one more cube. How many are in our stick now?
S: 7.
T: Play the same game with your partner but with 7 cubes! Move a cube from one stick to the other so that one stick has 1 less, and the other has 1 more. Each time use your words, 7 equals 6 and 1, for example.

Repeat the process with 8 cubes, too. Students who need it might be in a small group with you to support them in the use of the language and the systematic movement of 1 cube.
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes.

Student Debrief (8 minutes)

Lesson Objective: Model decompositions of 6–8 using linking cube sticks to see patterns.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- In the Problem Set, when you were counting the pineapples and the oranges, were there any sets that you could count faster than the others? Why or why not?
- What was the difference when you were filling in the parts of the number bonds for the fruit and the faces? (Parts are divided for you with the fruit. There is a 1 more pattern with the fruit.)
- What patterns did you notice when we were working with your 6-stick?
- What did you notice about the patterns with the 7- and 8-sticks? Were the patterns similar?
- If we were to play the game with a 5-stick, do you think the pattern would still be similar?
Lesson 10: Model decompositions of 6–8 using linking cube sticks to see patterns.

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Date: 11/12/13

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Lesson 10 Problem Set

Fill in the number bond to match.

Name ________________________________  Date ____________

Lesson 10: Model decompositions of 6–8 using linking cube sticks to see patterns.

NYS COMMON CORE MATHEMATICS CURRICULUM

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Color some of the faces orange and the rest blue. Fill in the number bond.

\[
\begin{array}{c}
\square \quad \square \\
\end{array}
\]

\[6 = \square \quad \square\]

Color some of the faces orange and the rest blue. Fill in the number bond.

\[
\begin{array}{c}
\square \quad \square \\
\end{array}
\]

\[\square = \square \quad \square\]

Color some of the faces orange and the rest blue. Fill in the number bond.

\[
\begin{array}{c}
\square \quad \square \\
\end{array}
\]

\[\square = \square \quad \square\]
Color 7 cubes green and 1 blue. Fill in the number bond.

equals  and

Color 6 cubes green and 2 blue. Fill in the number bond.

equals  and

Color some cubes green and the rest blue. Fill in the number bond.

equals  and
Color 4 cubes green and 4 blue. Fill in the number bond.

[Diagram of 8 cubes with 4 green and 4 blue]

☐ equals ☐ and ☐

Color 3 cubes green and 5 blue. Fill in the number bond.

[Diagram of 8 cubes with 3 green and 5 blue]

☐ equals ☐ and ☐

Color some cubes green and the rest blue. Fill in the number bond.

[Diagram of 8 cubes with unspecified number of green and blue]
Lesson 11

Objective: Represent decompositions for 6–8 using horizontal and vertical number bonds.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (5 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)

Total Time (50 minutes)

Fluency Practice (12 minutes)

- Take Apart Groups of Circles K.OA.1 (4 minutes)
- Finger Number Pairs K.OA.3 (3 minutes)
- Make 7 Matching Game K.OA.1 (5 minutes)

Take Apart Groups of Circles (4 minutes)

Materials: (S) Personal white boards

Note: This activity anticipates the day’s work with decomposition.

T: Draw three circles on your board. (Wait for students to do this.) Put X’s on two of them. How many circles have X’s?
S: 2.
T: How many circles do not have an X?
S: 1.
T: How many circles are on your board?
S: 3.
T: Raise your hand when you can say the number sentence starting with 2 (wait for all students to raise hands, and then signal). Ready?
S: 2 plus 1 equals 3.
T: Very good. Let’s go a little faster now. Erase. Draw 4 circles on your board. (Wait for students to do this.) Put X’s on 3 of them. (Wait.) How many do not have an X?
S: 1.
Lesson 11: Represent decompositions for 6–8 using horizontal and vertical number bonds.

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NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:
Scaffold the Application Problem for students with disabilities and below grade level students who are having difficulty using the number bond by providing them with a number bond that has one of the parts (5 or 3) already filled out.

T: Raise your hand when you can say the number sentence starting with 3. (Wait for all students to raise hands and then signal.) Ready?
S: 3 plus 1 equals 4.

Continue working through problems with totals of 1–5. The following is a suggested sequence: 4 + 1, 2 + 2, 3 + 2, 2 + 3, 1 + 1, 1 + 2, 1 + 3, and 1 + 4.

Finger Number Pairs (3 minutes)

Note: This activity gives students an opportunity to decompose numbers in more than one way, anticipating the work of the lesson. It also serves as an active practice for the Make 7 Matching Game.

T: You've gotten very good at showing fingers the Math way. I want to challenge you to think of other ways to show numbers on your fingers. Hint... you can use two hands! First I'll ask you to show me fingers the Math way. Then, I'll ask you to show me the number another way. Ready? Show me 5!
S: (Hold up all the fingers of the left hand.)
T: Now show me another way to make 5, using two hands.
S: (Show 3 fingers on one hand and 2 on the other. ➔ Show 1 finger on one hand and 4 on the other.)
T: How we can be sure that we're still showing 5?
S: Count the fingers on both hands.

Continue the process with 6–8. For numbers where more than one combination is possible, have students try each other’s combinations.

Make 7 Matching Game (5 minutes)

Materials: (S) Picture cards 0–7 (1 picture of each quantity) per pair

Note: Students will find the hidden partners of 7 in support of the day’s work with composition and decomposition.

Conduct activity as outlined in GK–M4–Lesson 7, but now have students find partners of 7.

Application Problem (5 minutes)

Materials: (S) Personal white boards

Nesim had 5 toy cars. Draw Nesim’s cars.

Awate had 3 toy cars. Draw a picture to show his cars, too. How many cars did they have together? Can you show the number bond to go with the story? Talk with your partner about your work.

Note: Composition of the number 8 will serve as an anticipatory set for this lesson.
Concept Development (25 minutes)

Materials: (S) Linking cube 5-stick, 5 additional loose linking cubes (all of one color or with color change at 5), number bond template inserted into personal white board

T: Starting with your 5-stick, make an 8-stick with your linking cubes. How many more cubes did you add?
S: 3!
T: When I say, “Snap!” break your 8-stick into two smaller sticks. Snap! What numbers did you find hiding inside the 8?
S: I have a 2 and a 6!
T: Great! You found a 2 and a 6 inside your 8! How would I show that in a number bond? (Allow students to guide you in creating the number bond on the board.) Make this number bond on your white board, too. (Allow students time to create the number bond.) Did anyone do it a different way?
S: I found a 5 and a 3. → I have a 1 and a 7! (Allow students to share other partners for 8, modeling it in the number bond format each time.
T: Put your stick back together. You have 8 cubes. Please take one off and put it aside. How many cubes are in your stick now?
S: There are 7.
T: Let’s play the game again... but first, please erase your white boards and turn them upside down. Could we still make a number bond this way?
S: Yes! It doesn’t matter which way it faces.
T: All right... snap! What partners to make 7 did you find?
S: I have a 2 and a 5.
T: Let’s write this in a number bond, too. (Guide students to help you create a number bond in a different orientation. After they copy it onto their personal boards, ask for other partners for 7.)

Ask students to repeat the activity with a partner using a cube stick of 6. Students who need support might be in a small group with you for assistance in using the language or identifying multiple decompositions of 6.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes.
Student Debrief (8 minutes)

Lesson Objective: Represent decompositions for 6–8 using horizontal and vertical number bonds.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Look at the stick with 6 cubes in the Problem Set. Share with a partner where you drew a line to break the stick. Do you have the same parts?
- When you broke apart your 8-stick, did your number bond have the same numbers as everyone else? Why?
- When you turned the number bond, what did you notice?
- Does the number bond change when it faces different directions?
- With your partner, talk about how many different ways you could break the 6-stick. The 7-stick. The 8-stick.
Lesson 11: Represent decompositions for 6–8 using horizontal and vertical number bonds.

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Name ___________________________ Date _____________

Draw a line to break the stick into 2 parts. Complete the number bond and number sentence.

6

6 is __________ and __________

7

7 is __________ and __________

On the back of your paper, draw a cube stick with some red cubes and some blue cubes. Draw a number bond to match.
Color 5 cubes green and 1 blue. Fill in the number bond.

6 is □ and □

Color 5 cubes green and 2 blue. Fill in the number bond.

□ is □ and □

Color 4 cubes green and 3 blue. Fill in the number bond.

□ is □ and □
Color 4 cubes green and 4 blue. Fill in the number bond.

\[ \square \square \square \square \square \square \square \square \]

\[ \square \quad \text{is} \quad \square \quad \text{and} \quad \square \]

Color 3 cubes green and 5 blue. Fill in the number bond.

\[ \square \square \square \square \square \square \square \square \]

\[ \square \quad \text{is} \quad \square \quad \text{and} \quad \square \]

Color 2 cubes green and 6 blue. Fill in the number bond.

\[ \square \square \square \square \square \square \square \square \]

\[ \square \quad \text{is} \quad \square \quad \text{and} \quad \square \]
Lesson 12

Objective: Use the 5-groups to represent the 5 + n pattern to 8.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (5 minutes)
- Concept Development (25 minutes)
- Student Debrief (8 minutes)

Total Time (50 minutes)

Fluency Practice (12 minutes)

- Draw More to Make 5 K.OA.3 (5 minutes)
- 5-Group Hands K.CC.2 (3 minutes)
- 5-Group on the Dot Path K.CC.2 (4 minutes)

Draw More to Make 5 (5 minutes)

Materials: (S) Fluency Problem Set

Note: This activity focuses students on the number 5 in order to prepare students to explore the 5 + n pattern.

After giving clear instructions and completing the first few problems together, allow students time to work independently. Encourage them to do as many problems as they can within a given timeframe. Go over the answers and direct students to energetically shout, “Yes!” for each correct answer.

5-Group Hands (3 minutes)

Materials: (T) Large 5-group cards (5–10)

Note: This activity helps to solidify students’ understanding of numbers to 10 in relationship to the five, an important understanding as students deepen their work with 6–10.

T: (Show the 6 dot card.) Raise your hand when you know how many dots are on top. (Wait until all hands are raised, then signal.) Ready?
S: 5.
T: Bottom?
S: 1.

A student demonstrates 7 as 5 on top and 2 on the bottom.
T: We can show this 5-group on our hands. 5 on top, 1 on the bottom, like this. (Demonstrate on hands, one above the other.)  
S: (Show 5 and 1 on hands, one above the other.)  
T: Push your hands out as you count on from 5, like this. 5 (extend the top hand forward), 6 (extend the bottom hand forward). Try it with me.

S: 5 (extend the top hand forward), 6 (extend the bottom hand forward).

Continue to 10, steadily decreasing guidance, until students can show the 5-groups on their hands with ease. 
Variation: Complete this activity without using the 5-group cards as support.

5-Group on the Dot Path (4 minutes)

Materials: (S) Dot path placed inside of personal white board

Note: This activity helps students gain flexibility in grouping 5 and understanding the 5 + n pattern for numbers 6–10.

Conduct activity as outline in GK–M4–Lesson 7.

Application Problem (5 minutes)

Materials: (S) Personal white boards

5 bees were buzzing around a tasty flower. Draw the flower and the bees. 2 more bees came to join them. Draw the new hungry bees.

We had 5 bees. Now we have 2 more bees! Use your picture to show how many bees are enjoying the flower together. Talk to your partner about the picture. Can you write a number bond to go with the story?

Note: The 5 and some more language of the story will serve as an anticipatory set for today’s lesson.

Concept Development (25 minutes)

Materials: (S) Two 5-group mats (template found at end of lesson) or template drawn on paper, 1 linking cube 5-stick, 5 loose linking cubes, personal white boards

T: Place your 5-group mats in front of you. Find your 5-stick. Let’s take it apart and put one cube in each square of the top 5-group mat. What do you notice?

S: We have a cube in each square. → The top mat is full.
Lesson 12: Use the 5-groups to represent the 5 + n pattern to 8.

Student Debrief (8 minutes)

Lesson Objective: Use the 5-groups to represent the 5 + n pattern to 8.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Look at your Problem Set. Why do we color all the cubes in one 5-group mat before coloring the cubes in the next 5-group mat?
- Look at the last problem where you colored 8 cubes. Compare with your neighbor’s. Did you color the same cubes? Did you color 5 cubes in the top row or did you color 8 a different way? (Discuss advantages and disadvantages to the different coloring combinations.)
- When you used your 5-group mat, was it easy to know how many cubes you had?
- Did you have to count them all each time to know how many you had?
- What patterns did you see in the number bonds today?
Draw more to make 5.
Name ____________________________ Date _________

5 boxes are colored. Color 3 more boxes to make 8. Complete the number bond.

5 and □ more is 8

5 boxes are colored. Color more boxes to make 7. Complete the number bond.

□ and □ more is □

Color 6 cubes. Complete the number bond.

□ □ □ □ □ □

□ □ □ □ □ □

□ and □ more is □
Draw more to make 6. Complete the number bond.

Draw more to make 7. Complete the number bond.

Draw more to make 8. Complete the number bond.
Name ____________________________ Date ____________

Fill in the number bond to match the squares.

6 is ________ and 1 more

Color 5 squares blue in the first row.
Color 2 squares red in the second row.

is 5 and more

Color 8 squares. Complete the number bond and sentence.

is 5 and more
Lesson 12 Homework

Use the 5-groups to represent the 5 + n pattern to 8.

Date: 11/12/13

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Lesson 12: Use the 5-groups to represent the $5 + n$ pattern to 8.

Date: 11/12/13