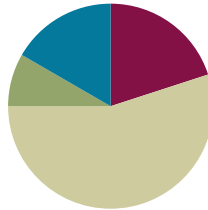# Lesson 6

Objective: Combine shapes to create a composite shape; create a new shape from composite shapes.

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)

- ▪ Rename for the Smaller Unit **2.NBT.1**   (3 minutes)
- ▪ Sprint: Addition and Subtraction Patterns **2.OA.2**   (9 minutes)

Rename for the Smaller Unit (3 minutes)

Note: This fluency activity reviews place value foundations.

- T: (Write 101 = _____ tens _____ ones.)
- T: I'm going to give you a number in unit form. I want you to rename 1 of the hundreds as 10 tens and then tell me how many hundreds, tens, or ones. Ready?
- S: 10 tens 1 one.
- T: (Write 121 = _____ tens _____ one.) Say the number sentence.
- S: 121 = 12 tens 1 one.
- T: 203.
- S: 203 = 1 hundred 10 tens 3 ones.
- T: 213.
- S: 213 = 1 hundred 11 tens 3 ones.

Continue with the following possible sequence: 305, 315; 204, 224; 108, 158; and 908, 968.

Sprint: Addition and Subtraction Patterns (9 minutes)
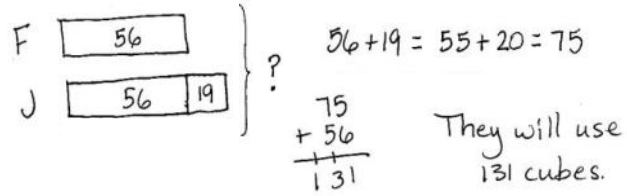
Materials: (S) Addition and Subtraction Patterns Sprint

Note: Students practice adding and subtracting to gain mastery of the sums and differences within 20.

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Application Problem (5 minutes)

Frank has 19 fewer cubes than Josie. Frank has 56 cubes. They want to use all of their cubes to build a tower. How many cubes will they use?

Note: This is a two-step problem with a *compare with bigger unknown* type problem as one step. Encourage students to draw a tape diagram to help visualize the comparison.

F [56]   } ?   56 + 19 = 55 + 20 = 75
J [56 | 19]

75
+ 56
131

They will use 131 cubes.
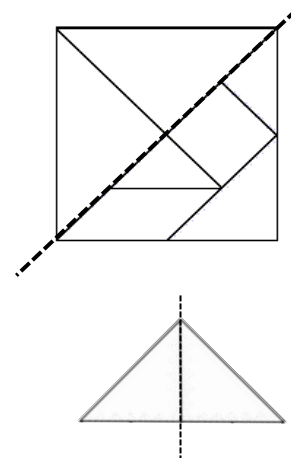
Concept Development (33 minutes)

Materials: (T) Tangram (Template), scissors, document camera (if available) (S) Tangram (Template), scissors, personal white board

Note: Students previously worked with tangrams in Grade 1 Module 5 Lesson 5. If time allows, refresh students' memory by reading *Grandfather Tang's Story* by Ann Tompert during story time.

Distribute the materials. (Students will also need the cut-out tangram pieces for the Problem Set, Homework, and Lesson 8.)
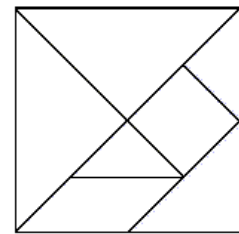
Part 1: Cutting the Tangram and Analyzing the Polygons

T: (Hold up the tangram.) Who remembers what this is called?

S: A tangram!

T: Let's describe the polygons as we cut them out.

T: First, cut out the large square. (Cut out a large square from the tangram as students do the same.)

T: (Hold up the tangram backward so students do not see the lines within.) As you cut, talk to your partner: What are the attributes, or characteristics, of a square?

S: A square has four straight sides and four square corners. → It's a special rectangle because its sides are all the same length. → It's a quadrilateral. → It has parallel sides.

T: Good descriptions! Watch how I fold my large square down the diagonal line that goes through the middle. (Fold the paper.) What polygon do you see in the top half?

S: A triangle!

T: As you cut out the triangle, tell your partner the attributes of a triangle.

S: A triangle has three straight sides. → It has three angles, or corners. → This triangle has a square corner.

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T: (Hold up the triangle.) How many triangles make up this **whole** triangle?

S: Two!

T: So we can make larger polygons out of smaller ones.

T: Cut apart the two smaller triangles, and set them aside. (Model as students do the same.)

T: Look at the other half. (Hold up the other large triangle, pictured to the right.) What polygons do you see inside this triangle?

S: I see two smaller triangles and one bigger triangle. → I see two trapezoids. → There's a square. → There's a parallelogram.

T: Which of the shapes are quadrilaterals? Hold them up as you say their names.

MP.6

S: The square. → The parallelogram. → The trapezoids.

T: Let's cut off the triangle on top and place that with the other two. (Model as students do the same.)

T: Now we have the large trapezoid. What are the attributes of this trapezoid?

S: It has four straight sides, but they're not all the same length. → This trapezoid has four corners, but they're not square corners. → It has just one pair of parallel sides.
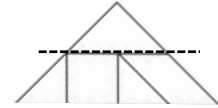
Next, cut off the parallelogram and trace, touch, and count its sides and angles. Cut out the remaining square and two triangles.

T: How many polygons make up the tangram?

S: Seven!

> **NOTES ON MULTIPLE MEANS OF ENGAGEMENT:**
>
> Support English language learners' oral language production by providing sentence frames such as, "I see _____ parallelograms because I see a _____," to use in partner turn and talks.

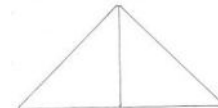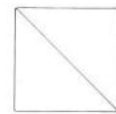## Part 2: Creating Composite Shapes

Allow time for students to explore ways to create new shapes. They do not have to be shapes that students can name. Remind students that they can flip, slide, and turn the pieces to make the new shapes.

Next, direct student pairs to create three shapes, a triangle, a square, and a parallelogram with no square corners (as pictured to the right), using the two largest triangles. After creating the shapes, students should draw them on their personal white boards. Circulate to check for understanding, and encourage students to persevere, providing the least direction possible.

Have students gather their square and the two smallest triangles and move to the carpet.

T: Try this! Can you create a triangle out of a square and the two smallest triangles? (Allow students time to work.)

T: Now, combine the triangle you just made with your partner's to make a square. (Allow students time to work.)

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T: Is it possible for us to make a really big square with all of the squares you just made?

S: I think so. Let's try! → I don't think we have enough.

T: Let's try. (Allow time for students to make the attempt. The ability to make a square depends on the number of students in the class. If it is not possible to make a square, ask what shape could be made, and allow time to make a rectangle.)

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.

Note: Challenge early finishers to reassemble the tangram.

> **NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:**
>
> Challenge students working above grade level by asking them to reconstruct the original square using the seven tangram pieces. A further challenge would be for them to use all seven pieces to make one large rectangle.

Student Debrief (10 minutes)

Lesson Objective: Combine shapes to create a composite shape; create a new shape from composite shapes.

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.

- Share the polygons you made in Problem 5 with your partner. Describe the attributes of each polygon.
- Why do you think we used tangrams for this lesson?
- Can you think of any real-world objects that are made up of lots of smaller shapes? (Provide an example to get students started if needed: tile floor, window blinds, chain-link fence, interlocking building blocks, brick wall.)
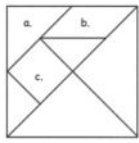
Lesson 6: Combine shapes to create a composite shape; create a new shape from composite shapes.

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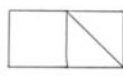
- How is breaking big shapes into smaller shapes kind of like decomposing numbers? Pennies and dimes? Centimeters and meters?
- Are all squares parallelograms? How can you prove that? Are all parallelograms squares?
- How is Frank and Josie's tower of cubes from the Application Problem similar to what we did today?

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.

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A

Number Correct: _____

Addition and Subtraction Patterns

1.	8 + 3 =		23.	8 + 8 =	
2.	11 – 3 =		24.	16 – 8 =	
3.	9 + 2 =		25.	9 + 6 =	
4.	11 – 2 =		26.	15 – 9 =	
5.	6 + 5 =		27.	9 + 9 =	
6.	11 – 6 =		28.	18 – 9 =	
7.	7 + 4 =		29.	7 + 7 =	
8.	11 – 7 =		30.	14 – 7 =	
9.	8 + 4 =		31.	8 + 9 =	
10.	12 – 4 =		32.	17 – 8 =	
11.	9 + 3 =		33.	7 + 9 =	
12.	12 – 3 =		34.	16 – 7 =	
13.	7 + 5 =		35.	19 – 6 =	
14.	12 – 7 =		36.	6 + 7 =	
15.	6 + 6 =		37.	17 – 6 =	
16.	12 – 6 =		38.	11 – 7 =	
17.	8 + 6 =		39.	7 + 6 =	
18.	14 – 8 =		40.	13 – 7 =	
19.	9 + 4 =		41.	19 – 7 =	
20.	13 – 9 =		42.	3 + 8 =	
21.	8 + 7 =		43.	5 + 8 =	
22.	15 – 8 =		44.	18 – 5 =	

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B

Number Correct: _____

Improvement: _____

Addition and Subtraction Patterns

1.	9 + 2 =		23.	9 + 6 =	
2.	11 – 2 =		24.	15 – 9 =	
3.	8 + 3 =		25.	8 + 8 =	
4.	11 – 3 =		26.	16 – 8 =	
5.	7 + 4 =		27.	7 + 7 =	
6.	11 – 7 =		28.	14 – 7 =	
7.	6 + 5 =		29.	9 + 9 =	
8.	11 – 6 =		30.	18 – 9 =	
9.	9 + 3 =		31.	7 + 9 =	
10.	12 – 3 =		32.	16 – 9 =	
11.	8 + 4 =		33.	8 + 9 =	
12.	12 – 4 =		34.	17 – 9 =	
13.	7 + 5 =		35.	19 – 7 =	
14.	12 – 5 =		36.	5 + 8 =	
15.	6 + 6 =		37.	18 – 5 =	
16.	12 – 6 =		38.	13 – 8 =	
17.	9 + 4 =		39.	6 + 7 =	
18.	13 – 4 =		40.	13 – 6 =	
19.	8 + 6 =		41.	19 – 6 =	
20.	14 – 8 =		42.	3 + 9 =	
21.	7 + 8 =		43.	6 + 9 =	
22.	15 – 7 =		44.	18 – 6 =	

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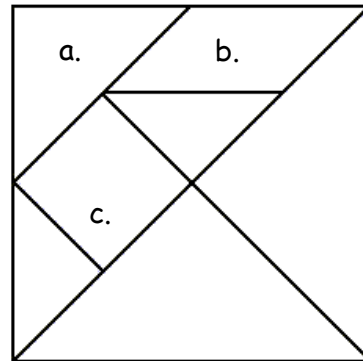
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Name _____   Date _____

1. Identify each polygon labeled in the tangram as precisely as possible in the space below.

   a. _____

   b. _____

   c. _____

2. Use the square and the two smallest triangles of your tangram pieces to make the following polygons. Draw them in the space provided.

a. A quadrilateral with 1 pair of parallel sides.	b. A quadrilateral with no square corners.
c. A quadrilateral with 4 square corners.	d. A triangle with 1 square corner.

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3. Use the parallelogram and the two smallest triangles of your tangram pieces to make the following polygons. Draw them in the space provided.

a. A quadrilateral with 1 pair of parallel sides.	b. A quadrilateral with no square corners.
c. A quadrilateral with 4 square corners.	d. A triangle with 1 square corner.

4. Rearrange the parallelogram and the two smallest triangles to make a hexagon. Draw the new shape below.

5. Rearrange your tangram pieces to make other polygons! Identify them as you work.

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Name _____   Date _____

Use your tangram pieces to make two new polygons. Draw a picture of each new polygon, and name them.

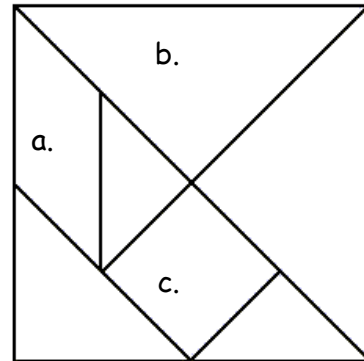1.

2.

Name _____   Date _____

1. Identify each polygon labeled in the tangram as precisely as possible in the space below.
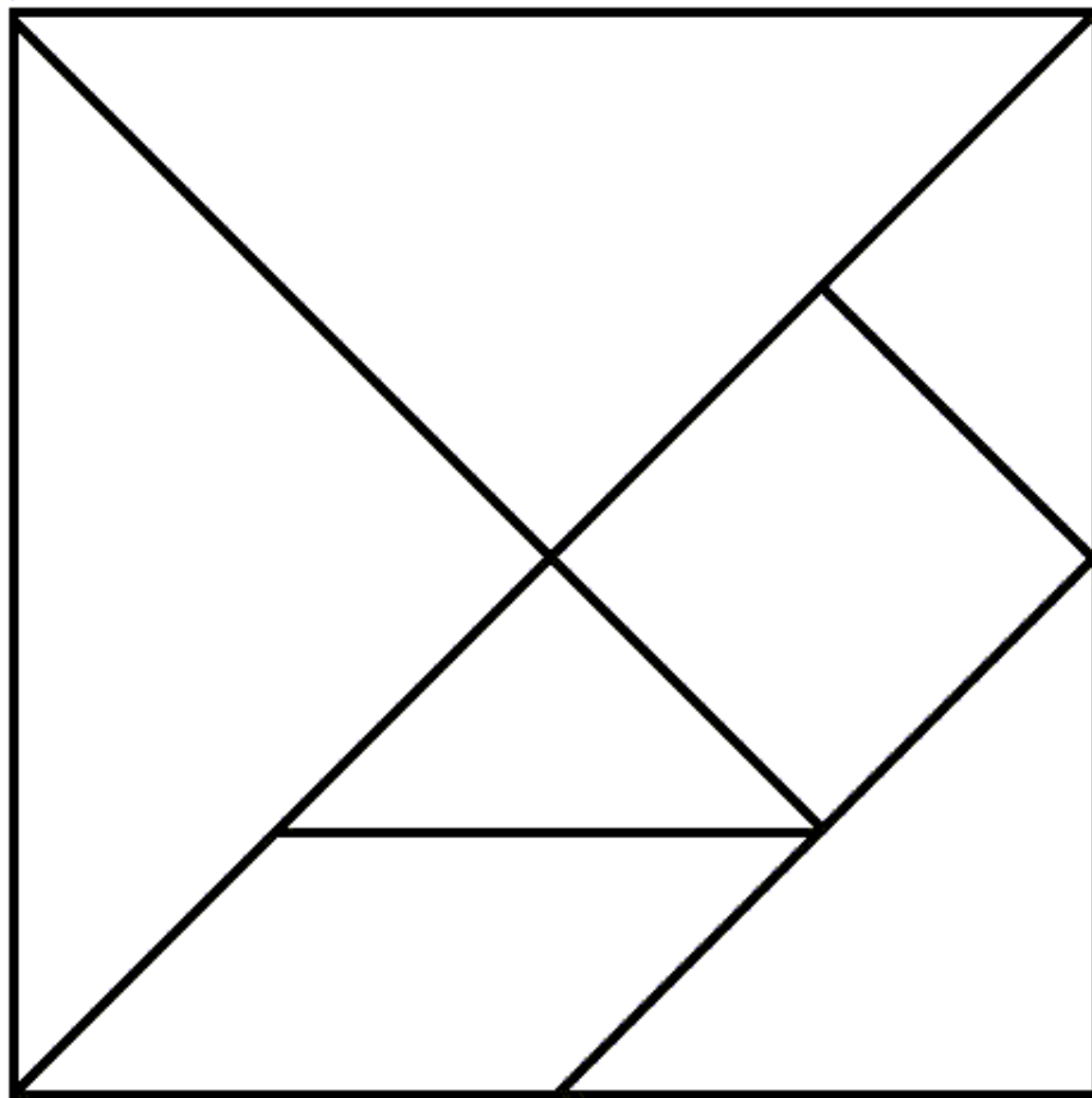
   a. _____

   b. _____

   c. _____

2. Use the square and the two smallest triangles of your tangram pieces to make the following polygons. Draw them in the space provided.

a. A triangle with 1 square corner.	b. A quadrilateral with 4 square corners.
c. A quadrilateral with no square corners.	d. A quadrilateral with only 1 pair of parallel sides.

3. Rearrange the parallelogram and the two smallest triangles of your tangram pieces to make a hexagon. Draw the new shape below.

4. Rearrange your tangram pieces to make at least 6 other polygons! Draw and name them below.

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Cut the tangram into 7 puzzle pieces.

tangram

Lesson 6: Combine shapes to create a composite shape; create a new shape from composite shapes.

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