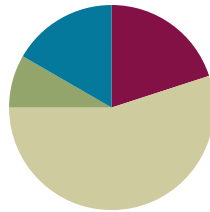


Lesson 7

Objective: Interpret equal shares in composite shapes as halves, thirds, and fourths.

Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(33 minutes)
■ Student Debrief	(10 minutes)
Total Time	(60 minutes)



Fluency Practice (12 minutes)

- Subtraction with Renaming **2.NBT.7** (7 minutes)
- Grade 2 Core Fluency Differentiated Practice Sets **2.OA.2** (5 minutes)

Subtraction with Renaming (7 minutes)

Materials: (S) Personal white board, hundreds place value chart (Lesson 3 Fluency Template)

Note: This fluency activity reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem. Students use their personal white boards and a place value chart to solve.

T: Slide the place value chart template into your personal white board.

T: (Write $161 - 18$ horizontally on the board.) Let's use a chip model to subtract. On your personal white board, record your work using the algorithm.

S: (Solve.)

T: $161 - 18$ is...?

S: 143.

Continue with the following possible sequence: $152 - 29$, $237 - 56$, $319 - 28$, $463 - 54$, and $208 - 57$.

Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

Materials: (S) Core Fluency Practice Sets (Lesson 3)

Note: During Topic B and for the remainder of the year, each day's Fluency Practice includes an opportunity for review and mastery of the sums and differences with totals through 20 by means of the Core Fluency Practice Sets or Sprints. The process is detailed, with Practice Sets provided, in Lesson 3.

Application Problem (5 minutes)

Mrs. Libarian’s students are picking up tangram pieces. They collect 13 parallelograms, 24 large triangles, 24 small triangles, and 13 medium triangles. The rest are squares. If they collect 97 pieces in all, how many squares are there?

Note: This is a two-step *put together with addend unknown* problem type. The numbers in this problem invite students to call upon a variety of strategies to solve.

$$\begin{array}{r}
 13 + 24 + 24 + 13 = \\
 \underline{\quad\quad} \\
 40 \quad 26 \\
 \underline{48} \\
 + 26 \\
 \hline
 74
 \end{array}$$

$$\begin{array}{r}
 74 + \underline{\quad} = 97 \\
 74 \xrightarrow{+6} 80 \xrightarrow{+17} 97 \\
 \underline{+17} \\
 23 \\
 \hline
 \text{There are 23 squares.}
 \end{array}$$

Concept Development (33 minutes)

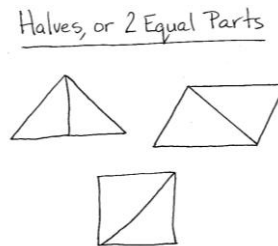
Materials: (T) Tangram pieces (Lesson 6), document camera, chart paper, pattern blocks
 (S) Tangram pieces (Lesson 6), pattern blocks in individual plastic bags (set of 1 hexagon, 4 squares, 3 triangles, 2 trapezoids, 3 wide (not thin) rhombuses)

Have students take out their tangram pieces. Distribute individual bags of pattern block pieces for later use.

Part 1: Using Tangrams to Create Composite Shapes Described as Halves

- T: Let’s continue exploring ways to compose new shapes using our tangram pieces.
- T: Start with just the two smallest triangles. What shapes can you make that you can name?
 (Allow students time to work.)

Circulate as students move the pieces to make new shapes. Choose three students to place their shapes under the document camera to show a larger triangle, a parallelogram with no square corners, and a parallelogram that is a square, respectively.



- T: What is the name of this polygon?
- S: Triangle!
- T: How many parts are in this large triangle?
- S: Two parts!
- T: Are the parts equal?
- S: Yes!
- T: We can say this triangle is made up of two equal shares, or parts, called halves.
- T: Let’s record this. (Draw the shape on chart paper, partitioned to show the pieces used.)

Repeat this process for the parallelogram and square, and record the shapes.

- T: Let’s label this chart *Halves, or 2 Equal Parts*. (Label the chart.)

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

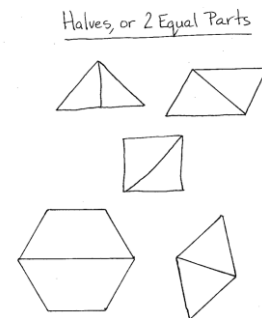
Support English language learners by showing pictures of halves, thirds, and fourths, or by cutting an apple in half while saying “half.” Post the pictures with the words underneath on the word wall.

- T: If you didn't make one of these shapes, move your pieces to make the shape now. If you did make all the shapes, try moving back and forth between them smoothly. (Wait for students to try all three shapes.)
- T: Can we make halves by putting together a small triangle and a parallelogram? Why or why not? Discuss with your partner.
- S: No, because the parts are different shapes, and the size is not the same. → No, because there are two parts, but they're not equal.
- T: That's right. To be halves, the two parts must be equal in size, which means they take up the same amount of space.
- T: (Point to each shape.) How many halves make a whole? Give me a complete sentence.
- S: Two halves make a whole.

Part 2: Using Pattern Blocks to Create Composite Shapes Described as Halves, Thirds, and Fourths

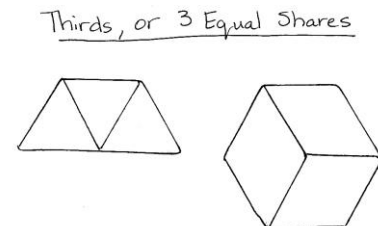
MP.3

- T: Let's explore halves using pattern blocks. Start with a hexagon. (Place a hexagon under the document camera as students get a hexagon from among their shapes.)
- T: What smaller polygon could you use to cover half of the hexagon? (Allow students time to experiment and find the trapezoid.)
- S: A trapezoid!
- T: Yes. One trapezoid covers half the hexagon. Put another trapezoid on top to cover the whole hexagon. (Place two trapezoids on top of the hexagon under the document camera as students do the same.)
- T: How many trapezoids make a whole hexagon?
- S: Two!
- T: Are they equal shares?
- S: Yes!
- T: How many halves are in the hexagon?
- S: Two halves!
- T: Let's record this on our *Halves* chart. (Record on the chart.)



Repeat this process for a rhombus, covering it with two equilateral triangles, and record on the chart.

- T: Let's try something different. This time we'll use a trapezoid. (Place a trapezoid under the document camera as students get a trapezoid from among their shapes.)
- T: Can you cover the trapezoid with three smaller polygons? (Allow students time to experiment.)
- T: What shape did you use?
- S: A triangle!
- T: Are the shapes equal in size?
- S: Yes!
- T: How many equal shares compose a whole trapezoid?
- S: Three!



- T: We call three equal shares, or parts, **thirds**. Let's make a new chart and record this. (Label a new chart *Thirds, or 3 Equal Shares*, and draw the shape on chart paper, partitioned to show the pieces used.)
- T: Work with a partner. Leave one triangle on, and cover the rest of the trapezoid with a rhombus. (Model under the document camera as students do the same.)
- T: Talk with your partner: Are these halves? Why or why not?
- S: They're not halves because there are two parts, but they're different shapes and sizes. → The two parts aren't equal because one is a triangle, and the other is a rhombus.
- T: Correct. Is it thirds?
- S: No, because there are only two parts, not three.
- T: Yes!

Repeat the process for a hexagon covered by three rhombuses, and record on the chart.

- T: Now, can you make one large square that is created with equal parts? (Allow students time to work with the smaller squares.)

Invite a student to show his or her composite square under the document camera. Have students note how many parts are used to make the square and if they are even. Introduce them to the term *fourths*, create a new chart labeled *Fourths, or 4 Equal Shares*, and draw the shape, partitioned to show the pieces used.

Allow students who show understanding to move on to the Problem Set.

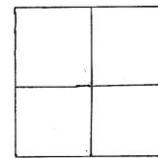
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Challenge students working above grade level by asking them to create a poster for the class with a variety of examples of halves, thirds, and fourths alongside non-examples of the same. Ask them to explain how the examples and non-examples are the same (e.g., they have the same number of pieces) and how they differ (e.g., the pieces are not equal).

Fourths, or 4 Equal Shares



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 7 Problem Set 2•8

Name Meaghan Date _____

1. Solve the following puzzles using your tangram pieces. Draw your solutions in the space below.

a. Use the two smallest triangles to make one larger triangle. 	b. Use the two smallest triangles to make a parallelogram with no square corners.
c. Use the two smallest triangles to make a square. 	d. Use the two largest triangles to make a square.
e. How many equal shares do the larger shapes in Parts (a-d) have? <u>2</u>	f. How many halves make up the larger shapes in Parts (a-d)? <u>2</u>

2. Circle the shapes that show halves.

COMMON CORE Lesson 7: Interpret equal shares in composite shapes as halves, thirds, and fourths. Date: 11/9/14 engage^{ny} 8.B.21

Student Debrief (10 minutes)

Lesson Objective: Interpret equal shares in composite shapes as halves, thirds, and fourths.

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.

Any combination of the questions below may be used to lead the discussion.

- Look at your Problem Set, and show your partner a shape that has two equal shares. What do we call those shares? (Halves. Repeat with **thirds** and fourths.)
- In Problem 4, does the trapezoid show thirds? Why or why not?
- When would you want to have equal shares of something?
- Use your pattern blocks to show me an example of halves. Show me an example of thirds. Now, show me an example that has three blocks but does not show thirds.

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

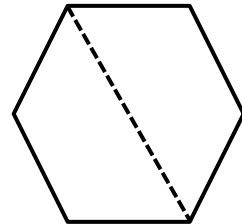
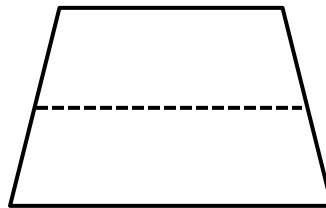
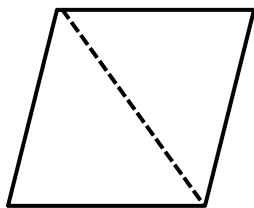
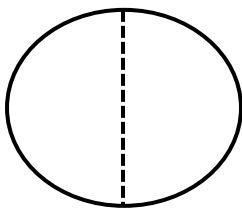
Name _____

Date _____

1. Solve the following puzzles using your tangram pieces. Draw your solutions in the space below.

<p>a. Use the two smallest triangles to make one larger triangle.</p>	<p>b. Use the two smallest triangles to make a parallelogram with no square corners.</p>
<p>c. Use the two smallest triangles to make a square.</p>	<p>d. Use the two largest triangles to make a square.</p>
<p>e. How many equal shares do the larger shapes in Parts (a-d) have?</p>	<p>f. How many halves make up the larger shapes in Parts (a-d)?</p>

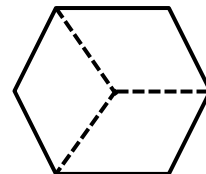
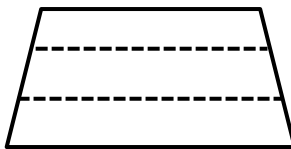
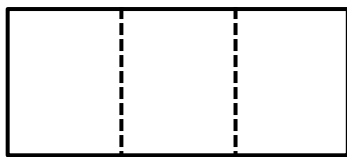
2. Circle the shapes that show halves.



3. Show how 3 triangle pattern blocks form a trapezoid with one pair of parallel lines. Draw the shape below.

- a. How many equal shares does the trapezoid have? _____
- b. How many thirds are in the trapezoid? _____

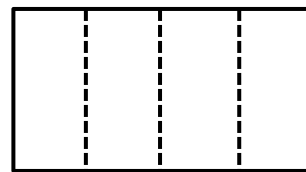
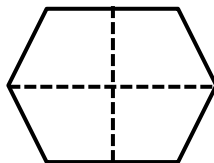
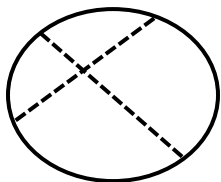
4. Circle the shapes that show thirds.



5. Add another triangle to the trapezoid you made in Problem 3 to make a parallelogram. Draw the new shape below.

- a. How many equal shares does the shape have now? _____
- b. How many fourths are in the shape? _____

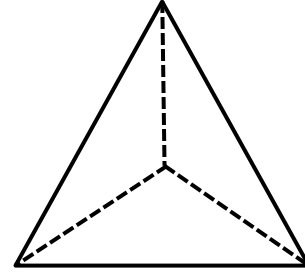
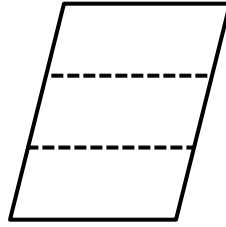
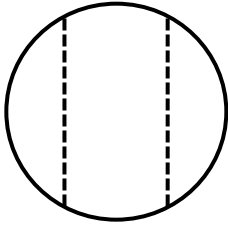
6. Circle the shapes that show fourths.



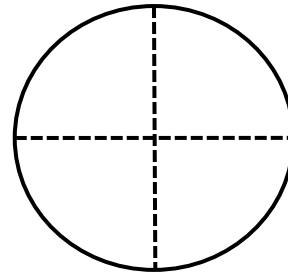
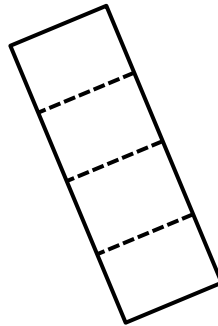
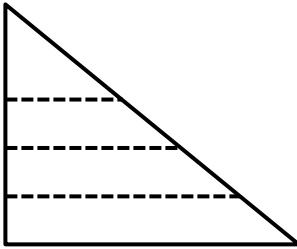
Name _____

Date _____

1. Circle the shapes that show thirds.



2. Circle the shapes that show fourths.



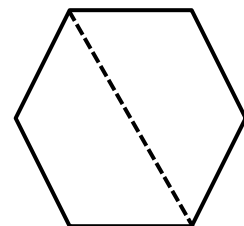
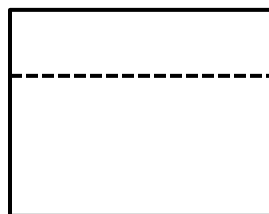
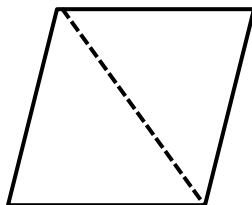
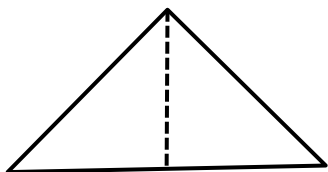
Name _____

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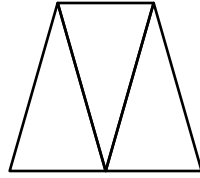
1. Solve the following puzzles using your tangram pieces. Draw your solutions in the space below.

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<p>c. Use the two smallest triangles to make a parallelogram with no square corners.</p>	<p>d. Use the two smallest triangles to make one larger triangle.</p>
<p>e. How many equal shares do the larger shapes in Parts (a-d) have?</p>	<p>f. How many halves make up the larger shapes in Parts (a-d)?</p>

2. Circle the shapes that show halves.

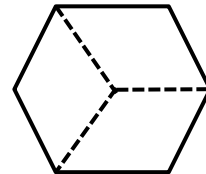
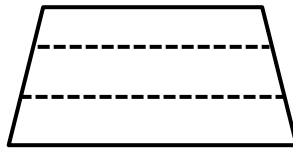
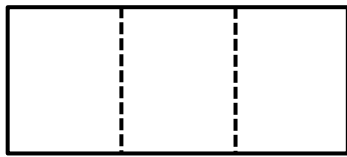


3. Examine the trapezoid.

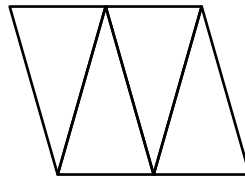


- a. How many equal shares does the trapezoid have? _____
- b. How many thirds are in the trapezoid? _____

4. Circle the shapes that show thirds.



5. Examine the parallelogram.



- a. How many equal shares does the shape have? _____
- b. How many fourths are in the shape? _____

6. Circle the shapes that show fourths.

