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**GRADE 2 • MODULE 8**

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**NOTE:** Student sheets should be printed at 100% scale to preserve the intended size of figures for accurate measurements. Adjust your copier or printer settings to *actual size* and set page scaling to *none*.

## Grade 2 • Module 8

# Time, Shapes, and Fractions as Equal Parts of Shapes

## OVERVIEW

In Module 8, the final module of the year, students extend their understanding of part–whole relationships through the lens of geometry. As students compose and decompose shapes, they begin to develop an understanding of unit fractions as equal parts of a whole.

In Topic A, students build on their prior knowledge of a shape’s defining attributes (**1.G.1**) to recognize and draw categories of polygons with specified attributes: the number of sides, corners, and angles (**2.G.1**). For example, students see that a rectangle has four straight sides, four right angles, and opposite sides with equal length. Students then relate the square, a special rectangle, to the cube by building a cube from six congruent squares. They describe the cube in terms of its attributes, counting the number of edges, faces, and corners (**2.G.1**). Once students are able to describe and analyze polygons and the cube according to their attributes in Topic A, they are ready to combine shapes and build composite shapes in Topic B.

Topic B opens with students using a tangram, a set of seven shapes that compose a square, to create a new shape. Students see that they can arrange two-dimensional shapes to create a new whole, or composite, shape, which can become part of an even larger whole. As students progress through the topic, they build and partition shapes by combining two or more smaller shapes and relating the parts to the whole. For example, they use different pattern blocks to show that a regular hexagon might be composed of two trapezoids or three rhombuses. One might say, “This hexagon is made from two identical trapezoids, or two equal parts.” This allows for interpreting equal shares of a whole as a fraction, as students name the equal parts *halves*, *thirds*, or *fourths* (**2.G.3**).

Next, in Topic C, students decompose circles and rectangles into equal parts and describe them as halves (a half of), thirds (a third of), and fourths (a fourth of) or quarters (**2.G.3**). For example, students see that a circle can be partitioned into four quarter-circles, or parts, which can be described as fourths. They learn to describe the whole by the number of equal parts, e.g., one whole circle is composed of 4 fourths. Finally, students decompose a rectangle into four parts that have equal area but different shapes (**2.G.3**).

The module closes with Topic D, where students apply their understanding of partitioning the whole into halves and fourths to tell time to the nearest five minutes (**2.G.3**, **2.MD.7**), using both analog and digital clocks. They construct simple clocks and see the relationship to partitioning a circle into quarters and halves, thereby decomposing 60 minutes. For example, 3 fourths of the circle can be interpreted as 3 intervals of 15 minutes, e.g.,  $15 + 15 + 15 = 45$  (**2.NBT.5**, **2.NBT.6**), or 45 minutes. They also use their understanding of skip-counting by fives and tens to tell time on an analog clock (**2.NBT.2**). Finally, they apply their learning by calculating time intervals of hours and half hours and close the year determining the time interval in days before they are third-graders.

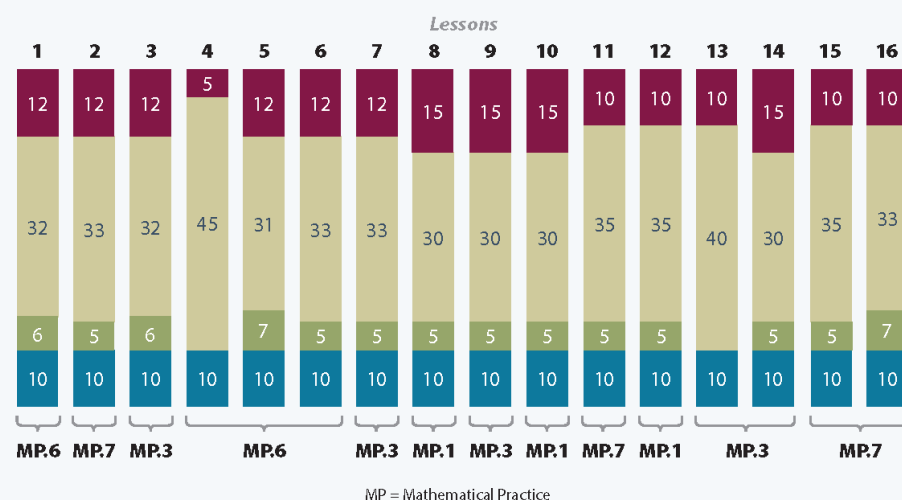
The Mid-Module Assessment follows Topic B, and the End-of-Module Assessment follows Topic D.



## Distribution of Instructional Minutes

This diagram represents a suggested distribution of instructional minutes based on the emphasis of particular lesson components in different lessons throughout the module.

- Fluency Practice
- Concept Development
- Application Problems
- Student Debrief



## Focus Grade Level Standards

### Work with time and money.<sup>1</sup>

- 2.MD.7** Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

### Reason with shapes and their attributes.<sup>2</sup>

- 2.G.1** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
- 2.G.3** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

<sup>1</sup> Focus on time. Money is addressed in Module 7.

<sup>2</sup> 2.G.2 is addressed in Module 6.

## Foundational Standards

- 1.MD.3** Tell and write time in hours and half-hours using analog and digital clocks. Recognize and identify coins, their names, and their values.
- 1.G.1** Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
- 1.G.2** Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students do not need to learn formal names such as “right rectangular prism.”)
- 1.G.3** Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
- 2.NBT.2** Count within 1000; skip-count by 5s<sup>3</sup>, 10s, and 100s.
- 2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 2.NBT.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.
- 2.MD.1** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

## Focus Standards for Mathematical Practice

- MP.1** **Make sense of problems and persevere in solving them.** Students are encouraged to persevere when arranging shapes to create specific composite shapes, when recomposing the pieces into different shapes, and when creating even larger shapes from composite shapes. When students partition composite shapes (e.g., circles and rectangles) into equal shares, they ask themselves, “How can I look at this differently?” Students organize their thinking through drawing, and they see, for example, that a circle can be described in terms of halves, thirds, or fourths.
- MP.3** **Construct viable arguments and critique the reasoning of others.** Students use drawings and precise language to describe and analyze shapes, and they defend their reasoning as to what makes a quadrilateral, for example, a rhombus. Students also discuss the partitioning of a composite shape (e.g., a hexagon) and relate the different parts, or shares, to halves, thirds, and fourths. They make connections between fraction concepts and telling time, explaining the connection between their work with halves and quarters to the analog clock.

<sup>3</sup> Use analog clock to provide a context for skip-counting by fives.



**MP.6 Attend to precision.** Students describe and analyze various two-dimensional shapes by attending to their specific attributes. Students accurately draw shapes using their knowledge of attributes and rulers. Then, while working with a partner, students name and analyze their partner's shape drawings by counting the number of sides or angles. Students also appropriately name parts of a whole using terms such as *halves*, *thirds*, and *fourths* or *quarters*.

**MP.7 Look for and make use of structure.** Students identify attributes, such as the number of sides and angles, in order to classify shapes such as triangles and quadrilaterals. They make use of the part-whole structure to understand that a whole unit can be partitioned into equal shares, or smaller units (e.g., each of 4 equal shares = a fourth of the whole). Students use their understanding of the partitioning of a circle to tell time to the quarter and half hour. Through previous fluency practice, students use the pattern of skip-counting by fives to tell time on an analog clock.

## Overview of Module Topics and Lesson Objectives

Standards	Topics and Objectives	Days
2.G.1 2.MD.1	<b>A Attributes of Geometric Shapes</b> Lesson 1: Describe two-dimensional shapes based on attributes. Lesson 2: Build, identify, and analyze two-dimensional shapes with specified attributes. Lesson 3: Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons. Lesson 4: Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids. Lesson 5: Relate the square to the cube, and describe the cube based on attributes.	5
2.G.3 2.G.1	<b>B Composite Shapes and Fraction Concepts</b> Lesson 6: Combine shapes to create a composite shape; create a new shape from composite shapes. Lessons 7–8: Interpret equal shares in composite shapes as halves, thirds, and fourths.	3
	Mid-Module Assessment: Topics A–B (assessment ½ day, return ½ day, remediation or further applications 1 day)	2
2.G.3 2.G.1	<b>C Halves, Thirds, and Fourths of Circles and Rectangles</b> Lessons 9–10: Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or fourths.	4



Standards	Topics and Objectives	Days
	Lesson 11: Describe a whole by the number of equal parts including 2 halves, 3 thirds, and 4 fourths.  Lesson 12: Recognize that equal parts of an identical rectangle can have different shapes.	
<b>2.MD.7</b> <b>2.G.3</b> 2.NBT.2 2.NBT.5 2.NBT.6	<b>D Application of Fractions to Tell Time</b>  Lesson 13: Construct a paper clock by partitioning a circle into halves and quarters, and tell time to the half hour or quarter hour.  Lesson 14: Tell time to the nearest five minutes.  Lesson 15: Tell time to the nearest five minutes; relate <i>a.m.</i> and <i>p.m.</i> to time of day.  Lesson 16: Solve elapsed time problems involving whole hours and a half hour.	4
	End-of-Module Assessment: Topics A–D (assessment $\frac{1}{2}$ day, return $\frac{1}{2}$ day, remediation or further applications 1 day)	2
<b>Total Number of Instructional Days</b>		<b>20</b>

## Terminology

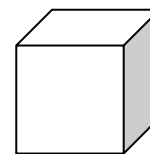
### New or Recently Introduced Terms

- a.m./p.m.
- Analog clock
- Angle (e.g., figure formed by the corner of a polygon)
- Digital clock
- Parallel (two lines on the same plane are parallel if they do not intersect)
- Parallelogram (quadrilateral with both pairs of opposite sides parallel)
- Polygon (closed figure with three or more straight sides, e.g., triangle, quadrilateral, pentagon, hexagon)
- Quadrilateral (four-sided polygon, e.g., square, rhombus, rectangle, parallelogram, trapezoid)
- Quarter past, quarter to
- Right angle (e.g., a square corner)
- Second (unit for measuring time)
- Third of (shapes), thirds (three equal shares)
- Whole
  - 2 halves

- 3 thirds
- 4 fourths

### Familiar Terms and Symbols<sup>3</sup>

- Attributes (characteristics of an object such as number of sides, angles, or faces)
- Cube (three-dimensional shape composed of six squares)
- Face (a two-dimensional side of a three-dimensional shape)
- Fourth of (shapes), fourths (four equal shares)
- Half of (shapes), halves (two equal shares)
- Half past (expression for 30 minutes past a given hour)
- Half hour (interval of time lasting 30 minutes)
- Hour (unit for measuring time, equivalent to 60 minutes or  $\frac{1}{24}$  of a day)
- Minute (unit for measuring time, equivalent to 60 seconds,  $\frac{1}{60}$  of an hour)
- O'clock (used to indicate time to a precise hour with no additional minutes)
- Two-dimensional shapes (familiar prior to Grade 2):
  - Circle
  - Half-circle
  - Quarter-circle
  - Hexagon (2 dimensional figure enclosed by six straight sides and six angles)
  - Rectangle (2 dimensional figure enclosed by four straight sides and four right angles)
  - Rhombus (2 dimensional figure enclosed by four straight sides of the same length)
  - Square (rectangle with four sides of the same length)
  - Trapezoid (2 dimensional figure enclosed by four straight sides with only one pair of parallel sides)
  - Triangle (2 dimensional figure enclosed by three straight sides)
- Quarter of (shapes), quarters (4 equal shares)



Cube

### Suggested Tools and Representations

- Cube: three-dimensional shape (real world examples such as a die, alphabet blocks, or a box)
- Geoboards
- Large instructional geared clock
- Pattern blocks
- Rulers
- Spaghetti
- Square tiles
- Student clocks, preferably those with gears which can provide the appropriate hour-hand alignment

<sup>3</sup> These are terms and symbols students have seen previously.

- Toothpicks

## Scaffolds<sup>4</sup>

The scaffolds integrated into *A Story of Units* give alternatives for how students access information as well as express and demonstrate their learning. Strategically placed margin notes are provided within each lesson elaborating on the use of specific scaffolds at applicable times. They address many needs presented by English language learners, students with disabilities, students performing above grade level, and students performing below grade level. Many of the suggestions are organized by Universal Design for Learning (UDL) principles and are applicable to more than one population. To read more about the approach to differentiated instruction in *A Story of Units*, please refer to “How to Implement *A Story of Units*.”

## Assessment Summary

Type	Administered	Format	Standards Addressed
Mid-Module Assessment Task	After Topic B	Constructed response with rubric	2.G.1 2.G.3
End-of-Module Assessment Task	After Topic D	Constructed response with rubric	2.MD.7 2.G.1 2.G.3

<sup>4</sup> Students with disabilities may require Braille, large print, audio, or special digital files. Please visit the website, [www.p12.nysed.gov/specialed/aim](http://www.p12.nysed.gov/specialed/aim), for specific information on how to obtain student materials that satisfy the National Instructional Materials Accessibility Standard (NIMAS) format.



## Topic A

## Attributes of Geometric Shapes

## 2.G.1, 2.MD.1

<b>Focus Standard:</b>	2.G.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
<b>Instructional Days:</b>	5	
<b>Coherence -Links from:</b>	G1–M5	Identifying, Composing, and Partitioning Shapes
<b>-Links to:</b>	G3–M7	Geometry and Measurement Word Problems

In Module 8, students continue to develop their geometric thinking from Grade 1, progressing from a descriptive to an analytic level of thinking, where they can recognize and characterize shapes by their attributes and properties.

In Topic A, Lesson 1, students describe various two-dimensional shapes according to specified attributes, such as the number of sides or angles (**2.G.1**). The names of the shapes are intentionally omitted in this lesson in order to encourage students to use precise language in their descriptions. Students must attend to a shape's defining attributes in order to describe the difference between shapes. For example, rather than describing a shape as quadrilateral, students describe it as a shape having four sides and four angles. In this lesson, students come to see the corner of a polygon as an angle, and in Lesson 4, the right angle will be introduced as a square corner. After students name the attributes of shapes, they use geoboards to create a shape given its attributes.

In Lesson 2, students build various polygons as they name them based on attributes. Using uncooked spaghetti of various lengths, they build a triangle, quadrilateral, pentagon, and hexagon (**2.G.1**), adding another piece of spaghetti for each construction. They then identify a collection of various polygons, both exemplars and variants of shapes (as shown below), including those with sides of unequal length. As they analyze shapes, the students expand their bank of mental images associated with names of shapes. Hence, this task serves to broaden, rather than limit, their understanding and to clarify common misconceptions about shapes.

Now that they have created, manipulated, and named shapes, students are ready to draw their own in Lesson 3. This lesson focuses on the four categories of polygons

Pentagons



Triangles



that students built in Lesson 2: triangles, quadrilaterals, pentagons, and hexagons. After the teacher-guided portion of the lesson, students use a ruler to draw straight lines and to create their own shapes, then trade with a partner. Partners take turns naming and analyzing shapes according to their attributes.

In Lesson 4, students use various attributes (e.g., side length, parallel lines, right angles) to identify different quadrilaterals. Along with recognizing trapezoids and rhombuses, seen in Grade 1, students are introduced to parallelograms. They learn to recognize parallel sides and square corners and to name quadrilaterals based on these attributes. For example, students might be questioned and guided as follows: “Draw a quadrilateral with both pairs of opposite sides parallel. We call this a parallelogram.” Next, “Now draw a quadrilateral with both pairs of opposite sides parallel *and* four square corners, or right angles. We call this a rectangle.” Then, the teacher might continue with, “Can you draw another quadrilateral that also has opposite sides parallel, but this time use your ruler to show that all sides are equal? We call this a rhombus.” While students learn the various names of shapes, the emphasis remains on analyzing shapes based on their varied attributes. In doing so, the students begin to notice the similarities and differences between various quadrilaterals.

Finally, in Lesson 5, students focus solely on the square and build its three-dimensional counterpart, the cube. In this lesson, students use toothpicks of equal length and an adhesive, e.g., sticky tack, to construct a cube. After first creating a square and naming its attributes, students are tasked with building a cube with only a picture to guide them. After constructing the cube, students count the number of faces and corners, and they see that right angles (again identified using an index card) are formed at every corner. Finally, with teacher guidance and modeling, students practice drawing cubes (2.G.1). From this lesson, students see a square as a face of the cube.

### A Teaching Sequence Towards Mastery of Attributes of Geometric Shapes

**Objective 1: Describe two-dimensional shapes based on attributes.**  
(Lesson 1)

**Objective 2: Build, identify, and analyze two-dimensional shapes with specified attributes.**  
(Lesson 2)

**Objective 3: Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons.**  
(Lesson 3)

**Objective 4: Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids.**  
(Lesson 4)

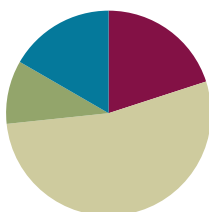
**Objective 5: Relate the square to the cube, and describe the cube based on attributes.**  
(Lesson 5)

## Lesson 1

**Objective:** Describe two-dimensional shapes based on attributes.

### Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Application Problem	(6 minutes)
■ Concept Development	(32 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (12 minutes)

- Rename for the Larger Unit **2.NBT.1** (3 minutes)
- Sprint: Adding Across a Ten **2.OA.2** (9 minutes)

### Rename for the Larger Unit (3 minutes)

Note: This fluency activity reviews place value foundations..

T: I'll tell you a number of ones. Make as many tens as you can, and then tell how many tens and ones. If there are no ones, only say the tens. Ready?

T: 10 ones.

S: 1 ten.

T: 30 ones.

S: 3 tens.

T: 41 ones.

S: 4 tens 1 one.

Repeat the process for the following possible sequence: 50 ones, 54 ones, 80 ones, 85 ones, 99 ones, 100 ones, 105 ones, and 120 ones.

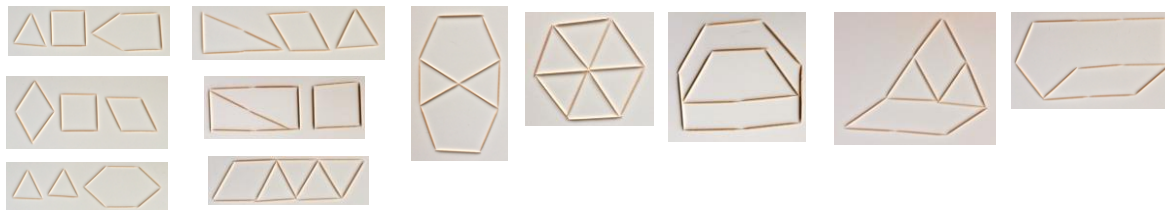
### Sprint: Adding Across a Ten (9 minutes)

Materials: (S) Adding Across a Ten Sprint

Note: This Sprint gives practice with the grade level fluency of adding within 20 and applies it to larger numbers.

### Application Problem (6 minutes)

Terrence is making shapes with 12 toothpicks. Draw 3 different shapes he could make using all of the toothpicks. How many other combinations can you find?



Note: This problem is designed to spark thought about the number of sides needed to produce different shapes. Encourage students to examine one another's work and expand their ideas about combination possibilities. You may need to clarify for students that two or more toothpicks may be used to make one side.

### Concept Development (32 minutes)

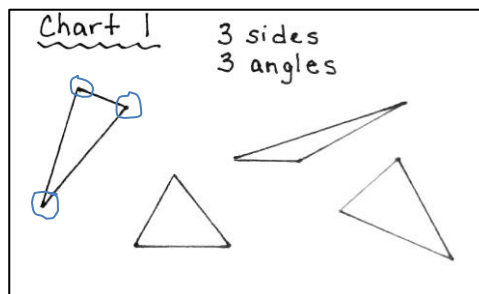
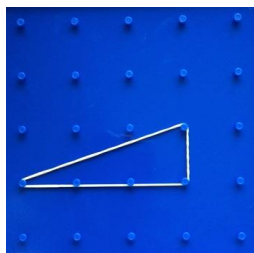
Materials: (T) Chart paper, marker, ruler (S) Personal white board, 1 rubber band, geoboard, 2 pencils

Display four empty charts labeled *Chart 1*, *Chart 2*, *Chart 3*, and *Chart 4* on the board. Distribute one geoboard and rubber band per student. Note: These charts will be used again in future lessons.

- T: Let's look at this shape. (Draw a triangle on Chart 1 as shown at the top of the next page.) How would you describe this shape without using its name?
- S: It has three sides. → It has three corners. → The sides are different lengths. → The sides are straight lines.
- T: Good. If a figure has three corners, then it also has three angles. I'm going to circle the angles on this triangle. (Circle with a marker.)
- T: Use your geoboards to create a shape with three sides and three angles that looks different from mine. (Circulate to check for understanding.)
- S: (Create a three-sided shape on the geoboard, illustrated on the next page.)
- T: I'm going to record some of your shapes on Chart 1. (Use a ruler to draw three more shapes.)
- T: (Point to the shapes on Chart 1.) Although these shapes look different, all of them have some **attributes**, or characteristics, in common. What are they?
- S: They all have three sides, three corners, and three angles. → They all are closed shapes. → They all have straight sides and no curves. → What is a closed shape?
- T: It means there are no gaps or overlaps between the straight sides. This shape is open. (Draw an open shape.)
- T: All of these shapes have common attributes. They all have three straight sides and three angles.



T: (Write 3 Sides and 3 Angles at the top of Chart 1, as shown below.)



T: Now, let's look at another shape. (Draw a quadrilateral with a concave angle on Chart 2, as shown below.) How would you describe this shape without using its name?

S: It has four straight sides. → Some of the sides are different lengths. → It has four corners, so it must have four angles.

T: Yes! Is there an angle here? It looks different. (Point to the concave angle on the quadrilateral.)

S: There's a corner, so I think so. → Yes, I think of an angle like a mouth; this one opens on the outside.

T: You're right. It is an angle. Let's circle the angles as we count them so we don't count the same angle twice. Count with me.

S: 1 angle, 2 angles, 3 angles, 4 angles.

T: Now it's your turn. On your geoboard, create a shape with four sides and four angles that looks different from mine. (Circulate to check for understanding.)

S: (Create a four-sided shape, as shown to the right.)

T: I'm going to record some of your shapes on Chart 2. (Choose various quadrilaterals, such as rectangles of varied lengths, trapezoids, or parallelograms. Include shapes that cannot be easily named. See image to the right.)

T: (Point to the shapes on Chart 2.) Although these shapes look different, all of them have what attributes?

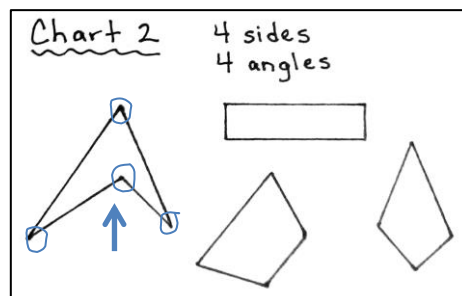
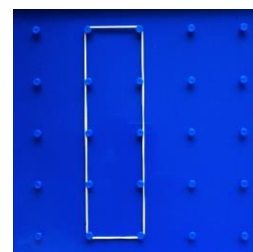
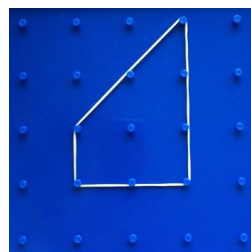
S: Four straight sides and four angles! → They are all closed! → They all have straight lines.

T: You're right. All of these shapes share several attributes. (Write 4 sides and 4 angles at the top of Chart 2 as shown to the right.)



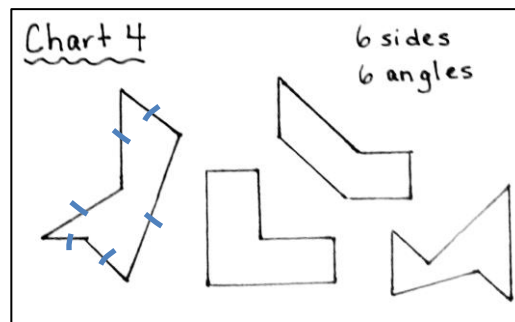
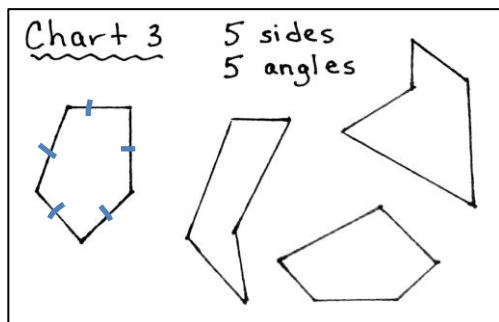
### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Some students find visual discrimination challenging, particularly when they are not looking at the exemplars of a given shape. Provide encouragement to support students' perseverance. Invite students forward to circle the angles on each shape as a way to confirm the attributes discussed.

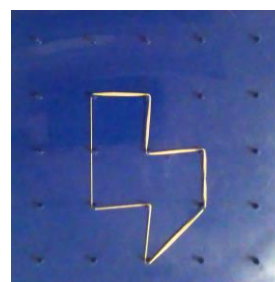


MP.6

Continue the above process for shapes with five sides and five angles (Chart 3), and six sides and six angles (Chart 4), as shown below. As the sides become more numerous, demonstrate how to mark the starting point of the count so students do not count sides twice. Again, highlight many variations of the pentagon and hexagon, drawing attention to various angles.



- T: There are many shapes that have more than six sides or six angles. On your geoboards, see if you can make a shape with seven sides and seven angles. When I say, "Show me," hold up your board so I can see your shape. (Allow students time to work.)
- T: Show me.
- S: (Hold up a seven-sided shape, like the one shown to the right.)
- T: Let's make sure we can count seven angles. Point and count on your shape with me. Ready?
- S: (Point and count chorally.) 1 side, 2 sides, ...7 sides!
- T: Now, let's make a shape with eight sides and eight angles. When I say, "Show me," hold up your boards again. (Allow students time to work.)
- T: Show me.
- S: (Hold up an eight-sided shape, like the one shown to the right.)
- T: This time, let's check for eight angles. Point and count again with me. Ready?
- S: (Point and count chorally.) 1 angle, 2 angles, ...8 angles!
- T: Now, it's your turn to try and stump your partner. Build a shape on your geoboard with any number of sides or angles. Then, trade with your partner. See if you can count the number of sides and angles on your partner's shape. If you agree, then make another shape.
- S: (Create shapes on their geoboards, trade with a partner, and count the number of sides and angles.)
- T: Now that we have done so much work with different shapes, how would you describe an angle? Talk to your partner.



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

In order to support English language learners, write the key terms of the lesson, e.g., *angle*, *sides*, and *attribute*, and post them on the word wall as they are introduced within the meaningful context of the instruction. Students who need the extra support will be able to refer to them whenever it is needed.

- S: It's the place where the corner is. → It's where two sides of the shape connect. → It's where two sides make a corner. → It's the shape of the place where the two sides touch.
- T: Yes, those are all good observations. When two sides come together like this, they form an angle. (Point to an acute angle on a triangle.) Show me this angle with two pencils. (Repeat the process for an obtuse angle and a right angle.)

Continue directing students to make angles to check their level of understanding. Give students directions and allow them time to demonstrate various angles sizes.

- T: Make a big angle!
- T: Make a smaller angle.
- T: Make a tiny angle.
- T: Make a huge angle.

Note: It is not necessary for students to know the terms obtuse, acute, and right for angles at this stage. This topic focuses instead on naming and describing shapes. The only angle critical to this focus is the right angle, which can be discussed as a square corner.

### Problem Set (10 minutes)


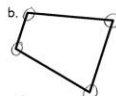

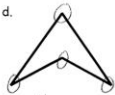
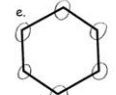
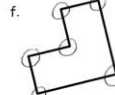

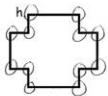
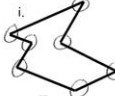
Students should do their personal best to complete the Problem Set within the allotted 10 minutes. Some problems do not specify a method for solving. This is an intentional reduction of scaffolding that invokes MP.5, Use Appropriate Tools Strategically. Students should solve these problems using the RDW approach used for Application Problems.

For some classes, it may be appropriate to modify the assignment by specifying which problems students should work on first. With this option, let the careful sequencing of the Problem Set guide your selections so that problems continue to be scaffolded. Balance word problems with other problem types to ensure a range of practice. Assign incomplete problems for homework or at another time during the day.

Note: Problem 2(e) can be interpreted in different ways. All of the shapes have the same number of sides and angles (e.g., Question 2a has three sides and three angles), so the correct answer is all of them.

Name Yossef Date \_\_\_\_\_

1. Identify the number of sides and angles for each shape. Circle each angle as you count. The first one has been done for you.

a. 	b. 	c. 
<u>3</u> sides <u>3</u> angles	<u>4</u> sides <u>4</u> angles	<u>5</u> sides <u>5</u> angles
d. 	e. 	f. 
<u>5</u> sides <u>5</u> angles	<u>6</u> sides <u>6</u> angles	<u>6</u> sides <u>6</u> angles
g. 	h. 	i. 
<u>8</u> sides <u>8</u> angles	<u>4</u> sides <u>4</u> angles	<u>7</u> sides <u>7</u> angles

## Student Debrief (10 minutes)

**Lesson Objective:** Describe two-dimensional shapes based on attributes.

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.

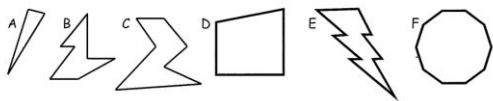
You may choose to use any combination of the questions below to lead the discussion.

- Look at the Problem Set. What did you notice about the number of angles and sides in each shape? How did you answer Problem 2(e)?
- Look at all the shapes on the first page of the Problem Set. With your partner, group the shapes based on the number of sides and angles each shape has.
- Look at the last problem on the Problem Set, which shows the two shapes on the geoboards. Tell your partner what would make the smaller shape the same as the larger shape.
- When Ethan first counted the sides on the first shape in Problem 3, he thought that it had 10 sides. How would you explain his mistake to him? How is this like the problem we began with today?
- Tell your partner why you need to pay attention to more than how a shape looks when grouping shapes.

## Exit Ticket (3 minutes)

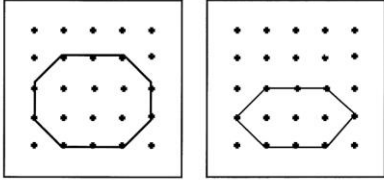
After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

2. Study the shapes below. Then answer the questions.



a. Which shape has the most sides? E  
 b. Which shape has 3 more angles than shape C? F  
 c. What shape has 3 fewer sides than shape B? D  
 d. How many more angles does shape C have than shape A? 4  
 e. Which of these shapes have the same number of sides as angles? all

3. Ethan said the two shapes below are both six-sided figures but just different sizes. Explain why he is incorrect.



They are not both 6 sided. One figure has 6 sides  
and the other has 8 sides.

**A**

# Correct \_\_\_\_\_

Add.

1	$8 + 1 =$		23	$50 + 30 =$	
2	$18 + 1 =$		24	$58 + 30 =$	
3	$28 + 1 =$		25	$9 + 3 =$	
4	$58 + 1 =$		26	$90 + 30 =$	
5	$7 + 2 =$		27	$97 + 30 =$	
6	$17 + 2 =$		28	$8 + 4 =$	
7	$27 + 2 =$		29	$80 + 40 =$	
8	$57 + 2 =$		30	$83 + 40 =$	
9	$6 + 3 =$		31	$83 + 4 =$	
10	$36 + 3 =$		32	$7 + 6 =$	
11	$5 + 4 =$		33	$70 + 60 =$	
12	$45 + 4 =$		34	$74 + 60 =$	
13	$30 + 9 =$		35	$74 + 5 =$	
14	$9 + 2 =$		36	$73 + 6 =$	
15	$39 + 2 =$		37	$58 + 7 =$	
16	$50 + 8 =$		38	$76 + 5 =$	
17	$8 + 4 =$		39	$30 + 40 =$	
18	$58 + 4 =$		40	$20 + 70 =$	
19	$50 + 20 =$		41	$80 + 70 =$	
20	$54 + 20 =$		42	$34 + 40 =$	
21	$70 + 20 =$		43	$23 + 50 =$	
22	$76 + 20 =$		44	$97 + 60 =$	

**B**

Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

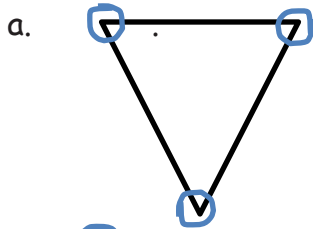
Add.

1	$7 + 1 =$		23	$50 + 30 =$	
2	$17 + 1 =$		24	$57 + 30 =$	
3	$27 + 1 =$		25	$8 + 3 =$	
4	$47 + 1 =$		26	$80 + 30 =$	
5	$6 + 2 =$		27	$87 + 30 =$	
6	$16 + 2 =$		28	$9 + 4 =$	
7	$26 + 2 =$		29	$90 + 40 =$	
8	$46 + 2 =$		30	$93 + 40 =$	
9	$5 + 3 =$		31	$93 + 4 =$	
10	$75 + 3 =$		32	$8 + 6 =$	
11	$5 + 4 =$		33	$80 + 60 =$	
12	$75 + 4 =$		34	$84 + 60 =$	
13	$40 + 9 =$		35	$84 + 5 =$	
14	$9 + 2 =$		36	$83 + 6 =$	
15	$49 + 2 =$		37	$68 + 7 =$	
16	$60 + 8 =$		38	$86 + 5 =$	
17	$8 + 4 =$		39	$20 + 30 =$	
18	$68 + 4 =$		40	$30 + 60 =$	
19	$50 + 20 =$		41	$90 + 70 =$	
20	$56 + 20 =$		42	$36 + 40 =$	
21	$70 + 20 =$		43	$27 + 50 =$	
22	$74 + 20 =$		44	$94 + 70 =$	

Name \_\_\_\_\_

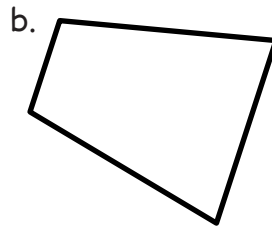
Date \_\_\_\_\_

1. Identify the number of sides and angles for each shape. Circle each angle as you count. The first one has been done for you.



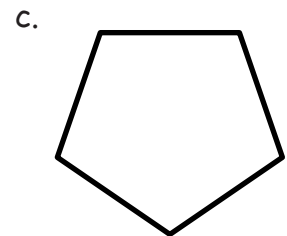
3 sides

3 angles



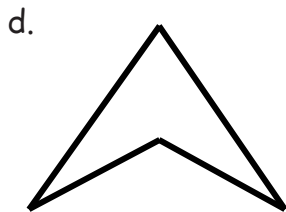
\_\_\_\_\_ sides

\_\_\_\_\_ angles



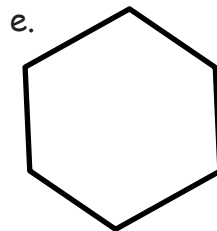
\_\_\_\_\_ sides

\_\_\_\_\_ angles



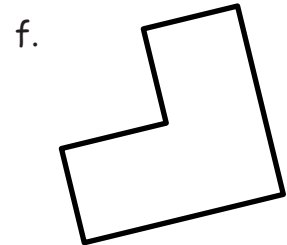
\_\_\_\_\_ sides

\_\_\_\_\_ angles



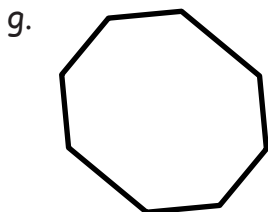
\_\_\_\_\_ sides

\_\_\_\_\_ angles



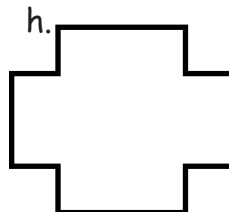
\_\_\_\_\_ sides

\_\_\_\_\_ angles



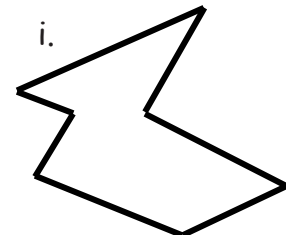
\_\_\_\_\_ sides

\_\_\_\_\_ angles



\_\_\_\_\_ sides

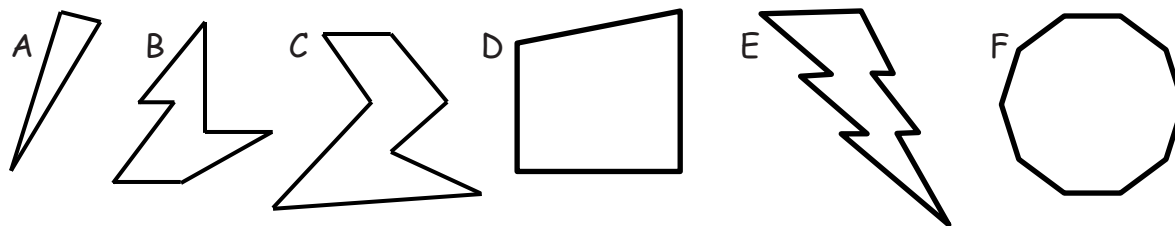
\_\_\_\_\_ angles



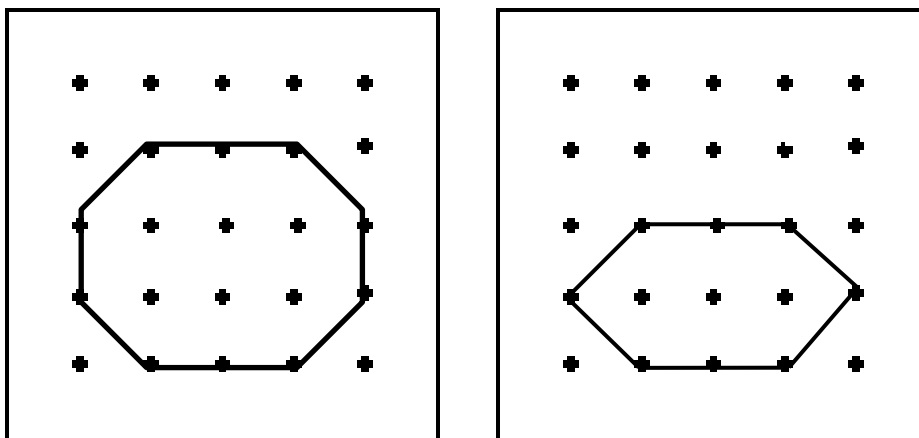
\_\_\_\_\_ sides

\_\_\_\_\_ angles

2. Study the shapes below. Then answer the questions.



- Which shape has the most sides? \_\_\_\_\_
  - Which shape has 3 more angles than shape C? \_\_\_\_\_
  - What shape has 3 fewer sides than shape B? \_\_\_\_\_
  - How many more angles does shape C have than shape A? \_\_\_\_\_
  - Which of these shapes have the same number of sides as angles? \_\_\_\_\_
3. Ethan said the two shapes below are both six-sided figures but just different sizes. Explain why he is incorrect.




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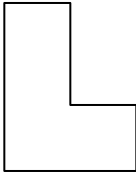


Name \_\_\_\_\_

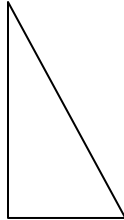
Date \_\_\_\_\_

1. Study the shapes below. Then answer the questions.

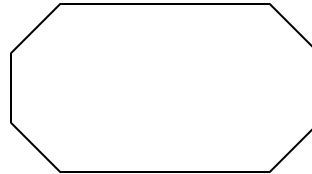
A



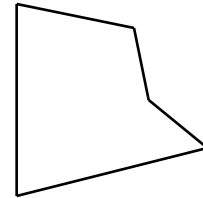
B



C



D



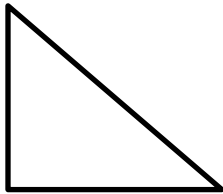
- Which shape has the most sides? \_\_\_\_\_
- Which shape has 3 fewer angles than shape C? \_\_\_\_\_
- What shape has 3 more sides than shape B? \_\_\_\_\_
- Which of these shapes have the same number of sides as angles? \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Identify the number of sides and angles for each shape. Circle each angle as you count.

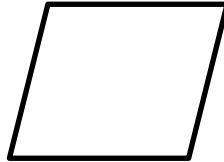
a.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

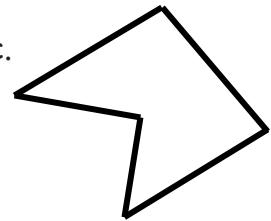
b.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

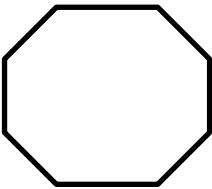
c.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

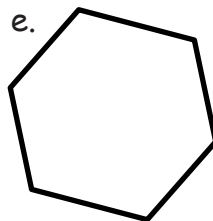
d.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

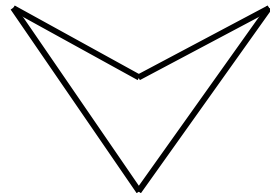
e.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

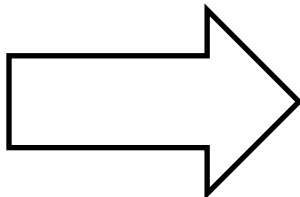
f.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

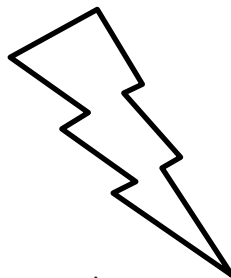
g.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

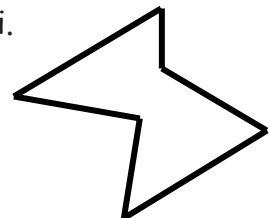
h.



\_\_\_\_\_ sides

\_\_\_\_\_ angles

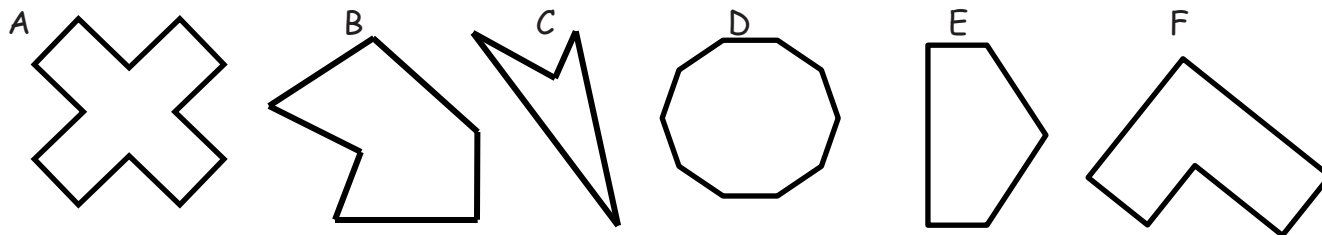
i.



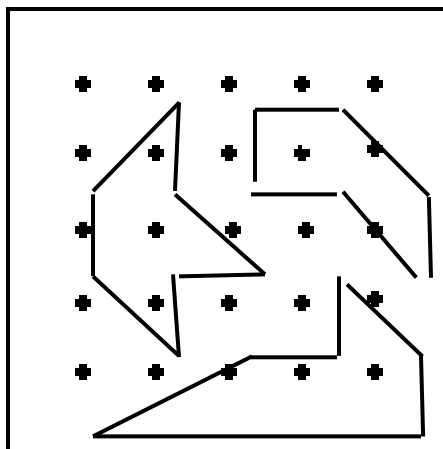
\_\_\_\_\_ sides

\_\_\_\_\_ angles

2. Study the shapes below. Then answer the questions.



- Which shape has the most angles? \_\_\_\_\_
  - Which shape has 4 more angles than shape F? \_\_\_\_\_
  - What shape has 5 fewer sides than shape D? \_\_\_\_\_
  - How many more angles does shape A have than shape B? \_\_\_\_\_
  - Which of these shapes have the same number of sides as angles? \_\_\_\_\_
3. Joseph's teacher said to make shapes with 6 sides and 6 angles on his geoboard. Shade the shapes that share these attributes, and circle the shape that does not belong. Explain why it does not belong.




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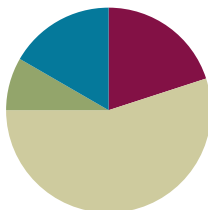
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## Lesson 2

**Objective:** Build, identify, and analyze two-dimensional shapes with specified attributes.

### Suggested Lesson Structure

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



### Fluency Practice (12 minutes)

- Rename for the Larger Unit **2.NBT.1** (3 minutes)
- Sprint: Make a Hundred to Add **2.NBT.7** (9 minutes)

### Rename for the Larger Unit (3 minutes)

Note: This fluency activity reviews place value foundations.

T: (Write 10 ones = \_\_\_\_ tens.)

T: I'm going to give you a number of ones. I want you to make as many tens as you can, and then tell me how many tens and ones. If there are no ones, then just say the tens. Ready?

T: Say the number sentence.

S: 10 ones = 1 ten.

T: (Write 100 ones = \_\_\_\_ tens 10 ones.) Say the number sentence.

S: 100 ones is 9 tens 10 ones.

T: 120 ones = \_\_\_\_ tens 10 ones.

S: 120 ones = 11 tens 10 ones.

Repeat the process for the following possible sequence: 140 ones, 210 ones, 250 ones, 225 ones, 381 ones, 360 ones, and 306 ones.

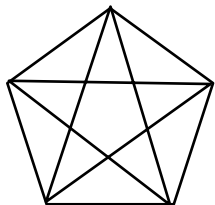
### Sprint: Make a Hundred to Add (9 minutes)

Materials: (S) Make a Hundred to Add Sprint

Note: Students review compensation, making a hundred, when adding in order to gain automaticity.

### Application Problem (5 minutes)

How many triangles can you find? (Hint: If you only found 10, keep looking!)



Note: For this Application Problem, students will use the template included at the end of the lesson. This brainteaser challenges students to search for a familiar shape, the triangle, in a different way. Students are encouraged to think creatively as they find triangles of various sizes and orientations. There are 35 triangles. Hint: There are five of each variation of triangle as students track them around the pentagon.



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Offer students with disabilities and students having difficulty seeing a solution a strategy to solve the triangle Application Problem. They can write the numbers inside the most obvious triangles and then lightly shade the larger triangles within the pentagon.

Another option is to print out the whole page for a student and have her shade one triangle at a time on each separate image.



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Tap into English language learning students' culture and language by asking them to contribute the words for polygon, triangle, pentagon, hexagon, and octagon in their native language (parents can help). Add the names in the students' languages to the charts. This will not only help students to bridge the languages, but will enrich the whole class' experience as well, since in Latin-based languages these are generally cognates. For example in Spanish, they are *polígono*, *triángulo*, *rectángulo*, *pentágono*, *hexágono*, and *octágono*.

### Concept Development (33 minutes)

Materials: (T) 4 charts from G2–M8–Lesson 1, tape, sentence strips with shape names (triangle, quadrilateral, pentagon, hexagon) (S) Container of uncooked spaghetti of differing lengths per each group of four students, 1 piece of dark construction paper per student

Note: The polygon is described first, as the other listed descriptions stem from it. The descriptions provided here provide a solid foundation to the definitions that will be part of students' experience in later grades.

When introducing the term *polygon*, show images of polygons and summarize by saying that they are closed shapes that are made up of some number of straight sides. Polygon and other shape descriptions are given below.

**Polygon:** Made up of line segments called *sides*. Every side meets exactly two other sides at the corners. A polygon always has the same number of angles as sides.

**Triangle:** A three-sided polygon with three angles.

**Quadrilateral:** A four-sided polygon with four angles.

**Pentagon:** A five-sided polygon with five angles.

Hexagon: A six-sided polygon. It also has six angles.

Prior to the lesson, arrange students in groups of four with a container of spaghetti for building shapes and 1 piece of dark construction paper per student.

T: Take two pieces of spaghetti of any length out of the container. Let's call these our sides. On your paper, arrange the spaghetti so that the two sides meet to make an angle.

S: (Arrange their spaghetti pieces into an open shape, shown at right.)

T: Take another piece of spaghetti and close the shape creating two more corners or angles.

S: (Complete the shape.)

T: Name the shape you just made.

S: Triangle.

T: Yes. Shapes can be described with more than one name. We can also use the word **polygon** to describe the triangle. A polygon is a closed shape with three or more angles, so a triangle is the smallest polygon.

T: Can you think of other shapes that are polygons?

S: Hexagon. → Rectangle. → Square.

T: (Draw an open shape with two sides on the board, pointing to one side.) How many sides meet this one?

S: Only one.

T: Is this a polygon?

S: No! It only has one angle. → It's not closed!

T: How can we turn this into a polygon?

S: Add another side?

T: Yes, I can add another side to close the shape like this. (Draw a line to complete the triangle.)

T: Turn and talk: This is a polygon. How do we know?

S: It's closed. → It has three angles. → It's a triangle, and that's a polygon.

T: You're right! Today we are going to name our shapes based on their attributes, or characteristics. (Hold up the word *triangle*.) Listen carefully: *Tri-* means three. So, a triangle is a shape with...?

S: Three angles!

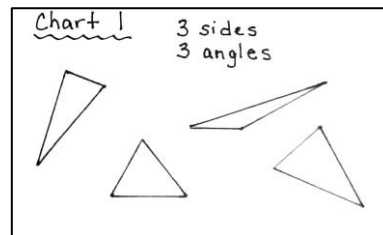
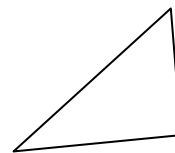
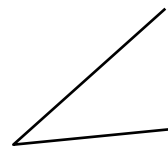
T: (Reveal Chart 1 from yesterday's lesson.) Here is the chart we made yesterday. A shape with three sides and three corners, or angles, can be named...?

S: A triangle!

T: (Tape the *triangle* card to the top of Chart 1.)

S: What do you notice about these triangles and the one on your paper?

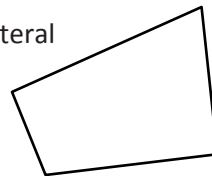
S: They don't all look the same. → They all have three sides and three corners, or angles. → Not all triangles look like this (points to an equilateral triangle). → I noticed that not all the sides are the same length; some are long, and some are short.



T: Good. So, even though they don't look the same, they are all triangles because they all have three sides and three corners, or angles.

T: Take another piece of spaghetti and make a closed shape with four sides.

S: (Build a quadrilateral. Due to the differing lengths of spaghetti the quadrilateral should be irregular and not as easy to name as a square or rectangle would be.)



T: Can you name the shape you made?

S: No, but it has four sides and four angles.

T: You just built another polygon, called a **quadrilateral**! (Hold up the word *quadrilateral* on a sentence strip.) *Quad-* means four. *Lateral* refers to sides. When we say quadrilateral, we're talking about a polygon with four sides.

T: (Reveal Chart 2 from yesterday's lesson.) What can we label our chart that has shapes with four sides and four angles?

S: Quadrilaterals!

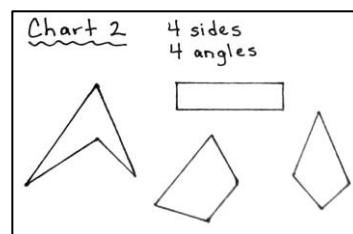
T: (Tape the *quadrilateral* card to the top of Chart 2.)

T: What do you notice about these quadrilaterals and the one on your paper?

S: They all have four sides, corners, and angles. → Some look like shapes I know, but some look different. → Some have equal sides, but some don't.

T: Good. The reason why these shapes are quadrilaterals is because of their shared attributes, not because of the way they look. These all have four straight sides, so they are...?

S: Quadrilaterals!



Continue to add a fifth and sixth piece of spaghetti to make a pentagon, then a hexagon. Follow the pattern above to discuss what students notice about the various shapes. Reveal Charts 3 and 4, labeling the pentagons and hexagons with the appropriate word cards. You may choose to add more pieces of spaghetti, giving students the opportunity to experiment with creating even larger polygons (e.g., heptagon, octagon).

T: Now, we're going to play Complete that Shape. I am going to draw part of a shape on the board, like this (as shown on right). Then, I will say, "Complete that pentagon." With your spaghetti, start with the part I have drawn and add more spaghetti sides, corners, and angles until you have built the entire shape. You can break the spaghetti into smaller pieces. Let's play.

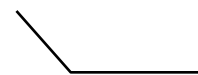


T: (Show an obtuse angle, as illustrated at right.) Complete that quadrilateral!

S: (Add two more pieces of spaghetti of varying lengths to create a quadrilateral.)

T: How many sides and angles do you have?

S: Four!



Continue playing the game to create more triangles, quadrilaterals, pentagons, and hexagons. Once students have had a few minutes to practice building different shapes with spaghetti, instruct them to work independently on 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 solve these problems using the RDW approach used for Application Problems.

## Student Debrief (10 minutes)

**Lesson Objective:** Build, identify, and analyze two-dimensional shapes with specified attributes.

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.

- Compare your shape names on the first page of your Problem Set with your partner's. Are there any shape names you disagree on? If yes, discuss who is correct and why.
- Look at the first shape on your Problem Set. What did you name it? (Quadrilateral.) Could you name it something else? (Polygon, rectangle.)
- If you closed your eyes and felt a shape with four sides and four corners could you name it? What would you name it?
- Picture a square in your head. Could you describe a square with another name?
- Could a polygon have only two angles? Why or why not?
- Polygons have many angles. *Poly-* means *many* and *-gon* means *angle*. What is the smallest number of angles a polygon can have? What do you think the largest number of angles could be?

Name José Date \_\_\_\_\_

1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

Hexagon	Quadrilateral	Triangle	Pentagon
a.	b.	c.	
d. <u>quadrilateral</u>	e. <u>triangle</u>	f. <u>pentagon</u>	
g.	h.	i.	
j. <u>hexagon</u>	k. <u>triangle</u>	l. <u>quadrilateral</u>	
m.	n.	o.	
p. <u>quadrilateral</u>	q. <u>hexagon</u>	r. <u>pentagon</u>	
s.	t.	u.	
v. <u>quadrilateral</u>	w. <u>quadrilateral</u>	x. <u>triangle</u>	

2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
a. Triangle <u>1</u> lines were added. There are <u>3</u> total sides.		
b. Hexagon <u>4</u> lines were added. There are <u>6</u> total sides.		
c. Quadrilateral <u>2</u> lines were added. There are <u>4</u> total sides.		
d. Pentagon <u>3</u> lines were added. There are <u>5</u> total sides.		

3. a. Explain why both polygon A and B are hexagons.  
They both have 6 sides and 6 angles.

b. Draw a different hexagon than the two that are shown.

4. Explain why both polygon C and D are quadrilaterals.  
They both have 4 sides and 4 angles.



**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Add.

1	$98 + 3 =$		23	$99 + 12 =$	
2	$98 + 4 =$		24	$99 + 23 =$	
3	$98 + 5 =$		25	$99 + 34 =$	
4	$98 + 8 =$		26	$99 + 45 =$	
5	$98 + 6 =$		27	$99 + 56 =$	
6	$98 + 9 =$		28	$99 + 67 =$	
7	$98 + 7 =$		29	$99 + 78 =$	
8	$99 + 2 =$		30	$35 + 99 =$	
9	$99 + 3 =$		31	$45 + 98 =$	
10	$99 + 4 =$		32	$46 + 99 =$	
11	$99 + 9 =$		33	$56 + 98 =$	
12	$99 + 6 =$		34	$67 + 99 =$	
13	$99 + 8 =$		35	$77 + 98 =$	
14	$99 + 5 =$		36	$68 + 99 =$	
15	$99 + 7 =$		37	$78 + 98 =$	
16	$98 + 13 =$		38	$99 + 95 =$	
17	$98 + 24 =$		39	$93 + 99 =$	
18	$98 + 35 =$		40	$99 + 95 =$	
19	$98 + 46 =$		41	$94 + 99 =$	
20	$98 + 57 =$		42	$98 + 96 =$	
21	$98 + 68 =$		43	$94 + 98 =$	
22	$98 + 79 =$		44	$98 + 88 =$	

**B**

Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

Add.

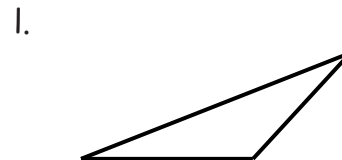
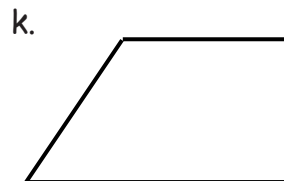
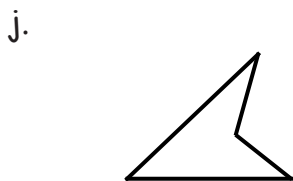
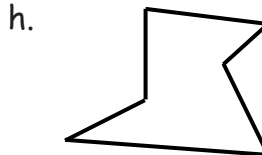
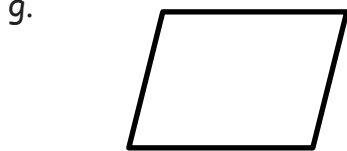
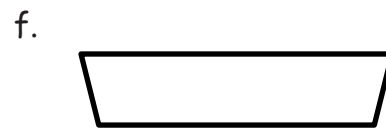
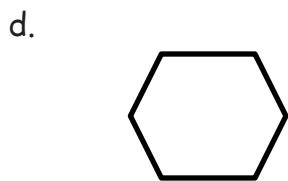
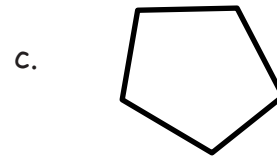
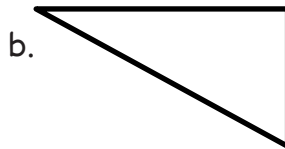
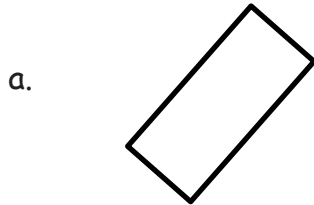
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2	$99 + 3 =$		24	$98 + 24 =$	
3	$99 + 4 =$		25	$98 + 35 =$	
4	$99 + 8 =$		26	$98 + 46 =$	
5	$99 + 6 =$		27	$98 + 57 =$	
6	$99 + 9 =$		28	$98 + 68 =$	
7	$99 + 5 =$		29	$98 + 79 =$	
8	$99 + 7 =$		30	$25 + 99 =$	
9	$98 + 3 =$		31	$35 + 98 =$	
10	$98 + 4 =$		32	$36 + 99 =$	
11	$98 + 5 =$		33	$46 + 98 =$	
12	$98 + 9 =$		34	$57 + 99 =$	
13	$98 + 7 =$		35	$67 + 98 =$	
14	$98 + 8 =$		36	$78 + 99 =$	
15	$98 + 6 =$		37	$88 + 98 =$	
16	$99 + 12 =$		38	$99 + 93 =$	
17	$99 + 23 =$		39	$95 + 99 =$	
18	$99 + 34 =$		40	$99 + 97 =$	
19	$99 + 45 =$		41	$92 + 99 =$	
20	$99 + 56 =$		42	$98 + 94 =$	
21	$99 + 67 =$		43	$96 + 98 =$	
22	$99 + 78 =$		44	$98 + 86 =$	

Name \_\_\_\_\_

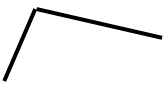
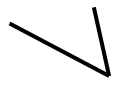


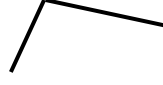
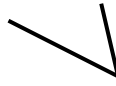
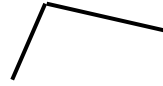
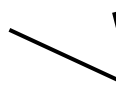
Date \_\_\_\_\_

1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

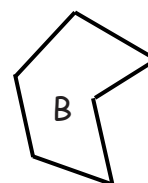
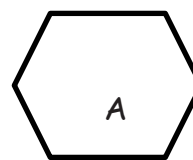
Hexagon	Quadrilateral	Triangle	Pentagon
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2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
<p>a. Triangle</p> <p>_____ lines were added.</p> <p>There are _____ total sides.</p>		
<p>b. Hexagon</p> <p>_____ lines were added.</p> <p>There are _____ total sides.</p>		
<p>c. Quadrilateral</p> <p>_____ lines were added.</p> <p>There are _____ total sides.</p>		
<p>d. Pentagon</p> <p>_____ lines were added.</p> <p>There are _____ total sides.</p>		

3. a. Explain why both polygon A and B are hexagons.

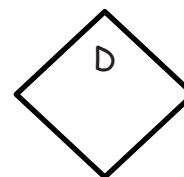


\_\_\_\_\_

\_\_\_\_\_

b. Draw a different hexagon than the two that are shown.

4. Explain why both polygon C and D are quadrilaterals.



\_\_\_\_\_

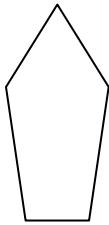
Name \_\_\_\_\_

Date \_\_\_\_\_

1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

Hexagon	Quadrilateral	Triangle	Pentagon
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a.



\_\_\_\_\_

b.



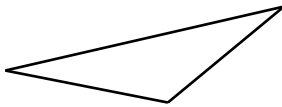
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c.



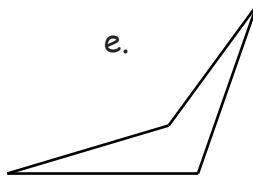
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d.



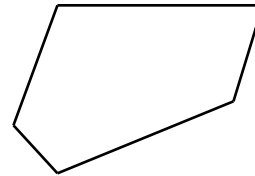
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e.



\_\_\_\_\_

f.



\_\_\_\_\_

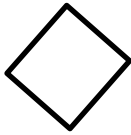
Name \_\_\_\_\_

Date \_\_\_\_\_

1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

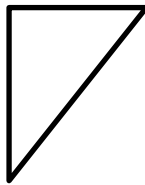
Hexagon	Quadrilateral	Triangle	Pentagon
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a.



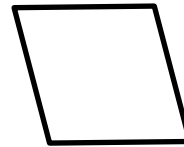
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b.



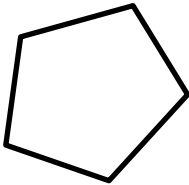
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c.



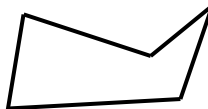
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d.



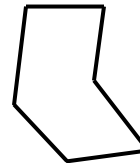
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e.



\_\_\_\_\_

f.



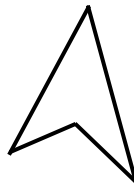
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g.



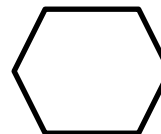
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h.



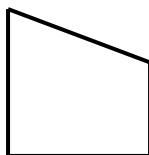
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i.



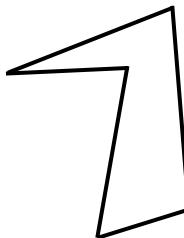
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j.



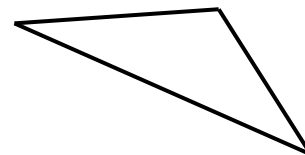
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k.





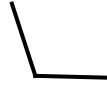



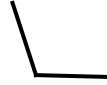

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l.

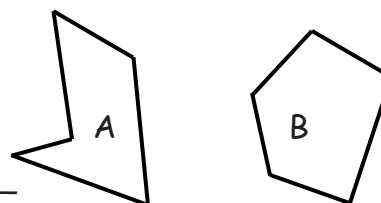


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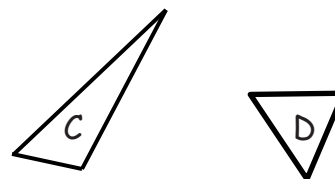
2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
a. Quadrilateral ____ lines were added. There are ____ total sides.		
b. Pentagon ____ lines were added. There are ____ total sides.		
c. Triangle ____ lines were added. There are ____ total sides.		
d. Hexagon ____ lines were added. There are ____ total sides.		

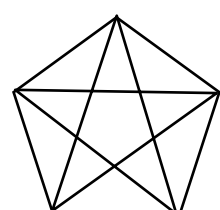
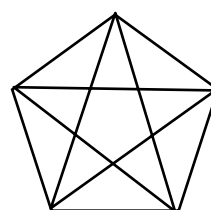
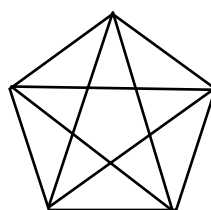
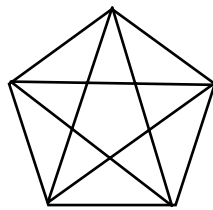
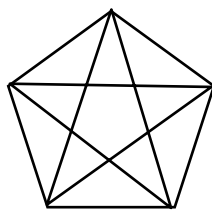
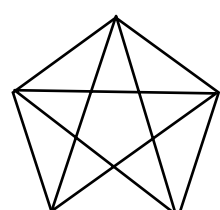
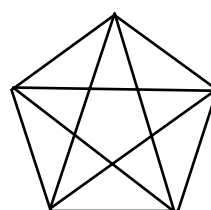
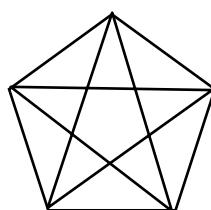
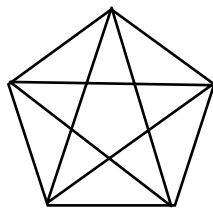
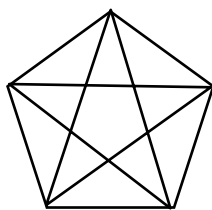
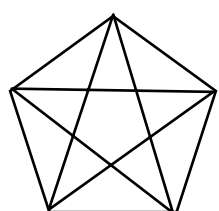
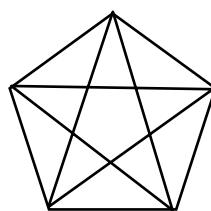
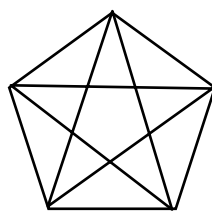
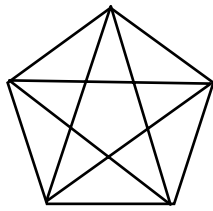
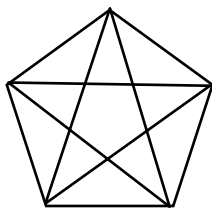
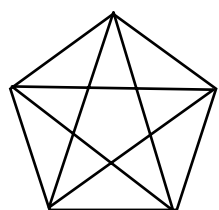
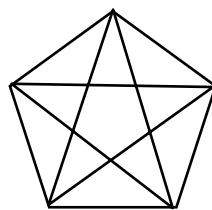
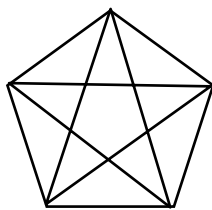
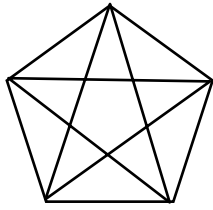
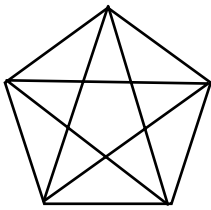
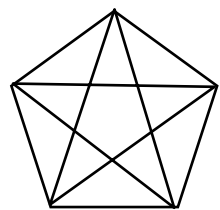
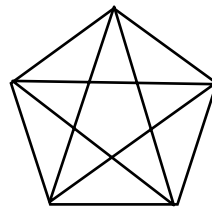
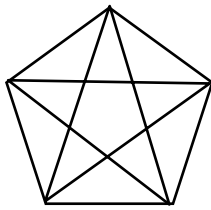
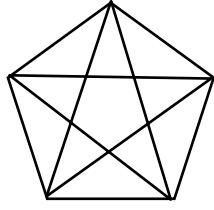
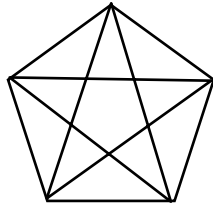
3. Explain why both polygon A and B are pentagons.

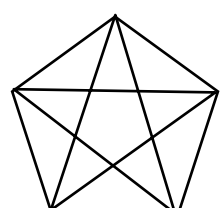
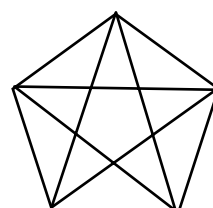
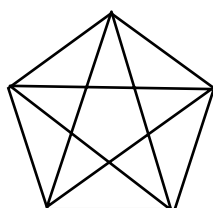
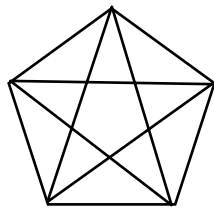
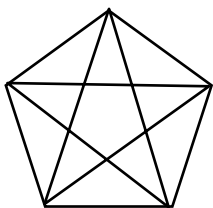
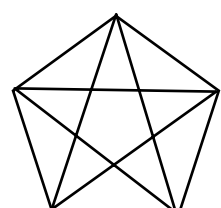
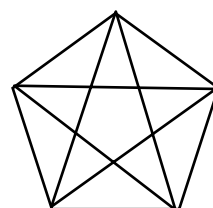
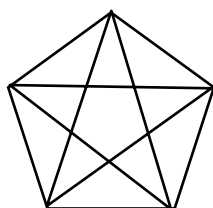
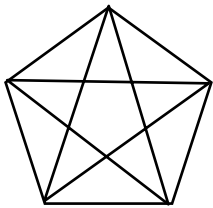
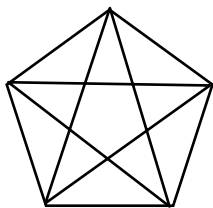
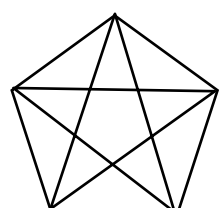
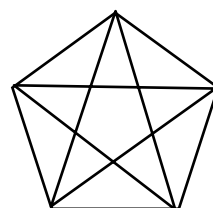
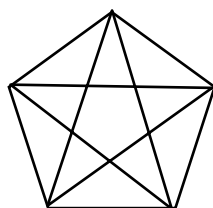
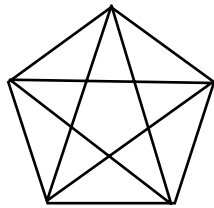
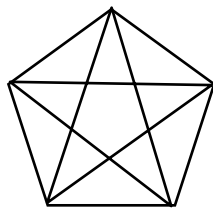
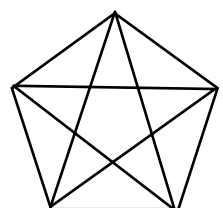
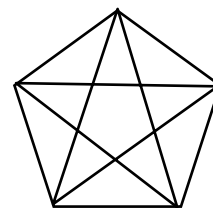
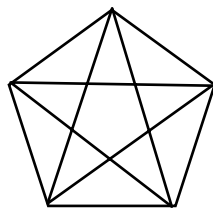
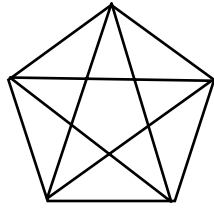
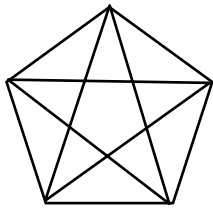
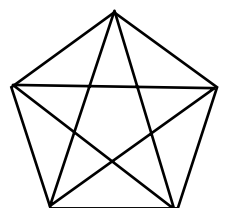
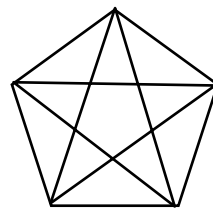
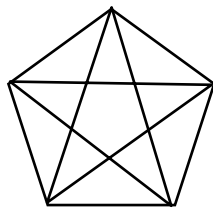
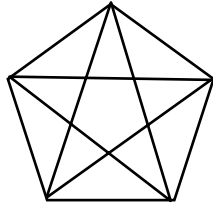
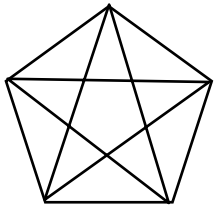


4. Explain why both polygon C and D are triangles.







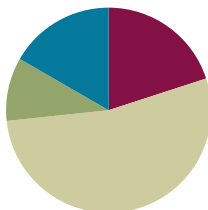


## Lesson 3

**Objective:** Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons.

### Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(6 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (12 minutes)

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

### Addition with Renaming (7 minutes)

**Materials:** (S) Personal white board, place value chart

**Note:** This fluency drill reviews the application of the chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and in standard form. Students will use their personal boards and a place value chart to solve.

T: (Write  $159 + 17$  horizontally on the board.) Let's use a chip model to add. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T: 1 hundred, 5 tens, 9 ones plus 1 ten, 7 ones is...?

S: 1 hundred, 7 tens, 6 ones!

T:  $159 + 17$  is...?

S: 176!

Continue with the following possible sequence:  $224 + 28$ ,  $267 + 82$ ,  $398 + 31$ , and  $336 + 55$ .

## Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

Materials: (S) Core Fluency Practice Sets

Note: During G2–M8–Topic A 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. Five options are provided in this lesson for the Core Fluency Practice Set, with Sheet A being the most simple addition fluency of the grade to Sheet E being the most complex. Start all students on Sheet A. Keep a record of student progress so that you can move students to more complex sheets when they are ready.

Students complete as many problems as they can in 120 seconds. We recommend 100% accuracy and completion before moving to the next level. Collect any Practice Sheets that have been completed within the 120 seconds, and check the answers. The next time Core Fluency Practice Sets are used, students who have successfully completed their set today can be provided with the next level.

Consider assigning early finishers a counting pattern and start number. Celebrate improvement as well as advancement. Students should be encouraged to compete with themselves rather than their peers. Discuss possible strategies to solve with students. Notify caring adults of each student’s progress.

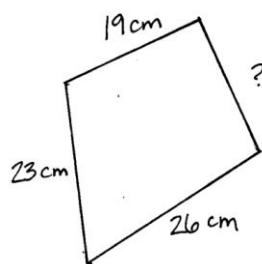


### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

To help struggling students engage with the Application Problem, offer a version with simpler numbers, e.g., sides of 3 cm, 9 cm, and 2 cm with a perimeter of 20 cm. Students can then solve the word problem without getting bogged down by the numbers.

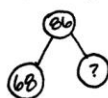
## Application Problem (6 minutes)

Three sides of a quadrilateral have the following lengths: 19 cm, 23 cm, and 26 cm. If the total distance around the shape is 86 cm, what is the length of the fourth side?



$$19 + 23 + 26 = ?$$

$$\begin{array}{r} 122 \\ 20 + 48 = 68 \end{array}$$



$$68 + \underline{\quad} = 86$$

$$68 + 20 - 2 = 86$$

$$20 - 2 = 18$$

The fourth side is 18 cm long.

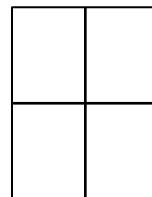
Note: This problem allows students to solve a two-step measurement word problem involving length in the context of geometric shapes using the RDW process. Encourage students to share their solution methods. For example, some may subtract, while others might count up to find the unknown side length.

## Concept Development (32 minutes)

Materials: (T) Document camera (if available), large piece of chart paper for a polygon sort (S) Straightedge, scissors, piece of white  $8\frac{1}{2}$ "  $\times$  11" inch paper

### Part 1: Drawing Polygons

Distribute one straightedge and piece of white paper to each student. Instruct students to follow you as they fold their papers in half twice (as shown on right), so that they have four sections on both sides of the paper for drawing. For precision, students should use a pencil so that they have the option to erase as they draw the shapes.



T: (On the board, draw a shape with a curve and two straight sides, as shown below.)

T: Is this a polygon?

S: No!

T: What attribute is it missing?

S: Straight sides!

T: How about this shape? (Draw a pentagon, as shown at right.)

S: Yes, it's a polygon, because the sides are straight. → It has the same number of sides and corners.

T: Yes, and what's another word for corners?

S: Angles.

T: Since polygons have straight sides, and the sides meet neatly at corners to form angles, let's use our straightedges to be precise when drawing different polygons today.

T: In one section on the paper you folded earlier, use your straightedge to draw a polygon with four straight sides. (Allow students time to draw.)

T: Describe your shape to your partner. (Listen and facilitate the descriptions below.)

S: Mine has four straight sides. → I have a polygon with four sides and four angles. → My quadrilateral has two little angles and two bigger angles. → Two of my shape's sides are short, and two are long.

T: (Circulate and observe student work.) Nice! I can see that some of your shapes look very different, even though they all have four sides and four angles. What do we call a polygon with four sides and four angles?

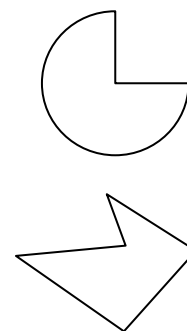
S: A quadrilateral!

T: In the next section of your paper, use your straightedge to draw a polygon with six angles.

S: (Draw a hexagon with six angles and six straight sides.)

T: Show your partner the six corners, or angles, of your polygon by circling them.

S: (Circle and count the angles while showing a partner.)



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Throughout the lesson, point to visuals posted on the board to help English language learners follow along. For instance, when asking students, "What do you know about the sides of the polygon?" point first to a side and then to the drawn pentagon.

MP.3

T: Good. Now show your partner the six straight sides of your polygon by crossing each one out as you count them, so you don't count the same side twice.

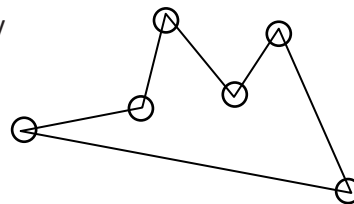
S: (Count sides while showing a partner.)

T: (Circulate and observe students sharing.) Great thinking! What is the same about all of your shapes?

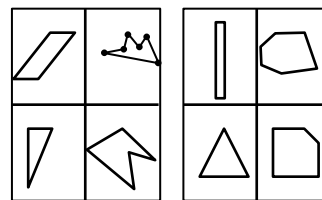
S: They all have six sides. → They are all called *hexagons*. → They have six corners and six angles.

T: Yes, and what is different?

S: The sides have all different lengths. → Some are big, and some are little. → They all look a little different.



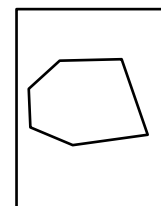
Instruct students to fill in the remaining two sections of their papers with a polygon with *three* sides and then a polygon with *five* angles (see examples at right), using the above vignette as necessary or appropriate.



**Find a Friend:** Instruct students to gently walk to find a friend with a different looking polygon with three, four, five, and six sides: “Find a friend with a triangle that looks different from yours.”

## Part 2: Sorting Polygons

While students are playing Find a Friend, distribute scissors and hang chart paper for the polygon sort. Students will need to work with a partner during the next portion of the lesson.



T: Now that you have drawn four polygons on your paper, use your scissors to cut on the folded lines so that you have four pieces of paper. (See image on the previous page.)

T: Trade shapes with a partner, and take turns describing the shapes' attributes. Then, name them by writing the words *triangle*, *quadrilateral*, *pentagon*, or *hexagon*.

T: Choose one polygon to put on our chart. (Display polygon chart.) Place it on the edge of your desk so I can add it to the chart while you complete your Problem Set.

Polygons!			
triangles	quadrilaterals	pentagons	hexagons

As students work on the Problem Set, place student cards on the chart based on how the student named the shape. Mistakes are anonymous and can lead to interesting discussions in the Student Debrief.

## 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 solve these problems using the RDW approach used for Application Problems.

## Student Debrief (10 minutes)

**Lesson Objective:** Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons.

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 Problems 1(b) and 2(b). How are these problems similar? How are they different?
- Look at Problems 1(d) and 2(d). Do all of your six-sided polygons look alike? What can we call a six-sided polygon? Can hexagons have five sides? Why not?
- If you know how many corners a polygon has, what else do you know about that polygon?
- Why is it important to use a straightedge when drawing polygons?
- Look closely at our polygon chart. Do you agree with the way that we sorted and named all of the polygons? If not, which do you disagree with and why?
- Pick a polygon that is not yours, and tell your partner why it is in the correct column.
- Did our polygon chart remind you of other work we have done in Grade 2?
- Tell your partner one word that you learned today that you did not know before.

## Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name Nydia Date \_\_\_\_\_

1. Use a straightedge to draw the polygon with the given attributes in the space to the right.

a. Draw a polygon with 3 angles.

Number of sides: 3  
Name of polygon: triangle

b. Draw a five-sided polygon.

Number of angles: 5  
Name of polygon: pentagon

c. Draw a four-angled polygon.

Number of sides: 4  
Name of polygon: quadrilateral

d. Draw a six-sided polygon.

Number of angles: 6  
Name of polygon: hexagon

e. Compare your polygons to those of your partner.  
Copy one example that is very different from your own in the space to the right.

2. Use your straightedge to draw 2 new examples of each polygon that are different from those you drew on the first page.

a. Triangle

b. Pentagon

c. Quadrilateral

d. Hexagon

Name \_\_\_\_\_

Date \_\_\_\_\_

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



Name \_\_\_\_\_

Date \_\_\_\_\_

1.	$10 + 8 =$	21.	$5 + 8 =$
2.	$4 + 10 =$	22.	$6 + 7 =$
3.	$9 + 10 =$	23.	$\underline{\hspace{1cm}} + 4 = 12$
4.	$11 + 5 =$	24.	$\underline{\hspace{1cm}} + 7 = 13$
5.	$13 + 3 =$	25.	$6 + \underline{\hspace{1cm}} = 14$
6.	$12 + 4 =$	26.	$7 + \underline{\hspace{1cm}} = 15$
7.	$16 + 3 =$	27.	$\underline{\hspace{1cm}} = 9 + 8$
8.	$15 + \underline{\hspace{1cm}} = 19$	28.	$\underline{\hspace{1cm}} = 7 + 5$
9.	$18 + \underline{\hspace{1cm}} = 20$	29.	$\underline{\hspace{1cm}} = 4 + 8$
10.	$13 + 5 =$	30.	$3 + 9 =$
11.	$\underline{\hspace{1cm}} = 4 + 16$	31.	$6 + 7 =$
12.	$\underline{\hspace{1cm}} = 6 + 12$	32.	$8 + \underline{\hspace{1cm}} = 13$
13.	$\underline{\hspace{1cm}} = 14 + 6$	33.	$\underline{\hspace{1cm}} = 7 + 9$
14.	$9 + 3 =$	34.	$6 + 6 =$
15.	$7 + 9 =$	35.	$\underline{\hspace{1cm}} = 7 + 5$
16.	$\underline{\hspace{1cm}} + 4 = 11$	36.	$\underline{\hspace{1cm}} = 4 + 8$
17.	$\underline{\hspace{1cm}} + 6 = 13$	37.	$20 = 13 + \underline{\hspace{1cm}}$
18.	$\underline{\hspace{1cm}} + 5 = 12$	38.	$18 = \underline{\hspace{1cm}} + 9$
19.	$\underline{\hspace{1cm}} + 8 = 14$	39.	$16 = \underline{\hspace{1cm}} + 7$
20.	$\underline{\hspace{1cm}} + 9 = 15$	40.	$20 = 9 + \underline{\hspace{1cm}}$

Name \_\_\_\_\_

Date \_\_\_\_\_

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

Name \_\_\_\_\_

Date \_\_\_\_\_

1.	$12 - 3 =$	21.	$13 - 7 =$
2.	$13 - 5 =$	22.	$15 - 9 =$
3.	$11 - 2 =$	23.	$18 - 7 =$
4.	$12 - 5 =$	24.	$14 - 7 =$
5.	$13 - 4 =$	25.	$17 - 9 =$
6.	$13 - 2 =$	26.	$12 - 9 =$
7.	$11 - 4 =$	27.	$13 - 6 =$
8.	$12 - 6 =$	28.	$15 - 7 =$
9.	$11 - 3 =$	29.	$16 - 8 =$
10.	$13 - 6 =$	30.	$12 - 6 =$
11.	$\underline{\hspace{1cm}} = 11 - 9$	31.	$\underline{\hspace{1cm}} = 13 - 9$
12.	$\underline{\hspace{1cm}} = 13 - 8$	32.	$\underline{\hspace{1cm}} = 17 - 8$
13.	$\underline{\hspace{1cm}} = 12 - 7$	33.	$\underline{\hspace{1cm}} = 14 - 9$
14.	$\underline{\hspace{1cm}} = 11 - 6$	34.	$\underline{\hspace{1cm}} = 13 - 5$
15.	$\underline{\hspace{1cm}} = 13 - 9$	35.	$\underline{\hspace{1cm}} = 15 - 8$
16.	$\underline{\hspace{1cm}} = 14 - 8$	36.	$\underline{\hspace{1cm}} = 18 - 9$
17.	$\underline{\hspace{1cm}} = 11 - 7$	37.	$\underline{\hspace{1cm}} = 16 - 7$
18.	$\underline{\hspace{1cm}} = 15 - 6$	38.	$\underline{\hspace{1cm}} = 20 - 12$
19.	$\underline{\hspace{1cm}} = 16 - 9$	39.	$\underline{\hspace{1cm}} = 20 - 6$
20.	$\underline{\hspace{1cm}} = 12 - 8$	40.	$\underline{\hspace{1cm}} = 20 - 17$

Name \_\_\_\_\_

Date \_\_\_\_\_

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

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Use a straightedge to draw the polygon with the given attributes in the space to the right.

- a. Draw a polygon with 3 angles.

Number of sides: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- b. Draw a five-sided polygon.

Number of angles: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- c. Draw a four-angled polygon.

Number of sides: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- d. Draw a six-sided polygon.

Number of angles: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- e. Compare your polygons to those of your partner.

Copy one example that is very different  
from your own in the space to the right.

2. Use your straightedge to draw 2 new examples of each polygon that are different from those you drew on the first page.

a. Triangle

--	--

b. Pentagon

--	--

c. Quadrilateral

--	--

d. Hexagon

--	--

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Use a straightedge to draw the polygon with the given attributes in the space to the right.

Draw a five-sided polygon.

Number of angles: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Use a straightedge to draw the polygon with the given attributes in the space to the right.

- a. Draw a polygon with 4 angles.

Number of sides: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- b. Draw a six-sided polygon.

Number of angles: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- c. Draw a three-angled polygon.

Number of sides: \_\_\_\_\_

Name of polygon: \_\_\_\_\_

- d. Draw a five-sided polygon.

Number of angles: \_\_\_\_\_

Name of polygon: \_\_\_\_\_



2. Use your straightedge to draw 2 new examples of each polygon that are different from those you drew on the first page.

a. Quadrilateral

--	--

b. Hexagon

--	--

c. Pentagon

--	--

d. Triangle

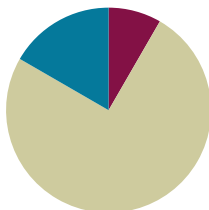
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## Lesson 4

**Objective:** Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids.

### Suggested Lesson Structure

■ Fluency Practice	(5 minutes)
■ Concept Development	(45 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (5 minutes)

- Addition with Renaming **2.NBT.7** (5 minutes)

### Addition with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $167 + 47$  vertically on the board.) Let's use a chip model to add. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T: 1 hundred, 6 tens, 7 ones plus 4 tens, 7 ones is...?

S: 2 hundreds, 1 ten, 4 ones!

T:  $167 + 47$  is...?

S: 214!

Continue with the following possible sequence:  $285 + 38$ ,  $234 + 67$ ,  $317 + 94$ , and  $367 + 55$ .

### Concept Development (45 minutes)

Materials: (T) 4 charts from G2-M8-L1, index card, square tile, drawing of rhombus (S) 1 piece of  $8\frac{1}{2}'' \times 11''$  white paper, centimeter ruler (template), 1 index card, 1 highlighter

Note: Students will need colored pencils for the homework.

Note: Today's Application Problem has been omitted due to the time intensive nature of the Concept Development.

Note: The shape descriptions provided here provide a solid foundation to the definitions that will be part of the students' experience in later grades. Students are not expected to memorize these, but rather to have an experience drawing different quadrilaterals using the new attributes of square corners and parallel sides.

Quadrilateral: A quadrilateral has four straight sides and is closed.

Trapezoid: A trapezoid has at least one pair of parallel sides.

Parallelogram: A parallelogram has two pairs of parallel sides.

Rectangle: A rectangle has four square corners.

Square: A square is a special rectangle with sides that are all the same length.

Rhombus: A rhombus has four sides that are all the same length.

Distribute a piece of  $8\frac{1}{2}'' \times 11''$  white paper, a centimeter ruler, and an index card to each student. Instruct students to follow you as they fold their papers in half twice, such that they have four sections on both sides of the paper for drawing. (See image on right.) For precision, students should use a pencil so that they have the option to erase as they draw the shapes.



### Part 1: Drawing Square Corners and Parallel Lines

T: Look at your index card. How many angles, does it have?

S: Four!

T: Yes. Let's look at our chart with other shapes that have four sides and four angles. (Circle the shape on the chart with three acute angles, as shown.)

T: How are the angles, or corners, on your index card different from those of this shape?

S: The ones on my index card are all the same. → The corners on my card are in the shape of an L. → The ones on the chart are big and small.

T: We call the angles on our index cards **square corners**.

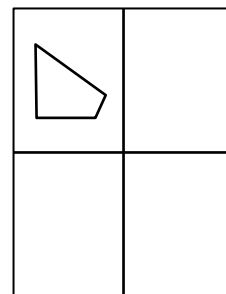
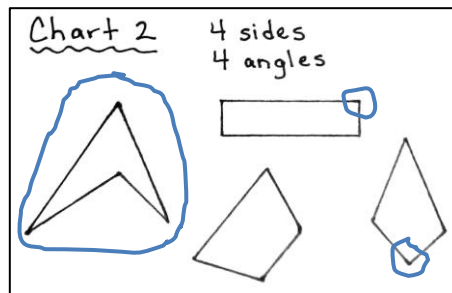
T: Look at Chart 2 again. Student A, come up and circle a square corner.

S: (Uses a marker to identify and circle a square corner.)

T: Thumbs up if you agree. Hmm, let's use our index card to check to see if Student A found a square corner. (Put the corner of the index card in the corner of the shape, and show students how to check by seeing if the lines of the shape line up with the edges of the index card.)

T: Good job, Student A! This is a square corner. (Find and check other square corners.)

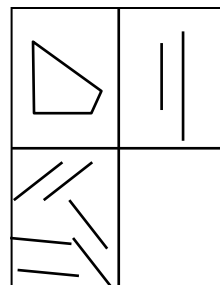
T: Let's use our index cards as a tool to help us draw a quadrilateral with one square corner.



- T: In one of the sections on your paper, draw a square corner using your index card as a guide. Then, use the straight edge of your card to draw two more lines to complete your quadrilateral.

As time permits, students might practice how to make other quadrilaterals.

- T: Place your centimeter ruler vertically in the next section on your paper. Use your centimeter ruler to draw a straight line within the section.
- S: (Draw a straight line using a pencil.)
- T: Without moving your ruler, use the opposite edge to draw a second straight line of any length. (See image at right.)
- S: (Draw a second straight line parallel to the first one using a pencil.)
- T: What do you notice about these lines?
- S: One is shorter than the other one. → They don't touch. → They don't make a corner or angle. → They are the same distance apart. The lines never come closer or get farther away from each other. → They look like the sides of an H.
- T: If I used a really long ruler and a really long piece of paper and kept drawing these lines, they would never cross or touch.
- T: We call these **parallel lines**. (Write *parallel* on the board.) Look at the word *parallel*. The two L's in the middle of the word are parallel.
- T: In the next section, position your ruler in different ways—horizontally, diagonally—and practice making more pairs of parallel lines.
- S: (Practice making parallel lines with their rulers in different positions.)



### NOTES ON TRAPEZOIDS:

According to the K–6 Geometry Progressions, the term *trapezoid* may have two different meanings, depending on an exclusive or inclusive definition.

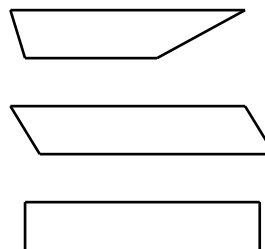
- Exclusive: A trapezoid is a quadrilateral with exactly one pair of parallel sides.
- Inclusive: A trapezoid is a quadrilateral with at least one pair of parallel sides.

While both definitions are legitimate, this curriculum uses the inclusive definition. Therefore, a parallelogram is also considered a trapezoid.

As time permits, direct the students to Chart 2 again to answer the question, “Which of these shapes has a pair of parallel lines?”

### Part 2: Drawing and Identifying a Trapezoid

- T: Position your ruler horizontally in a new section on your paper. Use your ruler to draw a straight line that is 8 cm long.
- S: (Draw an 8-cm line using a pencil.)
- T: Without moving your ruler, use the opposite edge of the ruler to draw a second straight line. Then, with your ruler, join the ends of both lines. (See three examples shown on the right.)
- S: (Use rulers to join the ends of both lines, forming a trapezoid.)
- T: You made a four-sided polygon. What do we call it?
- S: A quadrilateral!
- T: Compare your quadrilateral with those of your neighbors.



MP.6

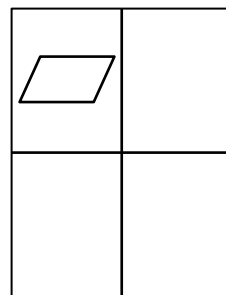
## MP.6

- T: Turn and talk: What new attribute do you notice about the sides of *these* quadrilaterals?
- S: They all have parallel sides. → Two opposite sides are parallel, but on some of our shapes, the other two aren't. → The opposite sides are different lengths (or the same length, depending on the figure). → They all have a pair of parallel sides.
- T: Does this quadrilateral have *at least* one pair of parallel sides?
- S: Yes!
- T: (Point to a different trapezoid, which may be a parallelogram or rectangle.) How about this quadrilateral?
- S: Yes!
- T: Your quadrilaterals are **trapezoids** if they have at least one pair of parallel sides. What is our new word?
- S: Trapezoid!



### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Some students might have difficulty drawing the different shapes. Support their learning by providing them with a template for their individual boards that has some of the lines already drawn, so that all they have to do is extend their drawings to connect the sides. This is especially useful for creating the trapezoid. Students may also be offered the use of a geoboard.



### Part 3: Drawing and Identifying a Parallelogram

- T: Turn your paper over. In another section, use both sides of your ruler to draw two parallel lines that are each 8 cm long. Draw one line starting at zero and stopping at 8 cm. Draw the other starting at any number but advancing 8 centimeters, like this. (Demonstrate.) Now, it's your turn.
- S: (Draw two parallel lines, each 8 cm in length.)
- T: Use these parallel lines to make another quadrilateral by joining the ends of the parallel sides.
- S: (Use their rulers to join the ends of both lines, forming a parallelogram, as shown on right.)
- T: What do you notice about the connecting sides?
- S: They are also parallel.
- T: How can you be sure?
- S: They look like they won't touch if they keep going. → I can put my ruler down that way and see the other line runs along it without getting any closer.
- T: Since this quadrilateral has two pairs of parallel sides (point to the parallel sides), we call it a **parallelogram**. What's it called?
- S: A parallelogram!

### Part 4: Drawing and Identifying a Rectangle and Square and Relating the Rhombus to a Square

- T: Now, let's draw another quadrilateral. In another section on your paper, use both sides of your ruler to draw two parallel lines that are 8 cm long. This time, start both lines at zero on your ruler.
- S: (Measure and draw two parallel lines, each beginning at zero and extending 8 cm in length.)
- T: Complete the quadrilateral by drawing two more lines.

S: (Use their rulers to join the ends of both lines, forming a rectangle, as shown on right.)

T: Turn and talk: What do you notice about the angles of this special quadrilateral?

S: They make square corners!

T: You already know this shape. What is it?

S: A rectangle!

T: Yes! A quadrilateral with four square corners is a rectangle.

T: There is a special rectangle, too. It is special because it has four square corners *and* four sides that are the same length. What do you think it is?

S: A square!

T: Watch as I draw a square. (Draw a square on the board.)

T: Let's double check to see if it is a rectangle. Student D, use your index card to check the corner angles to see if they are square corners.

S: (Student D checks corners.) Yes! They are square corners.

T: Good. Finally let's check to see if the sides are all the same length. Student E, use your ruler to measure each side of the square.

S: (Student E measures sides.) All the sides are 10 cm! It is a square.

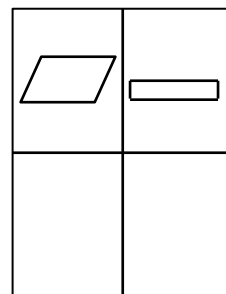
T: Just like a square, there is another quadrilateral that has four equal sides. It looks like this. (Draw a rhombus on the board.)

T: What do you notice?

S: It looks like a square leaning over. → I don't think it has square corners. → I think the sides are all equal, like a square. → I see that both pairs of opposite sides are parallel.

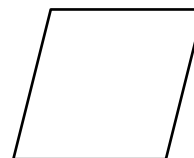
T: Yes! We call a quadrilateral with four equal sides a **rhombus**. It does have equal sides like a square, but it doesn't have to have square corners.

T: You've really flexed your geometry muscles today! On to the Problem Set!



### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Find time to help English language learners practice producing new geometric vocabulary. The sooner students are able to use the new vocabulary, the quicker they will learn it and use it. Make a game of it. Show students the shape and ask them to say its name, or ask them match shapes with their name and say the name as they do.



## 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 solve these problems using the RDW approach used for Application Problems.

Note: It is possible that there will not be enough time today for the Problem Set! If just a few minutes remain, consider having students instead draw different quadrilaterals with the attributes of parallel lines and square corners and see if they can identify which names apply to their shapes.

## Student Debrief (10 minutes)

**Lesson Objective:** Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids.

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.

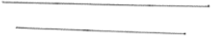
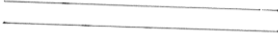
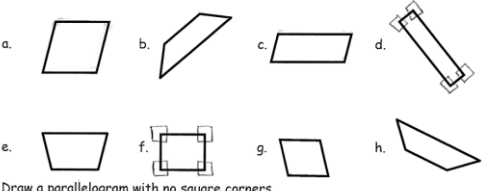
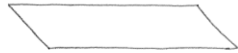
You may choose to use any combination of the questions below to lead the discussion.

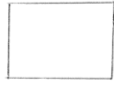
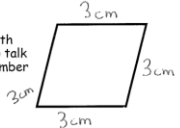
- Turn and talk: What do you know about **parallel lines**? Where do you see some in our classroom?
- Can a shape have different names? Tell your partner other names that a quadrilateral can be called.
- Use your fingers to show your partner a **square corner**. Use your fingers to show your partner an angle that is not square.
- What did all the shapes we talked about today have in common? (They all were quadrilaterals, or four-sided polygons, with four sides, corners, or angles.)
- Use some of the new vocabulary words you learned today to describe to your partner the attributes of a rectangle? A trapezoid? A **parallelogram**? A square? A rhombus?
- What makes a square a special rectangle? Explain how you know.

## Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name Yehuda Date \_\_\_\_\_

- Use your ruler to draw 2 parallel lines that are not the same length.  

- Use your ruler to draw 2 parallel lines that are the same length.  

- Highlight the parallel sides on each quadrilateral, and put a box around each right angle. Use your index card to find each right angle.  

- Draw a parallelogram with no square corners.  


- Draw a quadrilateral with 4 square corners.  

- Measure and label the sides of the figure to the right with your centimeter ruler. What do you notice? Be ready to talk about the attributes of this quadrilateral. Can you remember what this polygon is called?  
  
 rhombus
- A square is a special rectangle. What makes it special?  
A square is a special rectangle because all 4 sides are the same length.

Name \_\_\_\_\_

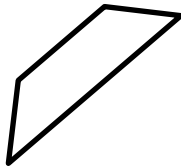
Date \_\_\_\_\_

1. Use your ruler to draw 2 parallel lines that are not the same length.
2. Use your ruler to draw 2 parallel lines that are the same length.
3. Highlight the parallel sides on each quadrilateral, and put a box around each right angle. Use your index card to find each right angle.

a.



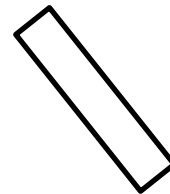
b.



c.



d.



e.



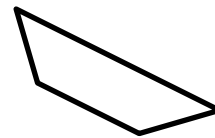
f.



g.



h.

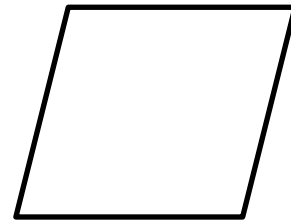


4. Draw a parallelogram with no square corners.



5. Draw a quadrilateral with 4 square corners.

6. Measure and label the sides of the figure to the right with your centimeter ruler. What do you notice? Be ready to talk about the attributes of this quadrilateral. Can you remember what this polygon is called?



7. A square is a special rectangle. What makes it special?

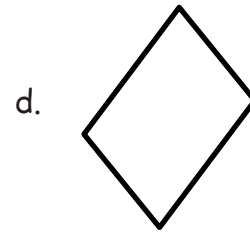
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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Highlight the parallel sides on each quadrilateral, and put a box around each square corner. Use your index card to find each square corner.



Name \_\_\_\_\_

Date \_\_\_\_\_

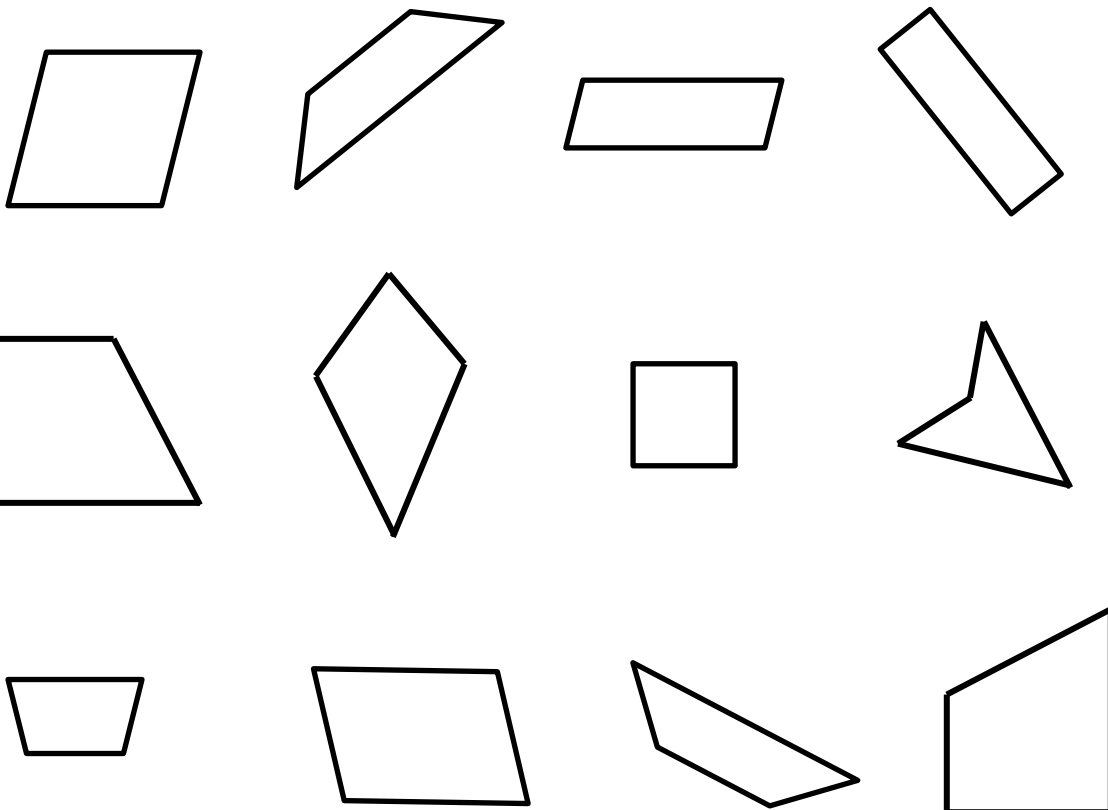
1. Use your ruler to draw 2 parallel lines that are not the same length.
  
  
  
  
  
  
  
  
  
  
2. Use your ruler to draw 2 parallel lines that are the same length.
  
  
  
  
  
  
  
  
  
  
3. Draw a quadrilateral with two sets of parallel sides. What is the name of this quadrilateral?
  
  
  
  
  
  
  
  
  
  
4. Draw a quadrilateral with 4 square corners and opposite sides the same length. What is the name of this quadrilateral?

5. A square is a special rectangle. What makes it special?

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6. Color each quadrilateral with 4 square corners red.  
Color each quadrilateral with no square corners blue.  
Color each quadrilateral with one set of parallel sides green.



Copy onto heavy tag board and cut.

1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---------	---	---	---	---	---	---	---	---	----	----	----	----	----	----

1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---------	---	---	---	---	---	---	---	---	----	----	----	----	----	----

1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---------	---	---	---	---	---	---	---	---	----	----	----	----	----	----

1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---------	---	---	---	---	---	---	---	---	----	----	----	----	----	----

1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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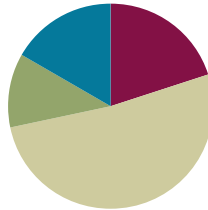
1 cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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## Lesson 5

**Objective:** Relate the square to the cube, and describe the cube based on attributes.

### Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Application Problem	(7 minutes)
■ Concept Development	(31 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (12 minutes)

- Rename for the Smaller Unit **2.NBT.1** (3 minutes)
- Sprint: Subtraction Patterns **2.OA.2, 2.NBT.5** (9 minutes)

### Rename for the Smaller Unit (3 minutes)

Note: This fluency activity reviews using place value understanding to rename units in preparation for subtraction with chips and the algorithm during Fluency Practice in G2–M8–Lessons 7 and 8.

T: (Write 1 hundred = \_\_\_\_ tens.)

T: I'm going to give you a number of hundreds and tens. I want you to rename 1 of the hundreds for 10 tens and then tell me how many hundred and tens. Ready?

T: Say the number sentence.

S: 1 hundred = 10 tens.

T: (Write 1 hundred, 1 ten = \_\_\_\_ tens.) Say the number sentence.

S: 1 hundred, 1 ten = 11 tens.

T: (Write 2 hundreds = 1 hundred, \_\_\_\_ tens.) Say the number sentence.

S: 2 hundreds = 1 hundred, 10 tens.

T: 2 hundreds, 1 ten.

S: 2 hundreds, 1 ten = 1 hundred, 11 tens.

T: (Write 2 hundreds = 1 hundred, 9 tens \_\_\_\_ ones.) Say the number sentence.

S: 2 hundreds = 1 hundred, 9 tens, 10 ones.

Repeat the process for 1 hundred, 3 tens; 2 hundreds, 3 tens; 3 hundreds, 4 tens; and 5 hundreds, 7 tens.

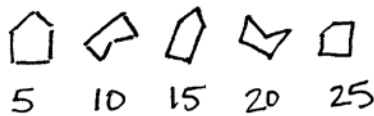
**Sprint: Subtraction Patterns (9 minutes)**

Materials: (S) Subtraction Patterns Sprint

Note: Students practice subtraction in order to gain mastery of the sums and differences within 20 and identify relationships with higher numbers.

**Application Problem (7 minutes)**

Owen had 90 straws to create pentagons. He created a set of 5 pentagons when he noticed a number pattern. (Draw on the board, as shown below.) How many more shapes can he add to the pattern?



$$90 - 25 = \square$$

20 5

$$70 - 5 = 65$$

5	10	15	20	25	30	35	40	45	50	55	60	65
1	2	3	4	5	6	7	8	9	10	11	12	13

Note: In this two-step *put together/take apart* problem, students see a pattern of five-sided polygons. Students may begin by using repeated addition or skip-counting by fives to see that Owen used 25 straws.

**Concept Development (31 minutes)**

Materials: (T) Cube (S) 1 bag of 50 toothpicks per 4 students, adhesive material (e.g., sticky tack, mini marshmallows, gumdrops), 2 pieces of  $8\frac{1}{2}'' \times 11''$  white paper

Note: Although precision is not emphasized in Part 2 of the Concept Development, it is essential that students use pencils for the activity. A step-by-step procedure for drawing the cube is illustrated in the lesson.



Arrange desks so that students are sitting in groups of four. Distribute a bag of toothpicks and an adhesive material for constructing a cube to each group, as well as 1 piece of  $8\frac{1}{2}'' \times 11''$  white paper per student.

**Part 1: Constructing a Cube**

- T: Watch as I use four toothpicks to build a square. (Build a square as shown above.)
- T: It's your turn. Use four toothpicks and some sticky tack to build a square! (Allow time to work.)
- T: Using words we have learned in the past week, describe your square to your partner.

S: It has four straight sides that are the same length. → It is a special rectangle.  
→ It has four square corners. → It can be called lots of different names: a polygon, a quadrilateral, a rectangle, a parallelogram, a square, and a trapezoid, too! → It has two pairs of parallel sides.

T: Good recall! A square can also be used to build a solid shape that has equal edges.

T: Here is a cube. (Hold up cube.) What shape are the faces of this cube?

S: Squares!

T: I want to build a cube with toothpicks. How many would I need?

S: I don't know. → We need to count to find out. → Lots.

T: Let's count the edges to find out. (Count the edges, marking each one as you go.) First, we'll count the edges on the bottom: 1 edge, 2 edges, 3 edges, 4 edges. Now, the edges around the middle: 5 edges, 6 edges, 7 edges, 8 edges. Now, those around the top: 9 edges, 10 edges, 11 edges, 12 edges.

T: How many edges does a cube have?

S: Twelve edges!

T: Can we use this square that we already built to construct our cube?

S: Yes!

T: Talk to your partner. How many more toothpicks do we need to build the cube?

S:  $12 - 4 = 8$ ! → Eight more toothpicks. → 4 and 8 is 12.

T: Get eight more toothpicks and some more sticky tack, and see if you can use your square to make a cube that looks like this picture.

S: (Work.)

T: (Circulate to support those who need it.)

T: Great job! Let's take a look at our cubes. How can we figure out how many corners our cube has?

S: We can count the sticky tack pieces we used.

T: Good, do that now. Count the ones on the bottom first, then the ones on the top. How many corners does a cube have?

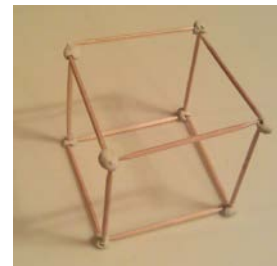
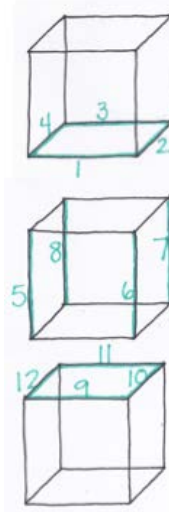
S: Eight corners!

T: This toothpick cube looks like it's missing something. In fact, I'm going to call it a skeleton cube. What is it missing?

S: The sides! → The faces!

T: Yes. Let's use paper to create faces for our cubes. Earlier you said that the faces are squares. How can we make squares that are the right size?

S: We can trace the bottom of the cube. → We can measure.



### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Support English language learners' comprehension by holding a cube (if possible), or a picture of a cube, and pointing to the faces, corners, and edges as they are mentioned during the lesson.



- T: Let's trace the bottom of our cubes. Make enough squares to cover all of the faces.
- S: (Work.)
- T: (Circulate to help those who need it.)
- T: How many squares did it take to make the cube?
- S: Four around the sides, one on top, and one on bottom. → Six!
- T: Good. With six square faces, our cubes would be complete.
- T: Hmm. So, we know that a cube has six square faces and eight corners.
- T: Do you remember when we figured out how many toothpicks we needed to build our cube? How many?
- S: Twelve!
- T: That's right, we can call the toothpicks edges. The cube has twelve edges.
- T: Tell your partner the attributes you know about a cube.
- S: It has eight corners. → It has six faces that are squares. → It has twelve edges. → Each face has all the attributes of a square, too; the four square corners and the sides are all the same length.
- T: Now that we know the attributes of a cube and can build a cube, let's try drawing one.

## Part 2: Drawing a Cube

Distribute 1 piece of  $8\frac{1}{2}'' \times 11''$  white paper to each student. Instruct the class to fold the paper in half twice so that they have eight sections, four on the front and four on the back.

T: With your pencil, but without a straightedge, draw the best square you can in the middle of the first section on your paper.

T: You've already drawn one face of a cube! Now, watch carefully and follow me as we draw some more.

Step 1: Start at the middle of the top edge, but a little above, and draw a straight line parallel to the top edge and about the same length.

Step 2: Make a square corner with the right side parallel to the right edge.

T: So far, what do you see?

S: I see a square and a square corner. → The front face of the cube.

T: Okay, keep watching, and do as I do!

Step 3: Draw three lines to connect the three corners of the square face to the endpoints and corner of the lines you drew.

T: What do you see now?

S: I see a square and two parallelograms. → I see three faces of a cube. → I see a cube, but I can't see all the parts. → I see a cube too, but since it's not a flat shape, some of the faces are hiding.

T: Bravo, you have drawn a cube! But, you're right. Some of the faces are hiding; we can only see three of them, even though we know there are six.

Step 1



Step 2



Step 3



MP.6

- T: For the next few minutes, practice drawing a cube in each section on your paper. It will become much easier with practice! (Allow students time to work. Circulate and provide guidance.)
- T: Take a look at all the cubes you've drawn! Put a star next to your best one. I am noticing that each of your cubes looks better and better every time you draw a new one! Well done!



### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

If students struggle to understand why they can only see three faces in their cube drawings, show them an actual cube. Position the cube so that they can only see three faces. This will help them understand that they are drawing the cube from a certain point of view.

## 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 solve these problems using the RDW approach used for Application Problems.

Note: The length of the lesson may prevent completion of the Problem Set today. However, print out a few copies for early finishers.

## Student Debrief (10 minutes)

**Lesson Objective:** Relate the square to the cube, and describe the cube based on attributes.

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 parallelogram in Problem 1. Could it be the face of an actual cube? Why or why not? Could it represent the face of a cube in a drawing?
- Look at the cubes your partner drew. Tell them which one you like the best and why.
- A square has four sides and four angles. Does a cube have the same number of faces, corners, and edges? (No, a cube has six faces, eight corners, and twelve edges. They are all different.)
- Tell your partner how the cube you built and the cube you drew are alike. How are they different?
- Was it easier to count and see the faces, corners, and edges on the toothpick cube or on the one you drew? Why?

Name Amber Date \_\_\_\_\_

1. Circle the shape that could be the face of a cube. Check with your ruler.







2. What is the most precise name of the shape you circled? Square

3. How many faces does a cube have? 6

4. How many edges does a cube have? 12



5. How many corners does a cube have? 8

6. Draw 6 cubes, and put a star next to your best one.





First cube 	Second cube 
Third cube 	Fourth cube 

**Exit Ticket (3 minutes)**


After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

<p><b>Fifth cube</b></p> 	<p><b>Sixth cube</b></p> 
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7. Connect the corners of the squares to make a different kind of drawing of a cube. The first one is done for you.

8. Derrick looked at the cube below. He said that a cube only has 3 faces. Explain why Derrick is incorrect.



Derrick can only see three faces of the cube but there are 3 more he can't see.

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**A**

# Correct \_\_\_\_\_

Subtract.

1	$8 - 1 =$		23	$41 - 20 =$	
2	$18 - 1 =$		24	$46 - 20 =$	
3	$8 - 2 =$		25	$7 - 5 =$	
4	$18 - 2 =$		26	$70 - 50 =$	
5	$8 - 5 =$		27	$71 - 50 =$	
6	$18 - 5 =$		28	$78 - 50 =$	
7	$28 - 5 =$		29	$80 - 40 =$	
8	$58 - 5 =$		30	$84 - 40 =$	
9	$58 - 7 =$		31	$90 - 60 =$	
10	$10 - 2 =$		32	$97 - 60 =$	
11	$11 - 2 =$		33	$70 - 40 =$	
12	$21 - 2 =$		34	$72 - 40 =$	
13	$61 - 2 =$		35	$56 - 4 =$	
14	$61 - 3 =$		36	$52 - 4 =$	
15	$61 - 5 =$		37	$50 - 4 =$	
16	$10 - 5 =$		38	$60 - 30 =$	
17	$20 - 5 =$		39	$90 - 70 =$	
18	$30 - 5 =$		40	$80 - 60 =$	
19	$70 - 5 =$		41	$96 - 40 =$	
20	$72 - 5 =$		42	$63 - 40 =$	
21	$4 - 2 =$		43	$79 - 30 =$	
22	$40 - 20 =$		44	$76 - 9 =$	

**B** Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

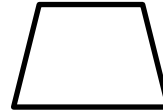
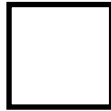
Subtract.

1	$7 - 1 =$		23	$51 - 20 =$	
2	$17 - 1 =$		24	$56 - 20 =$	
3	$7 - 2 =$		25	$8 - 5 =$	
4	$17 - 2 =$		26	$80 - 50 =$	
5	$7 - 5 =$		27	$81 - 50 =$	
6	$17 - 5 =$		28	$87 - 50 =$	
7	$27 - 5 =$		29	$60 - 30 =$	
8	$57 - 5 =$		30	$64 - 30 =$	
9	$57 - 6 =$		31	$80 - 60 =$	
10	$10 - 5 =$		32	$85 - 60 =$	
11	$11 - 5 =$		33	$70 - 30 =$	
12	$21 - 5 =$		34	$72 - 30 =$	
13	$61 - 5 =$		35	$76 - 4 =$	
14	$61 - 4 =$		36	$72 - 4 =$	
15	$61 - 2 =$		37	$70 - 4 =$	
16	$10 - 2 =$		38	$80 - 40 =$	
17	$20 - 2 =$		39	$90 - 60 =$	
18	$30 - 2 =$		40	$60 - 40 =$	
19	$70 - 2 =$		41	$93 - 40 =$	
20	$71 - 2 =$		42	$67 - 40 =$	
21	$5 - 2 =$		43	$78 - 30 =$	
22	$50 - 20 =$		44	$56 - 9 =$	

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Circle the shape that could be the face of a cube. Check with your ruler.



2. What is the most precise name of the shape you circled? \_\_\_\_\_

3. How many faces does a cube have? \_\_\_\_\_

4. How many edges does a cube have? \_\_\_\_\_

5. How many corners does a cube have? \_\_\_\_\_

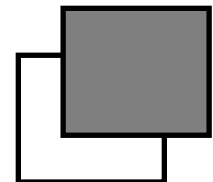
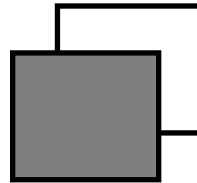
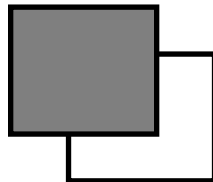
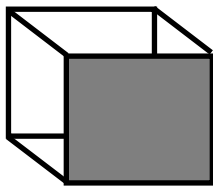
6. Draw 6 cubes, and put a star next to your best one.

<p>First cube</p>          	<p>Second cube</p>          
<p>Third cube</p>          	<p>Fourth cube</p>          

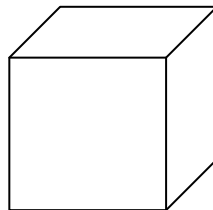
Fifth cube

Sixth cube

7. Connect the corners of the squares to make a different kind of drawing of a cube. The first one is done for you.



8. Derrick looked at the cube below. He said that a cube only has 3 faces. Explain why Derrick is incorrect.




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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Draw 3 cubes. Put a star next to your best one.

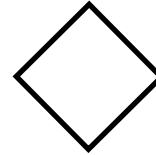
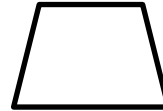
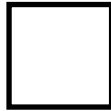
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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Circle the shapes that could be the face of a cube. Check with your ruler.



2. What is the most precise name of the shape you circled? \_\_\_\_\_

3. How many corners does a cube have? \_\_\_\_\_

4. How many edges does a cube have? \_\_\_\_\_

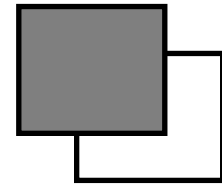
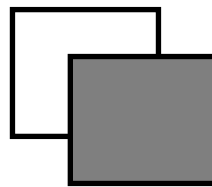
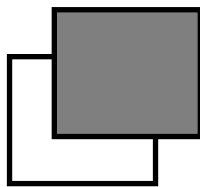
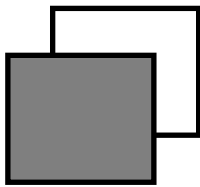
5. How many faces does a cube have? \_\_\_\_\_

6. Draw 6 cubes, and put a star next to your best one.

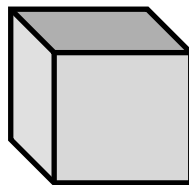
First cube	Second cube
Third cube	Fourth cube

Fifth cube	Sixth cube
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7. Connect the corners of the squares to make a different kind of drawing of a cube.



8. Patricia used the image of the cube below to count 7 corners. Explain where the 8<sup>th</sup> corner is hiding.




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## Topic B

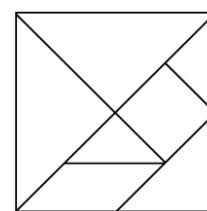
# Composite Shapes and Fraction Concepts

2.G.3, 2.G.1

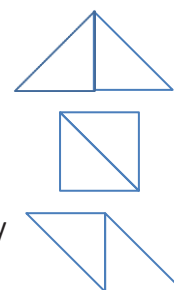
<b>Focus Standard:</b>	2.G.3	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
<b>Instructional Days:</b>	3	
<b>Coherence</b>	<b>-Links from:</b> G1–M5	Identifying, Composing, and Partitioning Shapes
	<b>-Links to:</b> G3–M7	Geometry and Measurement Word Problems

In Topic B, students build and partition composite shapes, exploring fraction concepts as they identify the relationships between parts and wholes.

Students see in Lesson 6 that the tangram puzzle (shown at right) is composed of many smaller two-dimensional shapes. As students cut out the various shapes within the tangram, they name them. They explore the variety of ways they can compose new shapes by repositioning the pieces. For example, students see that a larger triangle can be composed of two right triangles and a square, which can also be repositioned to form a trapezoid, parallelogram, or rectangle (as shown below). Further, students see that the composite triangle pictured below can be placed next to another triangle to form a larger square.



In Lesson 7, students interpret equal shares within composite shapes. They begin by using the tangram pieces from the previous day to show how the two smallest triangles can be positioned to form a larger triangle, parallelogram, or square (as shown at right). Each of these composite shapes is composed of two equal shares, described as halves. By the end of Lesson 7, students experiment with pattern blocks to see, for example, how three triangle blocks can be combined to form a trapezoid. Thus, the trapezoid can be



partitioned into three equal shares, with each share described as a third of the whole, as shown below (2.G.3).



In Lesson 8, students continue to use pattern blocks to build composite shapes from equal parts. For example, they see that a regular hexagon can be composed from two trapezoids, representing two equal shares, or halves. Alternatively, the hexagon can also be composed of three rhombuses (as shown below), described as thirds, or six same-size equilateral triangles. Students also use four square-inch tiles to compose a larger square and describe each part as a fourth (2.G.3).



### A Teaching Sequence Towards Mastery of Composite Shapes and Fraction Concepts

**Objective 1:** Combine shapes to create a composite shape; create a new shape from composite shapes. (Lesson 6)

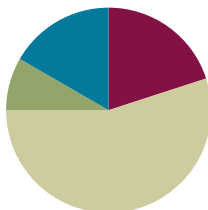
**Objective 2:** Interpret equal shares in composite shapes as halves, thirds, and fourths. (Lessons 7–8)

## 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)
<b>Total Time</b>	<b>(60 minutes)</b>



### 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  $101 = \underline{\hspace{1cm}}$  tens,  $\underline{\hspace{1cm}}$  ones.)

T: Rename 1 hundred for 10 tens, and then tell me how many hundreds, tens, and ones. Ready?

S: 10 tens, 1 one.

T: (Write  $121 = \underline{\hspace{1cm}}$  tens,  $\underline{\hspace{1cm}}$  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.

Repeat the process for 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 in order to gain mastery of the sums and differences within 20.

**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?

$$\begin{array}{r}
 \text{F } \boxed{56} \\
 \text{J } \boxed{56} \quad \boxed{19}
 \end{array}
 \left. \vphantom{\begin{array}{r} \text{F } \boxed{56} \\ \text{J } \boxed{56} \end{array}} \right\} ?$$

$$\begin{array}{r}
 56 + 19 = 55 + 20 = 75 \\
 \begin{array}{r}
 75 \\
 + 56 \\
 \hline
 131
 \end{array}
 \end{array}$$

They will use 131 cubes.

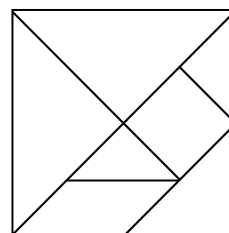
Note: This is a two-step problem with a *compare with bigger unknown* type problem as one step. Encourage students to draw a tape diagram to help visualize the comparison.

**Concept Development (33 minutes)**

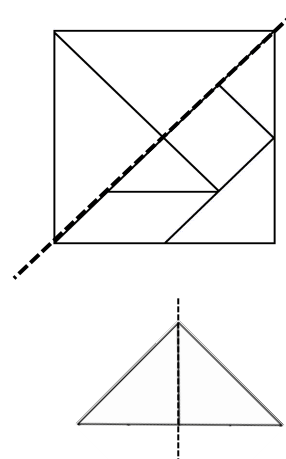
Materials: (T) Tangram sheet (template), scissors, document camera (if available) (S) Tangram sheet (template), scissors, personal white board

Note: Students previously worked with tangrams in G1–M5–Lesson 5. If time allows, refresh students' memory by reading *Grandfather Tang's Story* by Ann Tompert during story time.

Distribute materials. (Students will also need the cut-out tangram pieces for G2–M8–Lesson 8.)

**Part 1: Cutting the Tangram and Analyzing the Polygons**

- T: (Hold up tangram sheet.) 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 large square from tangram sheet as students do the same.)
- T: (Hold up tangram backwards 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 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.
- 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.

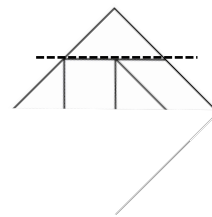
T: Which of the shapes are quadrilaterals? Hold them up as you say their names.

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.



MP.6



### 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.

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!

## Part 2: Creating Composite Shapes

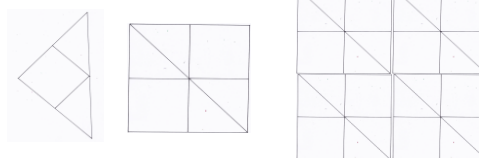
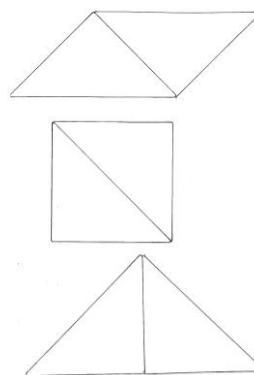
Allow time for students to explore ways to create new shapes. They do not have to be shapes that students can name. Remind students that they can flip, slide, and turn the pieces to make the new shapes.

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 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.)



- 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. Ability to make a square will depend 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 solve these problems using the RDW approach used for Application Problems.

Note: Challenge early finishers to reassemble the tangram.

### 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.

You may choose to use any combination of the questions below 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, Legos, brick wall.)

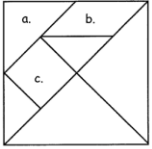
Name Hakeem Date \_\_\_\_\_

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

a. triangle

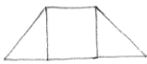
b. parallelogram

c. square

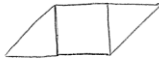


2. Use the square and the two smallest triangles to make the following polygons. Draw them in the space provided.


a. A quadrilateral with 1 pair of parallel sides.



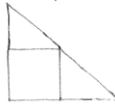
b. A quadrilateral with no square corners.



c. A quadrilateral with 4 square corners.

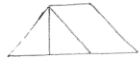


d. A triangle with 1 square corner.




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


a. A quadrilateral with 1 pair of parallel sides.



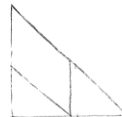
b. A quadrilateral with no square corners.



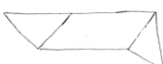
c. A quadrilateral with 4 square corners.



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.



- 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?



**NOTES ON  
MULTIPLE MEANS OF  
ACTION AND  
EXPRESSION:**

Challenge above grade level students 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.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Add or subtract.

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	$18 - 5 =$	

**B**

Improvement \_\_\_\_\_

# Correct \_\_\_\_\_

Add or subtract.

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	$18 - 6 =$	

Name \_\_\_\_\_

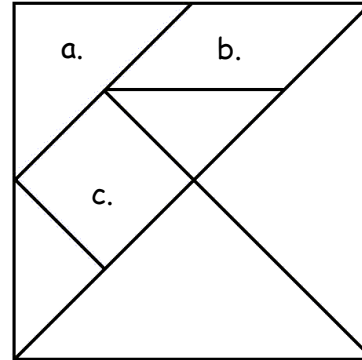
Date \_\_\_\_\_

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 to make the following polygons. Draw them in the space provided.

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

3. Use the parallelogram and the two smallest triangles 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.

Name \_\_\_\_\_

Date \_\_\_\_\_

Use your tangram pieces to make two new polygons. Draw a picture, and identify them.

1.

2.

Name \_\_\_\_\_

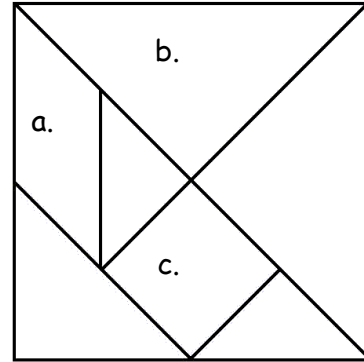
Date \_\_\_\_\_

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 to make the following polygons. Draw them in the space provided.

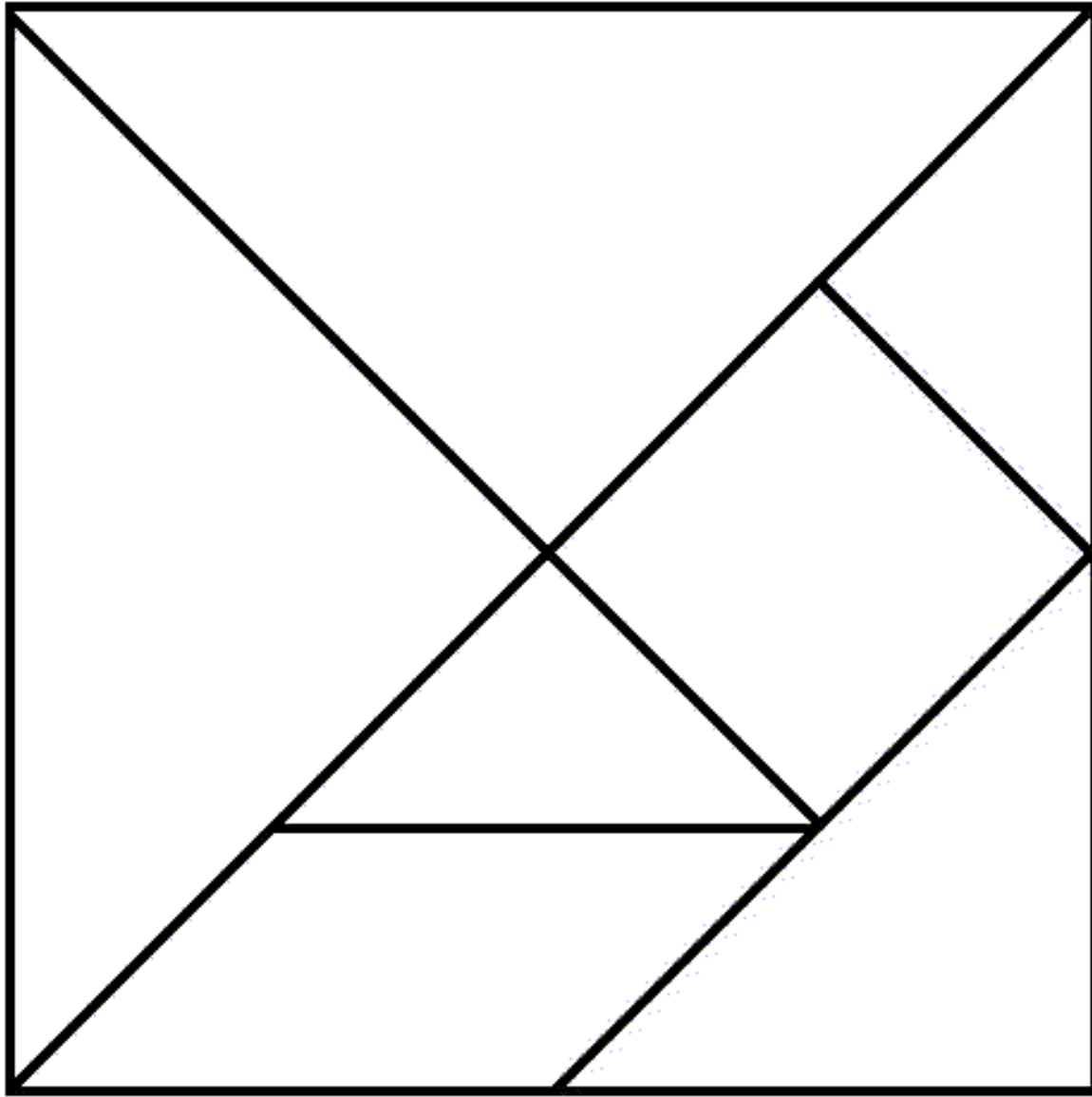
<p>a. A triangle with 1 square corner.</p>	<p>b. A quadrilateral with 4 square corners.</p>
<p>c. A quadrilateral with no square corners.</p>	<p>d. A quadrilateral with only 1 pair of parallel sides.</p>

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

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




Cut out the tangram into 7 puzzle pieces.

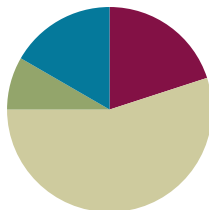


## Lesson 7

**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)
<b>Total Time</b>	<b>(60 minutes)</b>



### 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, place value chart

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

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

S: (Solve on their personal boards.)

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 from G2–M8–Lesson 3

Note: During G2–M8–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 and Practice Sets provided in G2–M8–Lesson 3.

**Application Problem (5 minutes)**

Mrs. Librarian'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?

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

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

there are 23 squares.

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.

**Concept Development (33 minutes)**

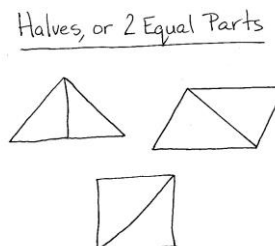
Materials: (T) Tangram pieces (from G2–M8–Lesson 6), document camera, chart paper, pattern blocks  
(S) Tangram pieces (from G2–M8–Lesson 6), pattern blocks in individual plastic bags (set of 1 hexagon, 4 squares, 3 triangles, 2 trapezoids, 3 wide, not thin, rhombuses)

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.



**NOTES ON  
MULTIPLE MEANS OF  
REPRESENTATION:**

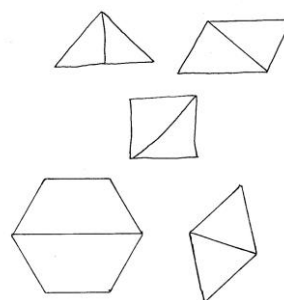
Support English language learners by showing pictures of halves, thirds, and fourths, or by cutting an apple in half as you say "half." Post the pictures with the words underneath on the word wall.

- T: Let's label this chart *Halves, or 2 Equal Parts*. (Label chart.)
- 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, which means the same size.
- 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

- 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 chart.)

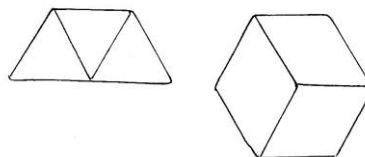
Halves, or 2 Equal Parts



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!

Thirds, or 3 Equal Shares



- T: We call three equal 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 their 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 Parts*, 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)

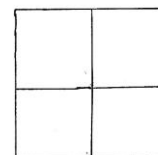
Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the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



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Challenge above grade level students 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



Name Meagan 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 does the large triangle in Parts (a-d) have? <u>2</u>	f. How many halves make up the large triangle in Parts (a-d)? <u>2</u>

2. Circle the shapes that show halves.

## 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.

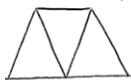
You may choose to use any combination of the questions below to lead the discussion.

- 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 you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

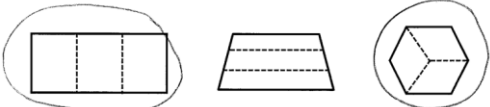
3. Show how 3 triangle pattern blocks form a trapezoid with one pair of parallel lines. Draw the shape below.



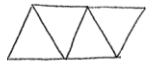
a. How many equal shares does the trapezoid have? 3

b. How many thirds are in the trapezoid? 3

4. Circle the shapes that show thirds.



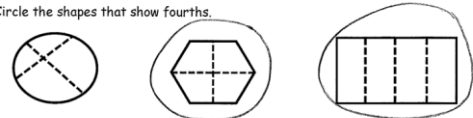
5. Add another triangle to the trapezoid you made in Problem 3 to make a parallelogram. Draw the new shape below.



a. How many equal shares does the shape have now? 4

b. How many fourths are in the shape? 4

6. Circle the shapes that show fourths.



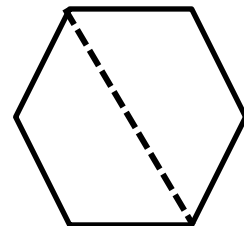
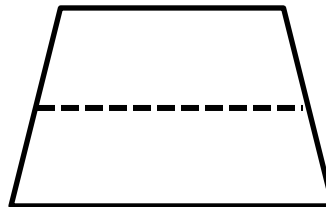
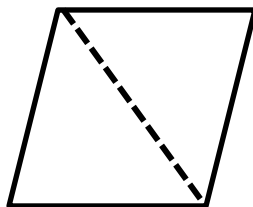
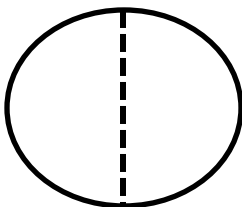
Name \_\_\_\_\_

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 does the large triangle in Parts (a-d) have?	f. How many halves make up the large triangle in Parts (a-d)?

2. Circle the shapes that show halves.

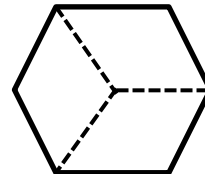
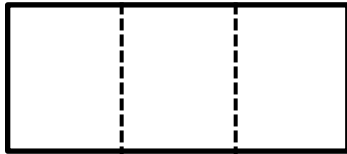


3. Show how 3 triangle pattern blocks form a trapezoid with one pair of parallel lines. Draw the shape below.

a. How many equal shares does the trapezoid have? \_\_\_\_\_

b. How many thirds are in the trapezoid? \_\_\_\_\_

4. Circle the shapes that show thirds.

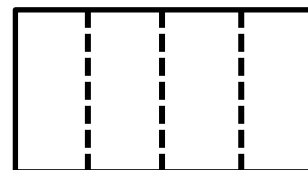
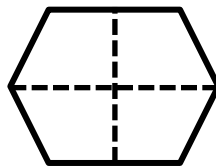
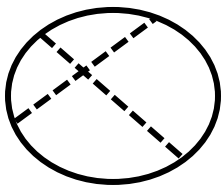


5. Add another triangle to the trapezoid you made in Problem 3 to make a parallelogram. Draw the new shape below.

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.

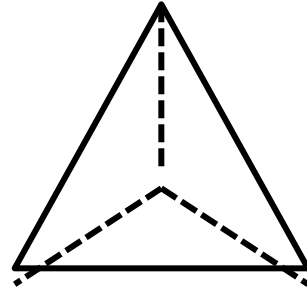
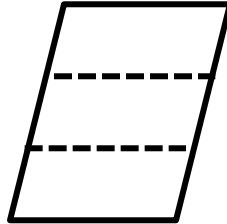
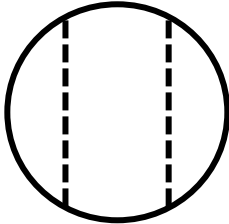




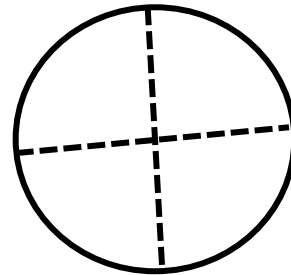
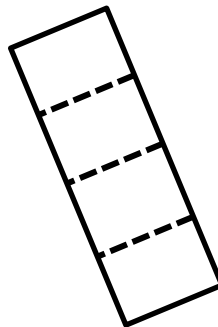
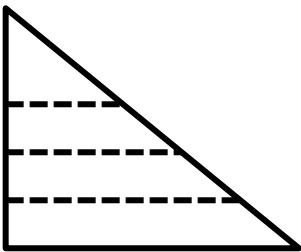
Name \_\_\_\_\_

Date \_\_\_\_\_

1. Circle the shapes that show thirds.



2. Circle the shapes that show fourths.



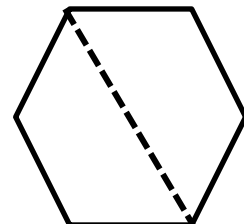
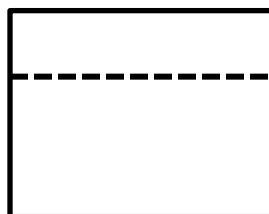
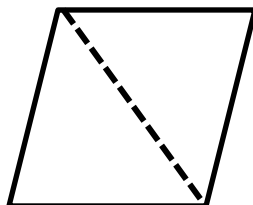
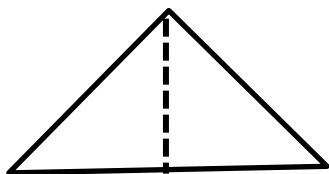
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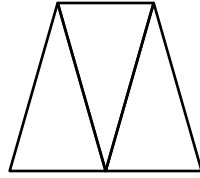
1. Solve the following puzzles using your tangram pieces. Draw your solutions in the space below.

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

2. Circle the shapes that show halves.



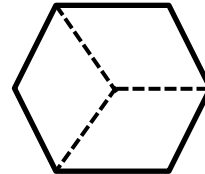
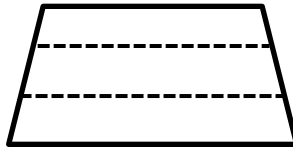
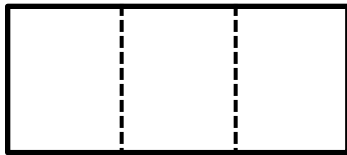
3. Examine the trapezoid.



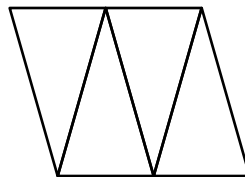
a. How many equal shares does the trapezoid have? \_\_\_\_\_

b. How many thirds are in the trapezoid? \_\_\_\_\_

4. Circle the shapes that show thirds.



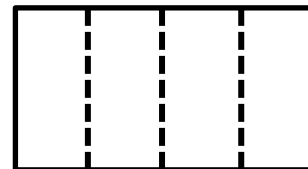
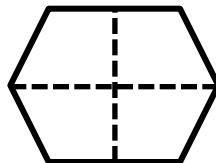
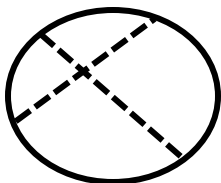
5. Examine the parallelogram.



a. How many equal shares does the shape have? \_\_\_\_\_

b. How many fourths are in the shape? \_\_\_\_\_

6. Circle the shapes that show fourths.

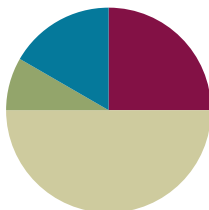


## Lesson 8

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

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (15 minutes)

- Rename for the Smaller Unit **2.NBT.1** (3 minutes)
- Subtraction with Renaming **2.NBT.7** (7 minutes)
- Grade 2 Core Fluency Differentiated Practice Sets **2.OA.2** (5 minutes)

### Rename for the Smaller Unit (3 minutes)

Note: This fluency activity reviews place value foundations.

- T: (Write  $121 = \underline{\hspace{1cm}}$  tens,  $\underline{\hspace{1cm}}$  ones.)
- T: Rename 1 hundred for 10 tens and then tell me how many hundreds, tens, and ones. Ready?
- S: 12 tens, 1 one.
- T: (Write  $158 = \underline{\hspace{1cm}}$  tens,  $\underline{\hspace{1cm}}$  ones.) Say the number sentence.
- S:  $158 = 15$  tens, 8 ones.
- T: 203.
- S:  $203 = 1$  hundred, 10 tens, 3 ones.
- T: 213.
- S:  $213 = 1$  hundred, 11 tens, 3 ones.

Repeat the process for the following possible sequence: 305, 315; 204, 224; 108, 158; and 908, 968.

### Subtraction with Renaming (7 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow

students work time between each problem, and reinforce place value understandings by having students say the answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $123 - 47$  horizontally on the board.) Let's use a chip model to subtract. On your boards, record your work using the algorithm.

S: (Solve on their personal white boards.)

T: 1 hundred, 2 tens, 3 ones minus 4 tens, 7 ones is...?

S: 7 tens, 6 ones!

T:  $123 - 47$  is...?

S: 76!

Continue with the following possible sequence:  $132 - 59$ ,  $231 - 65$ ,  $300 - 26$ ,  $446 - 77$ , and  $506 - 187$ .

## Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

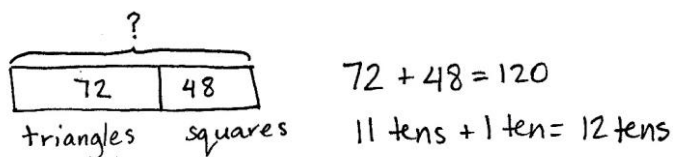
Materials: (S) Core Fluency Practice Sets from G2–M8–Lesson 3

Note: During G2–8–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 and Practice Sets provided in G2–M8–Lesson 3.

## Application Problem (5 minutes)

The students were making larger shapes out of triangles and squares. They put away all 72 triangles. There were still 48 squares on the carpet. How many shapes were on the carpet when they started?

Note: This is a *take from with start unknown* type problem. Encourage students to draw a tape diagram to visualize the relationships within the problem.



There were 120 shapes on the carpet when they started.



### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Scaffold the Application Problem for below grade level students by walking them through the calculation one step at a time. Ask questions such as, "How can we make this problem easier? How many tens are in 72 and 48? What do 2 ones and 8 ones make?" Continue until students come up with the answer.

## Concept Development (30 minutes)

**Materials:** (T) Pattern blocks, Problem Set, document camera (S) Problem Set, pattern blocks in individual plastic bags per pair (set of 1 hexagon, 6 squares, 6 triangles, 2 trapezoids, 3 wide, not thin, rhombuses)

**Note:** The Problem Set is completed throughout the Concept Development.

**Note:** In this lesson, students work in pairs to encourage math conversations as they explore equal shares using pattern blocks. Students identify and use one pattern block to cover a half, a third, or a fourth of a given shape. They then draw a picture of the composite shape formed by the halves, thirds, and fourths, and shade the smaller polygon within the composite shape.

For each problem, questions are supplied to support the objective. Post the questions so students can discuss their work in greater detail with a partner or at their tables. Encourage them to close their eyes and visualize how they moved the smaller polygons to create the new shape. Have them describe how they used flips, slides, or turns to move the pieces. This discussion, linked with action, develops spatial visualization skills.

Pass out the Problem Set and the individual bags of pattern blocks.

### Problem 1: Use one pattern block to cover half the rhombus.

- T:** Complete Problem 1. Share your thinking with your partner. Close your eyes and visualize how you moved the smaller polygons to create the rhombus. Describe how you flip, slide, or turn the pieces.

Ask questions such as the following to support deeper analysis of halves:

**MP.1**

- How can looking at angles and sides help you find the block that is half a rhombus?
- If the rhombus was made from a piece of paper, how many different ways could you cut it to get two halves? Draw the different ways you could cut the rhombus into two halves.



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Support English language learners' ability to follow the lesson when giving directions during the lesson by pointing to the rhombus, the hexagon, the trapezoid, and the square. Provide them with appropriate sentence frames to discuss their work with a partner.

### Problem 2: Use one pattern block to cover half the hexagon.

Ask questions such as the following to encourage interpreting different representations of a half:

- Cover the bottom half of the hexagon with three triangles. Is it still half covered? Why or why not?
- Cover the bottom half of the hexagon with a rhombus and a triangle. Is it still half covered?

### Problem 3: Use one pattern block to cover one-third of the hexagon.

Ask questions such as the following to encourage deeper understanding of thirds:

- How many thirds do you need to fill the whole hexagon?

- Cover one third with two triangles. Is the hexagon one third covered?
- What fraction is not covered?

**Problem 4: Use one pattern block to cover one-third of the trapezoid.**

Prompt students to interpret thirds in relationship to a whole:

- Use your drawing of the trapezoid formed by thirds to talk about how many small triangles would make a whole hexagon.
- How many thirds are in the trapezoid? In the hexagon?

**Problem 5: Use four pattern blocks to make one larger square.**

Prompt students to support different understandings of fourths:

- How many equal shares does the large square have?
- How many fourths make up the large square?
- How many fourths equal one whole square?
- Use your blocks to show that 2 fourths is the same as a half of the large square.

**Problem 6: Use one pattern block to cover one-sixth of the hexagon.**

Ask questions such as the following to support thinking about sixths:

- How many equal parts does the hexagon have?
- How many **sixths** make up the hexagon?





## Student Debrief (10 minutes)

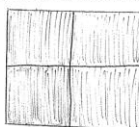

**Lesson Objective:** Interpret shares in composite shapes as halves, thirds, and fourths.

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

Name Sydney Date \_\_\_\_\_

- Use one pattern block to cover half the rhombus.
  - Identify the pattern block used to cover half of the rhombus. triangle
  - Draw a picture of the parallelogram formed by the 2 halves.
- Use one pattern block to cover half the hexagon.
  - Identify the pattern block used to cover half of a hexagon. trapezoid
  - Draw a picture of the hexagon formed by the 2 halves.
- Use one pattern block to cover 1 third of the hexagon.
  - Identify the pattern block used to cover 1 third of a hexagon. rhombus
  - Draw a picture of the hexagon formed by the 3 thirds.
- Use one pattern block to cover 1 third of the trapezoid.
  - Identify the pattern block used to cover 1 third of a trapezoid. triangle
  - Draw a picture of the trapezoid formed by the 3 thirds.

- Use 4 pattern block squares to make one larger square.
  - Draw a picture of the square formed in the space below.
  - Shade 1 small square. Each small square is 1 fourth (half / third / fourth) of the whole square.
  - Shade 1 more small square. Now, 2 fourths (halves / thirds / fourths) of the whole square is shaded.
  - And, 2 fourths of the square is the same as 1 half (half / third / fourth) of the whole square.
  - Shade 2 more small squares. 4 fourths is equal to 1 whole.
- Use one pattern block to cover 1 sixth of the hexagon.
  - Identify the pattern block used to cover 1 sixth of a hexagon. triangle
  - Draw a picture of the hexagon formed by the 6 sixths.

lesson.

You may choose to use any combination of the questions below to lead the discussion. Consider using some of the discussion questions posed to pairs during the Concept Development as part of the Student Debrief. This will give students an opportunity to share their learning and to solidify their understanding if they overcame a misconception.

- Which problem was most difficult to solve? What strategies did you use to solve it? What made you keep trying even when it was hard?
- How did knowing the attributes of each shape help you solve the problems?
- (Show a hexagon covered by a triangle.) Look at Problem 3. What part of the hexagon am I showing? How many more triangles do I need to fill the hexagon?
- (Hold up a pattern block triangle.) Can this triangle be a half, a third, or a fourth? Explain.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.



Name \_\_\_\_\_

Date \_\_\_\_\_

1. Use one pattern block to cover half the rhombus.
  - a. Identify the pattern block used to cover half of the rhombus. \_\_\_\_\_
  - b. Draw a picture of the parallelogram formed by the 2 halves.
  
2. Use one pattern block to cover half the hexagon.
  - a. Identify the pattern block used to cover half of a hexagon. \_\_\_\_\_
  - b. Draw a picture of the hexagon formed by the 2 halves.
  
3. Use one pattern block to cover 1 third of the hexagon.
  - a. Identify the pattern block used to cover 1 third of a hexagon. \_\_\_\_\_
  - b. Draw a picture of the hexagon formed by the 3 thirds.
  
4. Use one pattern block to cover 1 third of the trapezoid.
  - a. Identify the pattern block used to cover 1 third of a trapezoid. \_\_\_\_\_
  - b. Draw a picture of the trapezoid formed by the 3 thirds.

5. Use 4 pattern block squares to make one larger square.
- Draw a picture of the square formed in the space below.
  - Shade 1 small square. Each small square is 1 \_\_\_\_\_ (half / third / fourth) of the whole square.
  - Shade 1 more small square. Now, 2 \_\_\_\_\_ (halves / thirds / fourths) of the whole square is shaded.
  - And, 2 fourths of the square is the same as 1 \_\_\_\_\_ (half / third / fourth) of the whole square.
  - Shade 2 more small squares. \_\_\_\_\_ fourths is equal to 1 whole.
6. Use one pattern block to cover 1 sixth of the hexagon.
- Identify the pattern block used to cover 1 sixth of a hexagon. \_\_\_\_\_
  - Draw a picture of the hexagon formed by the 6 sixths.

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Name the pattern block used to cover half the rectangle. \_\_\_\_\_

Use the shape below to draw the pattern blocks used to cover 2 halves.

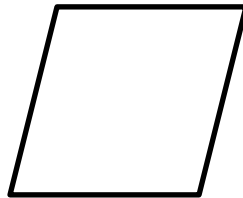


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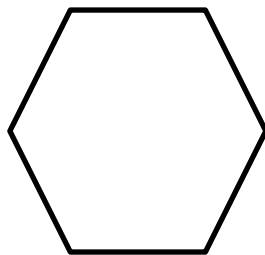
1. Name the pattern block used to cover half the rhombus. \_\_\_\_\_

Sketch the 2 pattern blocks used to cover both halves of the rhombus.



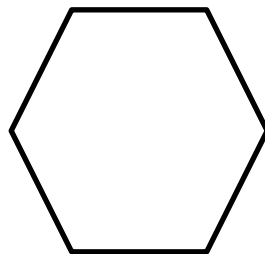
2. Name the pattern block used to cover half the hexagon. \_\_\_\_\_

Sketch the 2 pattern blocks used to cover both halves of the hexagon.



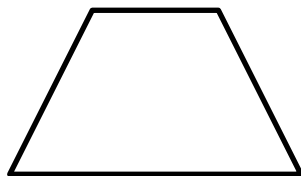
3. Name the pattern block used to cover 1 third of the hexagon. \_\_\_\_\_

Sketch the 3 pattern blocks used to cover thirds of the hexagon.

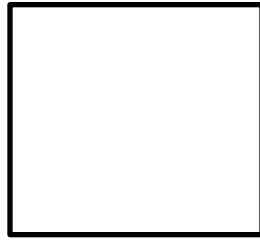


4. Name the pattern block used to cover 1 third of the trapezoid. \_\_\_\_\_

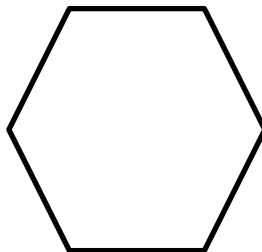
Sketch the 3 pattern blocks used to cover thirds of the trapezoid.



5. Sketch 4 pattern block squares used to make one larger square.



- a. Shade 1 small square. Each small square is 1 \_\_\_\_\_ (half / third / fourth) of the whole square.
- b. Shade 1 more small square. Now, 2 \_\_\_\_\_ (halves / thirds / fourths) of the whole square are shaded.
- c. And, 2 fourths of the square is the same as 1 \_\_\_\_\_ (half / third / fourth) of the whole square.
- d. Shade 2 more small squares. \_\_\_\_\_ fourths is equal to 1 whole.
6. Name the pattern block used to cover 1 sixth of the hexagon. \_\_\_\_\_  
Sketch the 6 pattern blocks used to cover 6 sixths of the hexagon.





## Topic C

# Halves, Thirds, and Fourths of Circles and Rectangles

2.G.3, 2.G.1

<b>Focus Standard:</b>	2.G.3	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
<b>Instructional Days:</b>	4	
<b>Coherence</b>	<b>-Links from:</b> G1–M5	Identifying, Composing, and Partitioning Shapes.
	<b>-Links to:</b> G3–M5	Fractions as Numbers on the Number Line

Topic C focuses on partitioning circles and rectangles into equal fractional parts. In Lesson 9, students are first introduced to partitioning shapes into two equal shares, or halves, using both circles and rectangles. As students are shown pictures of partitioned shapes, they are asked to determine whether the shaded (or unshaded) portion represents half of the figure. In order to encourage students to reason about equal shares, a variety of partitions and orientations are used.

Lesson 10 continues the same process with fourths and thirds. Splitting each half into two equal parts, the students create fourths. They also learn to decompose a whole into three equal parts to create thirds. Given a variety of partitioned shapes, students are asked to determine how many thirds or fourths are represented by the shaded (or unshaded) portion. Lesson 10 ends with students synthesizing their understanding of halves, thirds, and fourths by partitioning a pizza and a rectangular sheet cake, making decisions based on their share of the pie or cake.

In Lesson 11, students build upon their new knowledge by assembling a whole out of fractional parts. Given a circle made of two parts, students will see that the whole circle is composed of 2 halves. Similarly, they will see that a whole rectangle cut into thirds is made of 3 thirds, or that a square cut into fourths is made of 4 fourths.

Topic C concludes with Lesson 12, in which students learn that equal parts of a rectangle can have different shapes. Using geoboards, students might partition a given rectangle into two squares, two rectangles, or even two triangles. In each case, students describe the parts as halves. In addition, students partition a

square paper into differently shaped fourths and they explain how one of the fourths (the square shape) can be transformed into the other fourth (the rectangle shape), as shown below.



This topic provides a foundation for Topic D, applying what students have learned about fractional parts of a circle, particularly halves and quarters, to telling time on an analog clock.

### A Teaching Sequence Towards Mastery of Halves, Thirds, and Fourths of Circles and Rectangles

**Objective 1:** Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or fourths.  
(Lessons 9–10)

**Objective 2:** Describe a whole by the number of equal parts including 2 halves, 3 thirds, and 4 fourths.  
(Lesson 11)

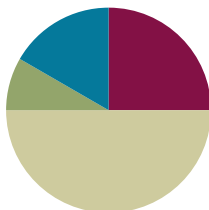
**Objective 3:** Recognize that equal parts of an identical rectangle can have different shapes.  
(Lesson 12)

## Lesson 9

**Objective:** Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or fourths.

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Encourage written reflection as students share the strategies they used to arrive at their answers. Ask questions such as, “How did you use the make a ten strategy?” or “How did your use of that strategy make the job of subtracting 96 from 120 easier?”

### Fluency Practice (15 minutes)

- Rename for the Larger Unit **2.NBT.1** (6 minutes)
- Sprint: Subtraction Patterns **2.OA.2, 2.NBT.5** (9 minutes)

#### Rename for the Larger Unit (6 minutes)

Note: This fluency activity reviews place value foundations.

T: I’m going to tell you a number of ones. Tell me the largest units that can be made. Ready?

T: (Write 12 ones = \_\_\_\_ ten \_\_\_\_ ones.)

T: Say the number sentence. (Point to the board.)

S: 12 ones = 1 ten 2 ones.

T: (Write 29 ones = 1 ten \_\_\_\_ ones.) Say the number sentence.

S: 29 ones = 1 ten 19 ones.

T: (Write 29 ones = \_\_\_\_ tens \_\_\_\_ ones.) Say the number sentence.

S: 29 ones = 2 tens 9 ones.

Repeat the process for the following possible sequence: 58 ones, 97 ones, 100 ones, 130 ones, 148 ones, 254 ones, 309 ones, 880 ones, etc.

#### Sprint: Subtraction Patterns (9 minutes)

Materials: (S) Subtraction Patterns Sprint

Note: Students practice subtracting in order to gain mastery of the sums and differences within 20 and relate those facts to larger numbers.



### Application Problem (5 minutes)

Mr. Thompson's class raised 96 dollars for a field trip. They need to raise 120 dollars.

- How much more money do they need to raise in order to reach their goal?
- If they raise 86 more dollars, how much extra money will they have?

Note: This problem reviews multi-digit addition and subtraction and invites students to use a variety of strategies to solve.

a.  $96 \xrightarrow{+4} 100 \xrightarrow{+20} 120$   
 They need to raise 24 dollars.

b. 
$$\begin{array}{r} 96 \\ + 86 \\ \hline 182 \end{array}$$
  $182 \xrightarrow{-100} 82 \xrightarrow{-20} 62$   
 or  

$$\begin{array}{r} 86 \\ - 24 \\ \hline 62 \end{array}$$
  
 They will have 62 extra dollars.

### Concept Development (30 minutes)

Materials: (T) 1 piece of  $8\frac{1}{2}'' \times 11''$  paper, circle template, shaded shapes template (S) 1 piece of  $8\frac{1}{2}'' \times 11''$  paper, circle template, shaded shapes template, personal white board, scissors, crayons or colored pencils

Distribute  $8\frac{1}{2}'' \times 11''$  paper and crayons or colored pencils to each student.

- T: (Hold up a piece of paper.) What shape is this paper?
- S: A rectangle!
- T: How can you prove that?
- S: It has four straight sides and four right angles.
- T: Partner A, choose one way to fold your paper in half.
- T: Partner B, fold your paper in half another way. (Circulate to ensure students are folding accurately.)
- T: Once you have folded your paper, open it up and draw straight down the fold line with a crayon. Then color one half and label it. (Model as students do the same.)
- T: Talk with your partner. Use math language to describe how your papers are alike and different.
- S: We folded them differently, but we both have two equal parts. → We both have two halves. → We both still have a whole piece of paper.
- T: Excellent! You have **partitioned**, or divided, your paper into two equal shares called halves.
- T: And we can describe either part, whether shaded or unshaded, as half, true?
- S: True!
- T: Cut along your fold line, and then hold up your papers. (Wait as students do so.)



- T: What are you holding?  
 S: Two halves. → Two equal shares. → Two equal parts that make a whole.  
 T: Put them together. Now what do you have?  
 S: One whole!

Pass out the circle template and scissors. At the end of this activity, have students store their circle in their personal board to use during tomorrow's lesson.

- T: Cut out the circle by cutting right on top of the black line. (Model as students do the same.)  
 T: Fold your circle in half. Is there more than one way to do that?  
 S: No.  
 T: (Hold up folded circle.) This reminds me of certain foods. Do you know which ones I'm thinking of?  
 S: An omelet! → A quesadilla! → A taco!  
 T: Sure! Whether it's eggs or a tortilla, we sometimes take a circle and fold it in half. Yum!  
 T: Now, open up your circle, and draw straight down the fold line with a crayon. Then, color one half and label it. (Model as students do the same.)  
 T: How would you describe this circle now?  
 S: One half is shaded and the other half is unshaded. → We have two equal shares. → We have 2 halves.  
 T: That is correct!



### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

English language learners' cultural background can be used to build on their prior knowledge. Allow students to express their mathematical knowledge in their native language. For instance, Spanish-speaking students can answer "dos partes iguales" in response to the question about describing their shaded circle.

MP.3

Guide students to rotate their circles to discover and discuss that halves are determined by equal parts, not by the orientation of the line.

Pass out the shaded shapes template, and have students insert it into their personal boards.

- T: Look at the shapes on the page. Talk with your partner about all the reasons why each shape is or is not two equal shares with one share shaded?

Circulate as students talk in order to listen for misconceptions or identify comments to share with the class.

- S: Shape A looks like a card if you fold it over. The parts would be equal and there are two of them so they're halves.  
 T: What an interesting observation! We've said that the shapes need to be the same size, so if you can fold one side of the rectangle on top of the other side and they match, then they must be halves.  
 S: If Shape B were a pizza it wouldn't be fair shares. The parts aren't equal, so it's not halves, even though there are two parts. → Shape C is not halves because there are three parts, not two, and it's not thirds because the parts aren't equal.  
 T: Ooh! I like your thinking! Halves means *two* equal parts make up the whole.

As students demonstrate proficiency, allow them 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 solve these problems using the RDW approach used for Application Problems.

## Student Debrief (10 minutes)

**Lesson Objective:** Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or 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.

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

- For Problem 2, are shapes (g) and (h) split into two equal shares? How do you know?
- For Problem 2(c) and (h), why didn't you shade in one part?
- What similarities and differences do you notice between Problems 2(b), (e), and (k)?
- Can all the shapes in Problem 2 be split into two equal shares? How would Problem 2(d) change?
- Turn and talk. For Problem 3, what mental strategy did you use to split the shapes into halves? How does your work compare to your partner's?
- For Problem 3, how many ways can you split the shapes into halves? Do you notice anything interesting about circles?

Name Maria Date \_\_\_\_\_

1. Circle the shapes that have 2 equal shares with 1 share shaded.

2. Shade 1 half of the shapes that are split into 2 equal shares. One has been done for you.

a.	b.	c.	d.
e.	f.	g.	h.
i.	j.	k.	

3. Partition the shapes to show halves. Shade one half of each. Compare your halves to your partner's.

a.

b.

**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Subtract.

1	$5 - 1 =$		23	$10 - 2 =$	
2	$15 - 1 =$		24	$11 - 2 =$	
3	$25 - 1 =$		25	$21 - 2 =$	
4	$75 - 1 =$		26	$31 - 2 =$	
5	$5 - 2 =$		27	$51 - 2 =$	
6	$15 - 2 =$		28	$51 - 12 =$	
7	$25 - 2 =$		29	$10 - 5 =$	
8	$75 - 2 =$		30	$11 - 5 =$	
9	$4 - 1 =$		31	$12 - 5 =$	
10	$40 - 10 =$		32	$22 - 5 =$	
11	$43 - 10 =$		33	$32 - 5 =$	
12	$43 - 20 =$		34	$62 - 5 =$	
13	$43 - 21 =$		35	$62 - 15 =$	
14	$43 - 23 =$		36	$72 - 15 =$	
15	$12 - 2 =$		37	$82 - 15 =$	
16	$62 - 2 =$		38	$32 - 15 =$	
17	$62 - 12 =$		39	$10 - 9 =$	
18	$18 - 8 =$		40	$11 - 9 =$	
19	$78 - 8 =$		41	$51 - 9 =$	
20	$78 - 18 =$		42	$51 - 10 =$	
21	$41 - 11 =$		43	$51 - 19 =$	
22	$92 - 12 =$		44	$65 - 46 =$	

**B**

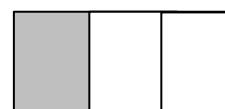
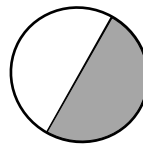
Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

Subtract.

1	$4 - 1 =$		23	$10 - 5 =$	
2	$14 - 1 =$		24	$11 - 5 =$	
3	$24 - 1 =$		25	$21 - 5 =$	
4	$74 - 1 =$		26	$31 - 5 =$	
5	$5 - 3 =$		27	$51 - 5 =$	
6	$15 - 3 =$		28	$51 - 15 =$	
7	$25 - 3 =$		29	$10 - 9 =$	
8	$75 - 3 =$		30	$11 - 9 =$	
9	$3 - 1 =$		31	$12 - 9 =$	
10	$30 - 10 =$		32	$22 - 9 =$	
11	$32 - 10 =$		33	$32 - 9 =$	
12	$32 - 20 =$		34	$62 - 9 =$	
13	$32 - 21 =$		35	$62 - 19 =$	
14	$32 - 22 =$		36	$72 - 19 =$	
15	$15 - 5 =$		37	$82 - 19 =$	
16	$65 - 5 =$		38	$32 - 19 =$	
17	$65 - 15 =$		39	$10 - 2 =$	
18	$16 - 6 =$		40	$11 - 2 =$	
19	$76 - 6 =$		41	$51 - 2 =$	
20	$76 - 16 =$		42	$51 - 10 =$	
21	$51 - 11 =$		43	$51 - 12 =$	
22	$82 - 12 =$		44	$95 - 76 =$	

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Circle the shapes that have 2 equal shares with 1 share shaded.

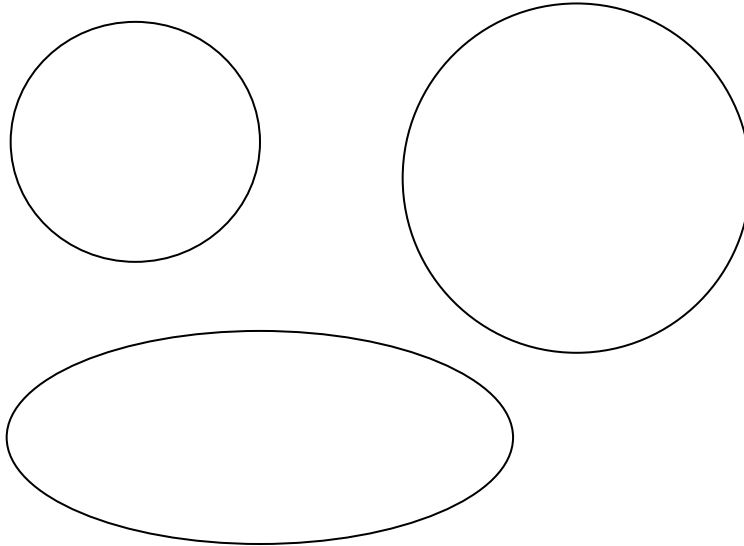


2. Shade 1 half of the shapes that are split into 2 equal shares. One has been done for you.

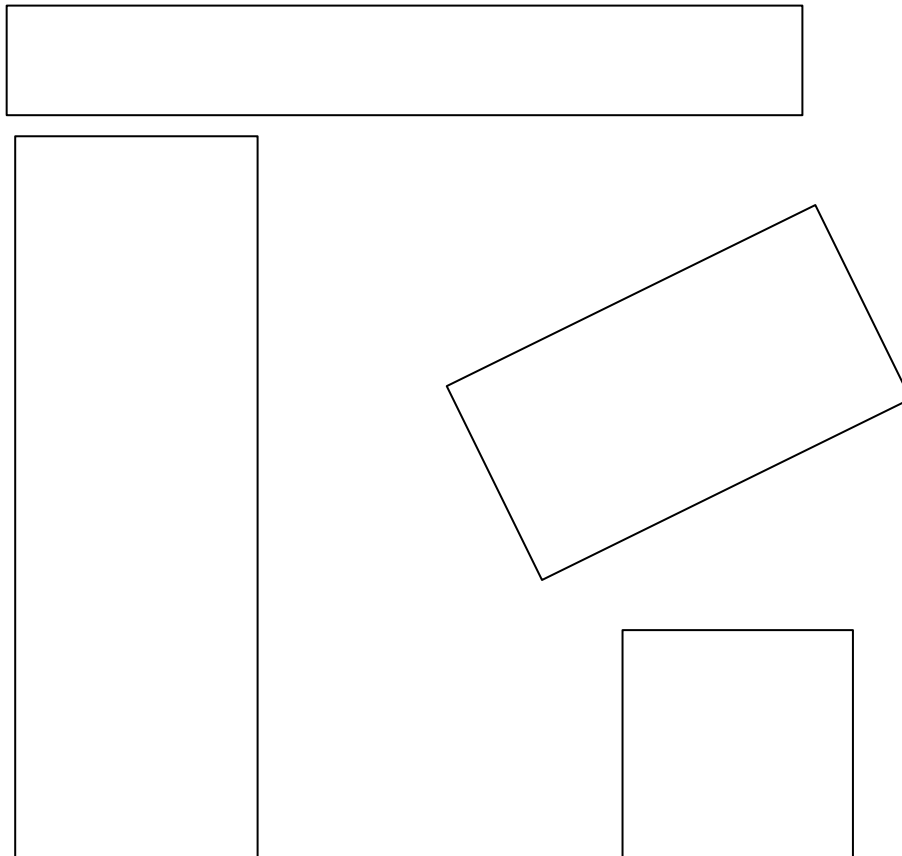
<p>a.</p>	<p>b.</p>	<p>c.</p>	<p>d.</p>
<p>e.</p>	<p>f.</p>	<p>g.</p>	<p>h.</p>
<p>i.</p>		<p>j.</p>	<p>k.</p>

3. Partition the shapes to show halves. Shade one half of each. Compare your halves to your partner's.

a.



b.

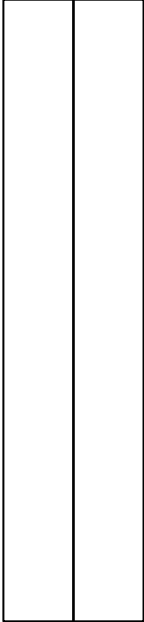
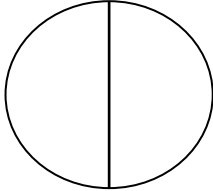
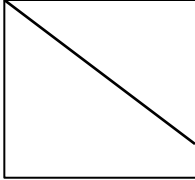
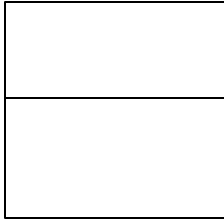
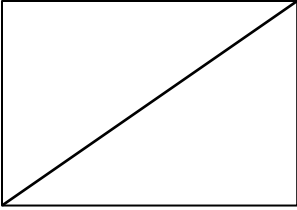
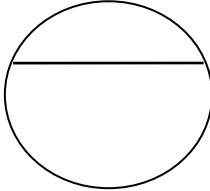
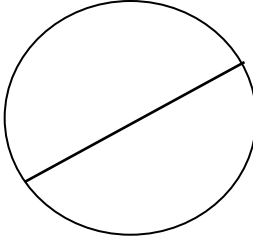




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Date \_\_\_\_\_

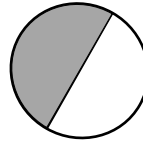
1. Shade 1 half of the shapes that are split into 2 equal shares.

a. 	b. 	c. 	d. 
	e. 	f. 	g. 

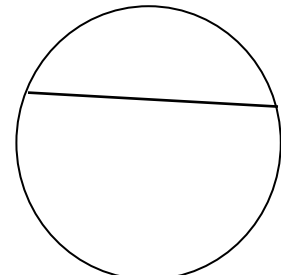
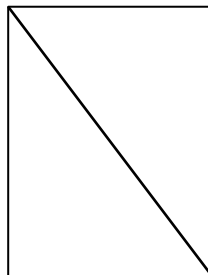
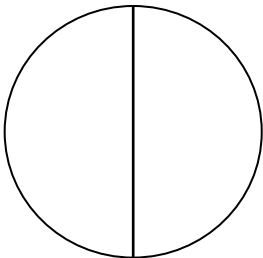
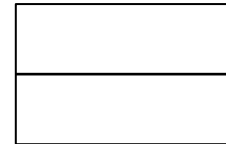
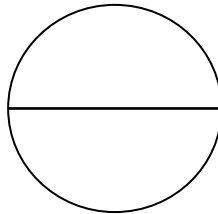
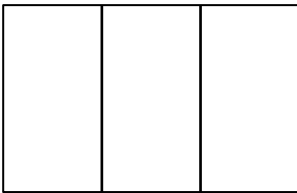
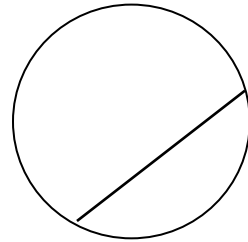
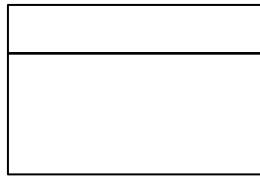
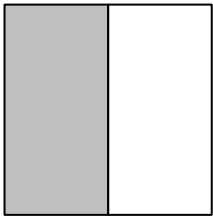
Name \_\_\_\_\_

Date \_\_\_\_\_

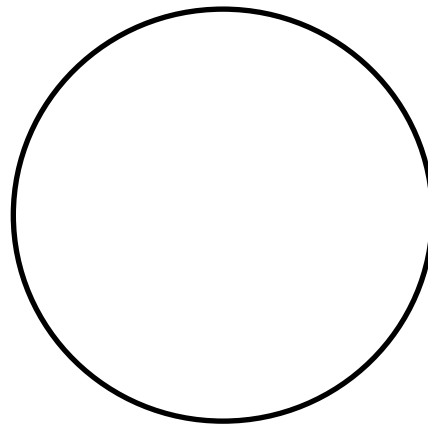
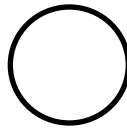
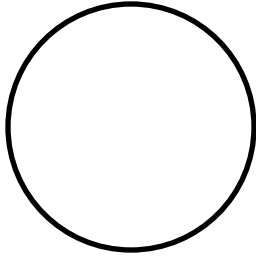
1. Circle the shapes that have 2 equal shares with 1 share shaded.

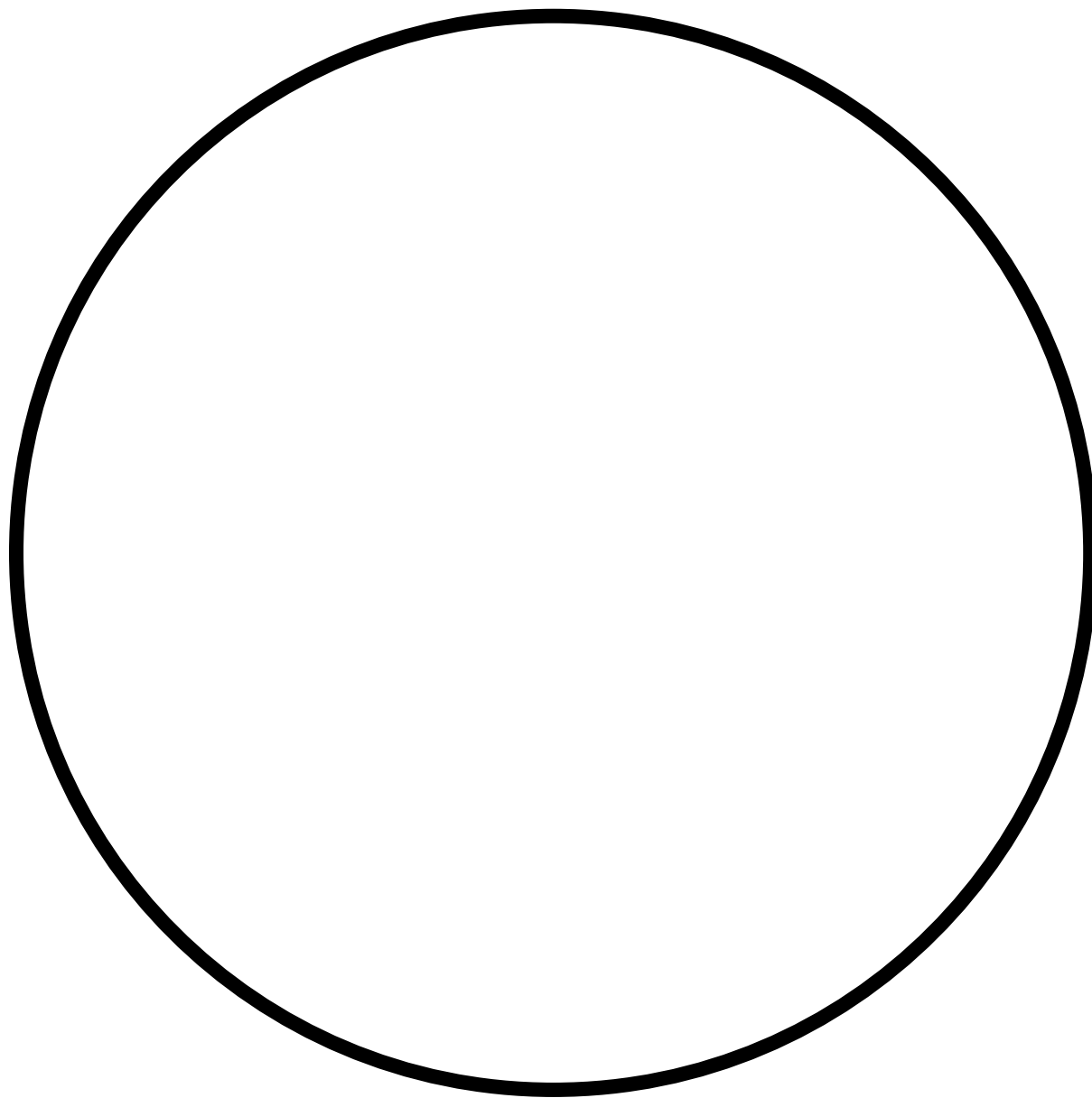


2. Shade 1 half of the shapes that are split into 2 equal shares. One has been done for you.

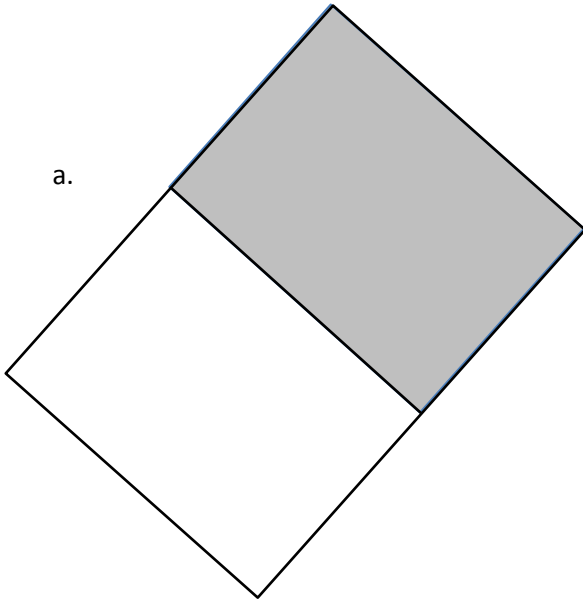


3. Partition the shapes to show halves. Shade one half of each.

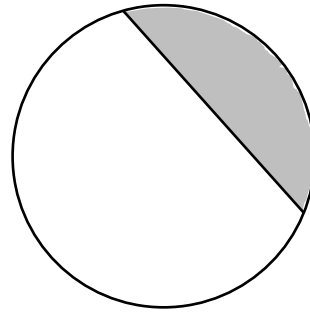




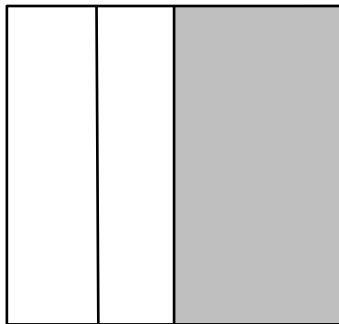
a.



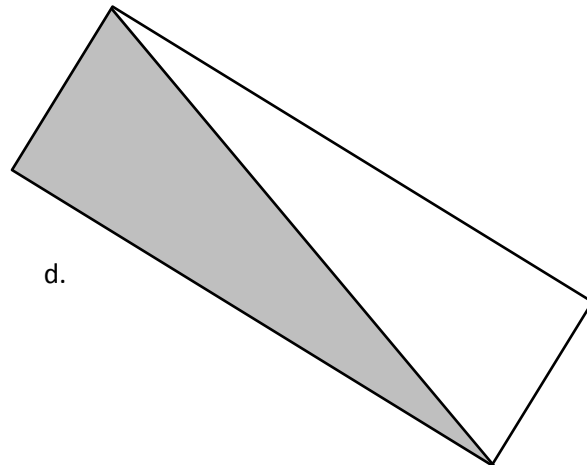
b.



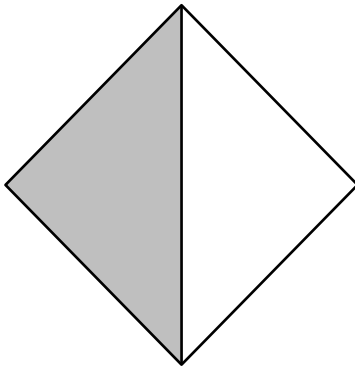
c.



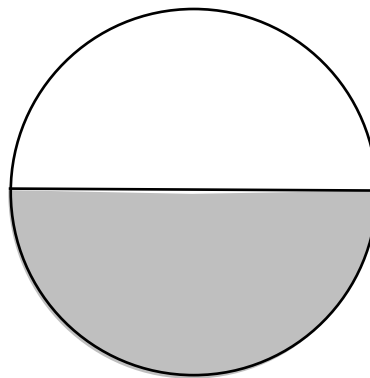
d.



e.



f.

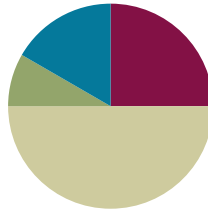


## Lesson 10

**Objective:** Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or fourths.

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (15 minutes)

- Rename for the Larger Unit **2.NBT.1** (6 minutes)
- Sprint: Addition Patterns **2.OA.2, 2.NBT.5** (9 minutes)

### Rename for a Larger Unit (6 minutes)

Note: This fluency activity reviews place value foundations needed to bundle when adding multi-digit numbers.

T: I'm going to give you a number. I want you to bundle and rename the units. Ready?

T: (Write 13 tens = \_\_\_\_ hundred \_\_\_\_ tens.)

T: Say the number sentence. (Point to the board.)

S: 13 tens = 1 hundred 3 tens.

T: Say 13 tens in standard form.

S: One hundred thirty.

T: (Write 26 tens 10 ones = \_\_\_\_ hundreds \_\_\_\_ tens.) Say the number sentence.

S: 26 tens = 2 hundreds 7 tens.

T: Say the number in standard form.

S: Two hundred seventy.

Repeat the process for the following possible sequence: 34 tens 10 ones, 56 tens 10 ones, 81 tens, 90 tens, 1 hundred 35 tens, 3 hundred 44 tens, 7 hundred 28 tens 10 ones, 5 hundred, 34 tens, 13 ones, and 3 hundred 44 tens 24 ones.

**Sprint: Addition Patterns (9 minutes)**

Materials: (S) Addition Patterns Sprint

Note: Students practice adding in order to gain mastery of the sums and differences within 20 and relate those facts to larger numbers.

**Application Problem (5 minutes)**

Felix is passing out raffle tickets. He passes out 98 tickets and has 57 left. How many raffle tickets did he have to start?

Note: This is an *add to with start unknown* type problem that reviews two-digit addition with two compositions.

$$\begin{array}{r} 98 \\ + 57 \\ \hline 155 \end{array}$$

Felix had 155 tickets in the beginning.

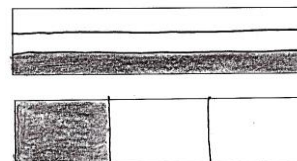
**Concept Development (30 minutes)**

Materials: (T) 1 piece of  $8\frac{1}{2}'' \times 11''$  paper, cut and colored circle from G2–M8–Lesson 9 (S) Rectangles and circle template, personal white board, 1 piece of  $8\frac{1}{2}'' \times 11''$  paper, crayons or colored pencils, cut and colored circle from G2–M8–Lesson 9

**Part 1: Making Thirds**

Pass out rectangles and circle template, and have students insert it into their personal boards.

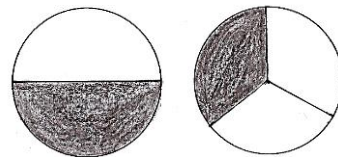
- T: Yesterday, we worked with halves. Today, let's take a look at thirds.
- T: When something is divided in thirds, how many equal shares does it have?
- S: Three!
- T: Correct! Draw two lines in each rectangle to show two different ways to partition them into thirds. (Demonstrate, and then allow students time to work.)
- T: Shade in one third of each rectangle. What do you notice?
- S: The thirds look different. → Even though they are both thirds, one is long and skinny, and one is short and fat. → Even though they're different shapes, they're both one third of the whole shape. → They both have two parts unshaded.
- T: Practice partitioning the rectangles into thirds. (Allow students time to work.)



**NOTES ON  
MULTIPLE MEANS OF  
ENGAGEMENT:**

Some students might have difficulty partitioning a rectangle into thirds. Give them a ruler to help them find where to draw their two lines to make equal parts. They can also fold their papers into thirds, thereby making a mark for them to draw their lines.

- T: Choose your rectangle that best shows thirds. Let's color each third and count as we go. Point to one third, and count with me. This is one third.
- S: (Point and count.) One third. (Continue, coloring to show 2 thirds and then 3 thirds, counting after each.)
- T: Erase your boards. Now, use two vertical lines to partition one rectangle into thirds. Then draw one vertical line to cut another rectangle into halves.
- T: Color one third of the top rectangle and one half of the bottom rectangle. (Pause as students work.)
- T: Which part is larger?
- S: One half is larger.
- T: Look at both rectangles as a whole. Which has more parts? Halves or thirds?
- S: Thirds.
- T: So, thirds have more parts, but the parts are smaller. Think about that for a moment. Why do you think that is?
- S: The more times you cut the rectangle, the smaller the pieces. → Yeah, and if you just cut it once, the pieces will be bigger.
- T: Let's try that with circles. (Draw two circles of equal size on the board. Divide one in half and one into thirds. Invite students to do the same with the circles on their template.)
- T: Which is more, one half or one third? Why?
- S: It's the same as with the rectangle. → One half is greater because there are only two parts. → One third is smaller because you cut the circle into more pieces.



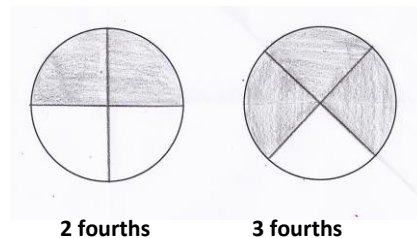
Have students erase their boards and practice drawing thirds in the circles. Repeat the process above, inviting students to choose the circle that shows the best thirds and to count each third.

## Part 2: Making Fourths

Have students take out their circle from yesterday's lesson.

**MP.1**

- T: We already folded, colored, and labeled one half. Let's turn the circle over and make fourths, or quarters, on the other side. When something is divided into fourths, how many equal shares does it have?
- S: Four!
- T: Fold your circle to partition it into four equal parts. Make sure each part is equal in size. Fold so the ends of the first line come together at the edge. (Model as students do the same.)
- T: Color and label one fourth of your circle. (Model as students do the same.)
- T: Point and count the fourths with your partner.
- S: 1 fourth, 2 fourths, 3 fourths, 4 fourths.





MP.1

- T: Now, use your personal boards to partition your circles into fourths. (Allow students time to work.) Tell your partner how you divided the circle into equal shares.
- S: I made it look like my paper circle. → I drew a cross in the middle of the circle. → You can draw an X in the circle.
- T: Shade in 2 fourths of the circle. (Allow students time to work.)
- T: Now, let's partition our rectangles into fourths, or quarters. There are a few different ways we can do this. (Demonstrate and then allow students time to work.)



Have students continue to practice partitioning rectangles into fourths and then shading the following possible patterns: 3 fourths, 4 fourths, 1 quarter, and 2 quarters.

### Part 3: Partitioning to Make Thirds and Fourths of a Sheet Cake and Pizza

- T: We're going to use your personal boards and the template to show equal shares. Let's pretend that the rectangles are sheet cakes and the circle is a pizza.
- T: It's easy to think about food when we talk about equal shares because there are so many foods we cut up to share with friends and family, like cakes, pizza, quesadillas, and candy bars!
- T: You're going to draw lines to cut the pizza and sheet cakes into halves, thirds, and fourths. Please show two different ways of partitioning when slicing the two sheet cakes. Then you'll color your share.
- T: For example, if I say, "You get 3 fourths of the cake," show me two different ways to partition the rectangles, and color 3 fourths on each cake.

Ask students to show a variety of partitions, for example, naming 1, 2, and 3 thirds and 1, 2, 3, and 4 fourths, as students partition and color their share.

- T: Now, listen to my story, and show me how each shape should be divided. Mary, Colleen, and Saffron share a pizza equally. Show how to slice the pizza, and label each share with their name. (Allow students time to work.)
- T: Talk with your partner: What fraction of the pizza did the girls share in all?
- S: They shared the whole pizza. → That's 3 thirds!
- T: Correct! What if Mary also eats Colleen's share of the pizza? How much has she eaten?
- S: Mary has eaten two thirds of the pizza. → She has eaten double her share. → She has eaten two shares now.



#### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Support English language learners during partner shares by giving them sentence frames to assist them. For instance: "The three of them shared \_\_\_\_\_," or "They each got a \_\_\_\_\_ of the pizza."

Allow students who have demonstrated proficiency 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 solve these problems using the RDW approach used for Application Problems.

## Student Debrief (10 minutes)

**Lesson Objective:** Partition circles and rectangles into equal parts, and describe those parts as halves, thirds, or 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.

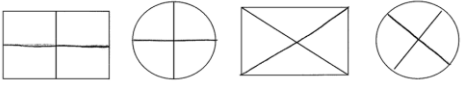
You may choose to use any combination of the questions below to lead the discussion.

- For Problem 1(a), how did you determine where to draw another line to make fourths?
- For Problem 2, Jasmine looked at the shaded rectangles and exclaimed, “3 thirds equals 2 thirds plus 1 third!” Do you agree with her? Why?
- For Problem 3, what is interesting about 2 fourths? Can you relate it to halves? When you shaded 3 fourths, what part was left unshaded? How about when you shaded 1 fourth?
- Look at Problem 4(e) and (h). How can 2 thirds be greater than 3 thirds?
- How are Problems 4(a), (d), and (g) alike? How are they different? When will the fourths be exactly the same size and shape?
- For Problem 5, what fraction of the pizza did Maria get? How do you know?

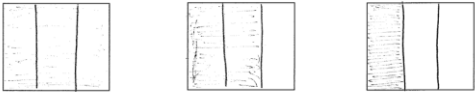
Name Keanna Date \_\_\_\_\_

1. Do the shapes in Problem 1(a) show halves or thirds? halves

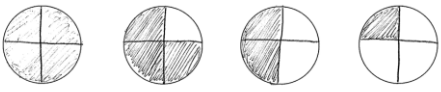
a. Draw 1 more line to partition each shape into fourths.



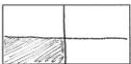


2. Partition each rectangle into thirds. Shade the shapes as indicated.









3. Partition each circle into fourths. Then, shade the shapes as indicated.




4. Partition and shade the following shapes as indicated. Each rectangle or circle is one whole.

a. 1 fourth  b. 1 third  c. 1 half 

d. 2 fourths  e. 2 thirds  f. 2 halves 

g. 3 fourths  h. 3 thirds  i. 3 halves 

Split the pizza below so that Maria, Paul, Jose, and Mark each have an equal share. Label each student's share with his or her name.

b. What fraction of the pizza was eaten by each of the boys?  

1 fourth

c. What fraction of the pizza did the boys eat altogether?  
3 fourths

**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Add.

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

**B**

Improvement \_\_\_\_\_

# Correct \_\_\_\_\_

Add

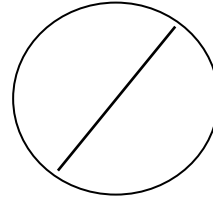
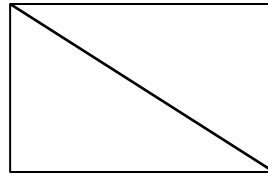
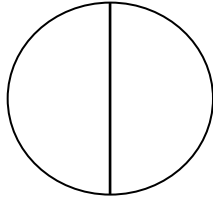
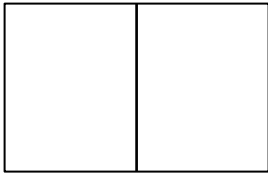
1	$9 + 1 =$		23	$19 + 5 =$	
2	$19 + 1 =$		24	$29 + 5 =$	
3	$39 + 1 =$		25	$17 + 7 =$	
4	$6 + 4 =$		26	$27 + 7 =$	
5	$16 + 4 =$		27	$19 + 6 =$	
6	$36 + 4 =$		28	$19 + 7 =$	
7	$9 + 2 =$		29	$29 + 6 =$	
8	$19 + 2 =$		30	$29 + 7 =$	
9	$29 + 2 =$		31	$17 + 8 =$	
10	$7 + 4 =$		32	$17 + 9 =$	
11	$17 + 4 =$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

Name \_\_\_\_\_

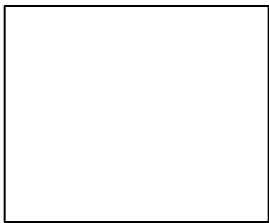
Date \_\_\_\_\_

1. Do the shapes in Problem 1(a) show halves or thirds? \_\_\_\_\_

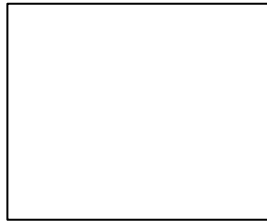
a. Draw 1 more line to partition each shape into fourths.



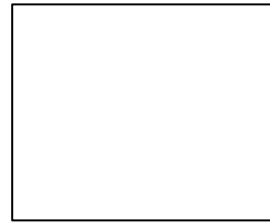
2. Partition each rectangle into thirds. Shade the shapes as indicated.



3 thirds

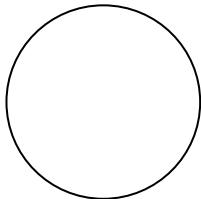


2 thirds

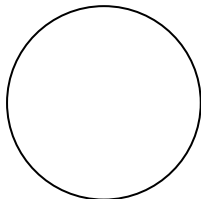


1 third

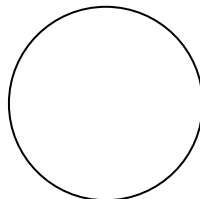
3. Partition each circle into fourths. Then, shade the shapes as indicated.



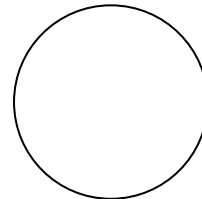
4 fourths



3 fourths



2 fourths



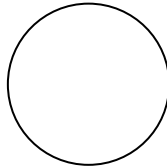
1 fourth

4. Partition and shade the following shapes as indicated. Each rectangle or circle is one whole.

a. 1 fourth



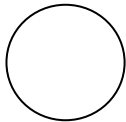
b. 1 third



c. 1 half



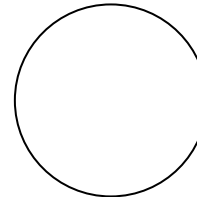
d. 2 fourths



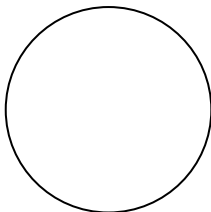
e. 2 thirds



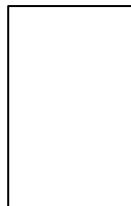
f. 2 halves



g. 3 fourths



h. 3 thirds



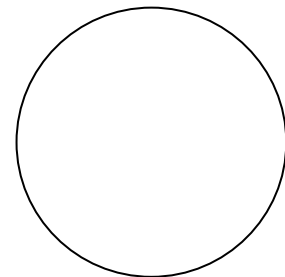
i. 3 halves



5. Split the pizza below so that Maria, Paul, Jose, and Mark each have an equal share. Label each student's share with his or her name.

a. What fraction of the pizza was eaten by each of the boys?

b. What fraction of the pizza did the boys eat altogether?

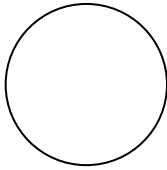


Name \_\_\_\_\_

Date \_\_\_\_\_

1. Partition and shade the following shapes as indicated. Each rectangle or circle is one whole.

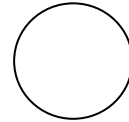
a. 2 halves



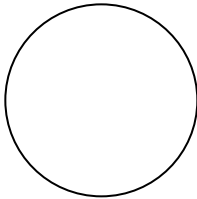
b. 2 thirds



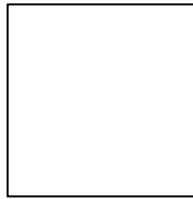
c. 1 third



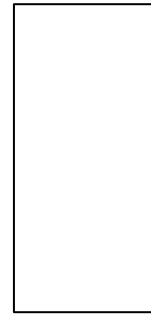
d. 1 half



e. 2 fourths



f. 1 fourth

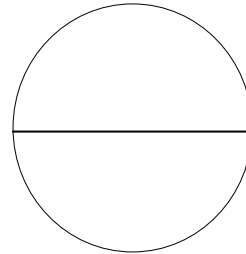
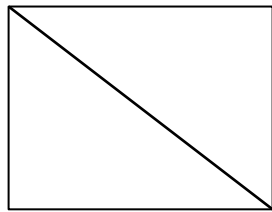
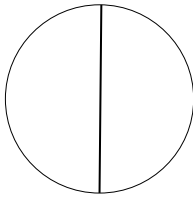




Name \_\_\_\_\_

Date \_\_\_\_\_

1. Do the shapes below show halves or thirds? \_\_\_\_\_

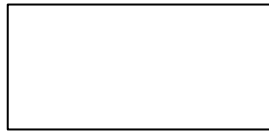


- a. Draw 1 more line to partition each shape above into fourths.

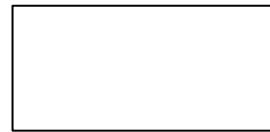
2. Partition each rectangle into thirds. Shade the shapes, as indicated.



2 thirds

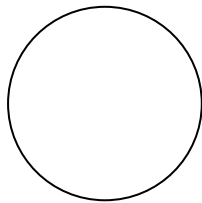


1 third

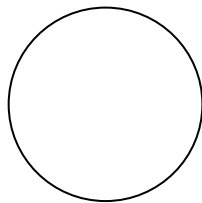


3 thirds

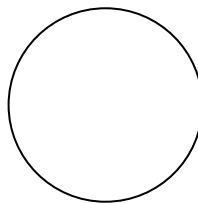
3. Partition each circle into fourths. Then, shade the shapes as indicated.



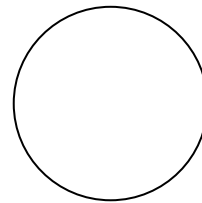
1 fourth



3 fourths



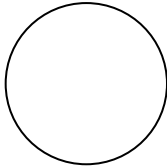
4 fourths



2 fourths

4. Partition and shade the following shapes. Each rectangle or circle is one whole.

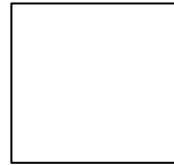
a. 1 half



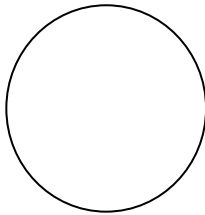
b. 1 fourth



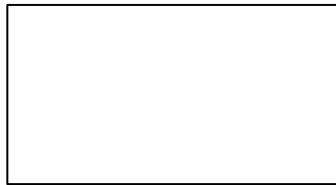
c. 1 third



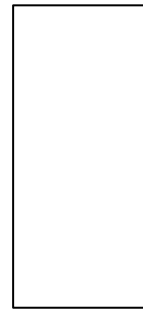
d. 2 fourths



e. 2 halves



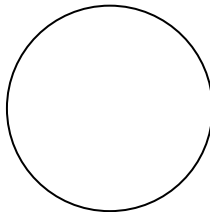
f. 2 thirds



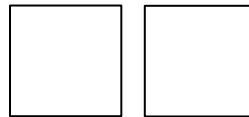
g. 3 thirds



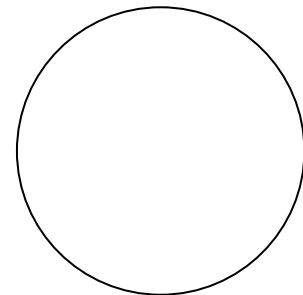
h. 3 fourths



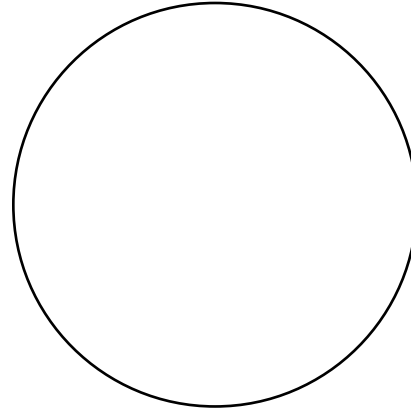
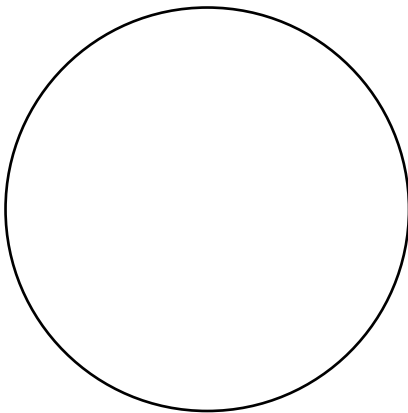
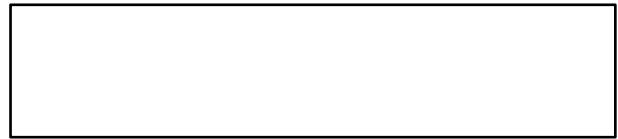
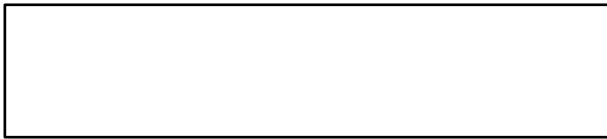
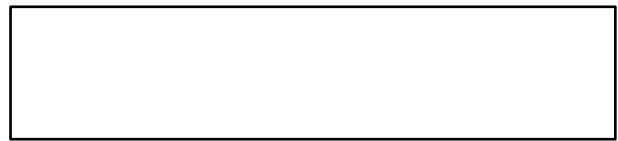
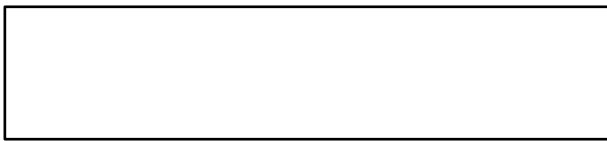
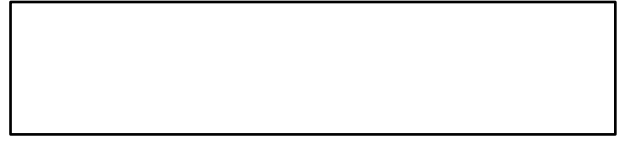
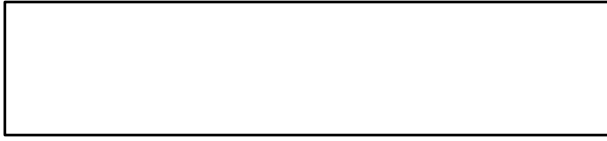
i. 3 halves



5. Split the pizza below so that Shane, Raul, and John all have an equal share. Label each student's share with his name.



What fraction of the pizza did the boys get in all?

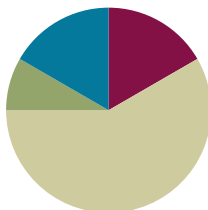


## Lesson 11

**Objective:** Describe a whole by the number of equal parts including 2 halves, 3 thirds, and 4 fourths.

### Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(35 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (10 minutes)

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

### Addition with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $112 + 159$  horizontally on the board.) Let's use a chip model to add. On your boards, record your work using the vertical method.

S: (Solve on their personal boards.)

T:  $112 + 159$  is...?

S: 271!

Continue with the following possible sequence:  $184 + 135$ ,  $385 + 108$ ,  $323 + 491$ ,  $263 + 178$ ,  $589 + 223$ , and  $471 + 289$ .

### Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

Materials: (S) Core Fluency Practice Sets from G2–M8–Lesson 3



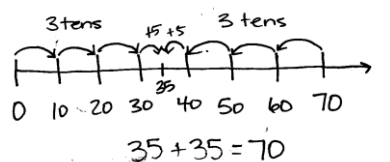
#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

If the students have the four parts of a square oriented like a rectangle have the discussion that four one-fourths of a rectangle still make the whole but the question was asking for a square, a special kind of rectangle. Ask, "How could we change the orientation so that the four parts make a square?"

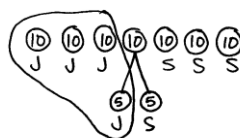
Note: During G2–M8–Topic D and for the remainder of the year, each day's Fluency Practice includes an opportunity for review and mastery of the sums and differences with totals through 20 by means of the Core Fluency Practice Sets or Sprints. The process is detailed and Practice Sets provided in G2–M8–Lesson 3.

### Application Problem (5 minutes)

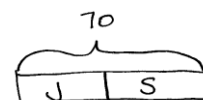
Jacob had collected 70 baseball cards. He gave half of them to his brother Sammy. How many baseball cards does Jacob have left?



Jacob has 35 baseball cards left.



$10 + 10 + 10 + 5 = 35$   
 $10 + 10 + 10 + 5 = 35$   
 $35 + 35 = 70$   
 Jacob still has 35 baseball cards.



$30 + 30 = 60$   
 $5 + 5 = 10$   
 $35 + 35 = 70$   
 Jacob has 35 baseball cards left.

Note: This Application Problem combines what students have learned about subtraction and their new knowledge of halves. It reinforces that halves are equal, and that a whole is comprised of equal parts.



#### NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Offer below grade level students the following version of the Application Problem: Jacob collected 70 baseball cards. He gave half of them to his brother Sammy. Now Sammy has 35 baseball cards. How many baseball cards does Jacob have left?

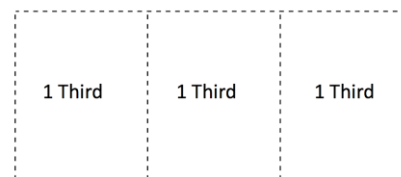
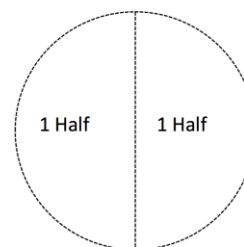
### Concept Development (35 minutes)

Materials: (T/S) Labeled fraction parts template, 1 piece of unlined paper, glue stick

Copy and cut out enough labeled fraction parts templates to have one piece for each student. Check to be sure that there are the right number of pieces to form complete circles.

#### Part 1: Completing a Whole and Counting Thirds and Fourths in the Whole

- T: (Call on a volunteer and give him one half of the circle template.) Look at the part that Student A is holding. Does he have a whole circle?
- S: No.
- T: What does he need to complete the circle?
- S: Another half!
- T: Good. Watch as I complete the whole. (Hold the other half of the circle next to Student A's part.) 1 half and 1 half



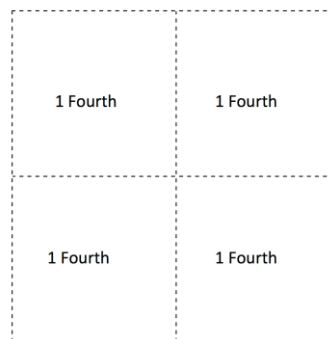
makes 1 whole; 2 halves make a whole! Say it with me.

- S: 1 half and 1 half makes a whole. 2 halves make a whole.
- T: Good. (Call two volunteers and give them each one-third of the rectangle template.) Look at the parts of a rectangle Student B and Student C are holding. They each have 1 third of a rectangle. How many thirds do you see altogether?
- S: 2 thirds.
- T: What do they need to complete the whole rectangle?
- S: 1 more third.
- T: Yes, watch as I complete the whole. (Hold 1 third of the rectangle next to the others.) 1 third and 1 third and 1 third make a whole; 3 thirds make a whole! Say it with me.
- S: 1 third and 1 third and 1 third makes a whole; 3 thirds make a whole.
- T: (Call three volunteers and give them each 1 fourth of the square template.) Look at the parts of a square that Student B, Student C, and Student D are holding. They each have 1 fourth of a square. What do they need to complete the whole square?
- S: 1 more fourth.
- T: Let's complete the whole. (Finish the shape to correctly form a square.)
- T: Good thinking everyone. This one was tricky. 1 fourth and 1 fourth and 1 fourth and 1 fourth make 1 whole; 4 fourths makes 1 whole. Say it with me.
- S: 1 fourth and 1 fourth and 1 fourth and 1 fourth make 1 whole; 4 fourths makes 1 whole.



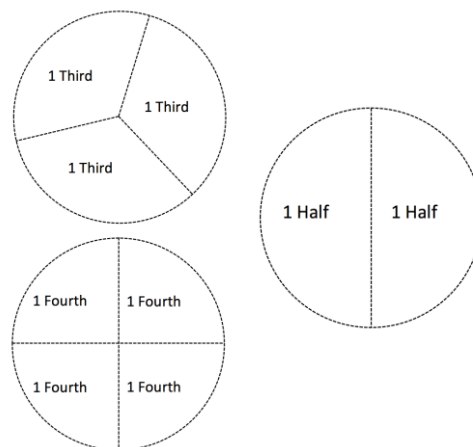
### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

To help underscore for English language learners that fractional parts make a whole, get students to hold the two halves as you say, "One-half and one-half makes a whole. Two-halves make a whole." And then have student volunteers join their halves to form a whole. Continue for thirds and fourths.



## Part 2: Making a Whole Circle from Paper Cutouts

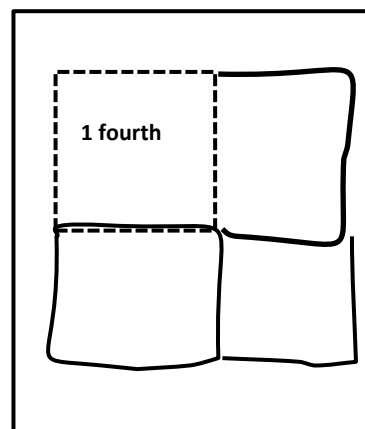
- T: (From the previously cut labeled fraction parts templates, distribute one piece of a whole circle (halves, thirds, or fourths) to each student.) Each of you has a piece of a whole circle. When I say, "Find your whole," walk around the room to complete your whole. Ready? Find your whole!
- S: (Find their whole. Assist those who need help making their whole group.)
- T: Very good. Let's look at our whole groups. Do all of our groups have the same number of people?
- S: No!
- T: Which group has the most people? Which group has the fewest number of people?



- S: The fourths have the most people, because it takes 4 fourths to make the whole square. → The halves have the fewest number of people, because it only takes 2 halves to make a whole.
- T: Which group has the biggest pieces? Which group has the smallest pieces?
- S: The halves are the biggest. → The fourths are the smallest.
- T: Good. So what can we say about thirds compared to halves and fourths?
- S: Thirds are bigger than fourths but smaller than halves! → A shape can have more thirds than halves.

### Part 3: Drawing a Whole Circle from One Part to the Whole

- T: (Hold up 1 fourth of a square.) What type of part do I have?
- S: 1 fourth!
- T: I'm going to glue my 1 fourth on my paper. How many more fourths do I need to complete the whole square?
- S: 3 more.
- T: Watch as I draw 3 more fourths to complete the whole (pictured). 4 fourths make 1 whole.
- T: (Pass out a half, third, or fourth piece to each student.) Tell your partner what part you have.
- S: I have a half! → This is a third. → Mine is the same as the teacher's, 1 fourth.
- T: (Pass out unlined paper and glue sticks.) Take your piece of a whole and glue it on your paper. Use a crayon to complete the whole.
- S: (Work quietly while the teacher circulates to help those needing assistance.)
- T: Great job making a whole! Show your partner your work! Let's practice some more on our Problem Set.



MP.7

Extended Practice: Have some extra cut-up, labeled fraction parts for early finishers to complete halves, thirds, and fourths.

### 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 solve these problems using the RDW approach used for Application Problems.

Name Robert Date \_\_\_\_\_

1. For parts a, c, and e, identify the shaded area.

a. 1 half 2 halves

b. Circle the shape above that has a shaded area that shows 1 whole.

c. 1 third 2 thirds 3 thirds

d. Circle the shape above that has a shaded area that shows 1 whole.

e. 1 fourth 4 fourths 2 fourths 3 fourths

f. Circle the shape above that has a shaded area that shows 1 whole.

### Student Debrief (10 minutes)

**Lesson Objective:** Describe a whole by the number of equal parts including 2 halves, 3 thirds, and 4 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.


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


- For Problem 1(c), which is closer to one whole, 1 third or 2 thirds?
- If you shade 3 fourths of a rectangle, is it possible that 2 fourths are left unshaded?
- What is the same and different about 2 halves, 3 thirds, and 4 fourths?
- For Problem 2, how can you check to make sure your answer is correct?
- Sangeeta says that 2 halves cannot equal 3 thirds. Explain why you agree or disagree.


2. What fraction do you need to color to shade 1 whole?


a.   
2 thirds

b.   
1 half

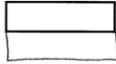
c.   
2 fourths

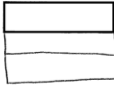
d.   
1 third


e.   
1 half

f.   
1 fourth

3. Draw to complete each shape.

a. This is 1 half. Draw 1 whole. 

b. This is 1 third. Draw 1 whole. 

c. This is 1 fourth. Draw 1 whole. 

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

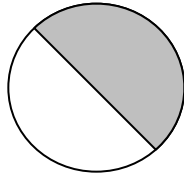


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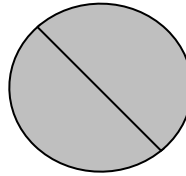
Date \_\_\_\_\_

1. For parts a, c, and e, identify the shaded area.

a.



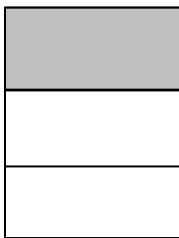
\_\_\_\_\_ half



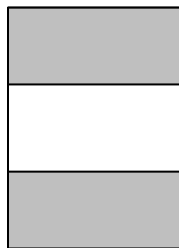
\_\_\_\_\_ halves

b. Circle the shape above that has a shaded area that shows 1 whole.

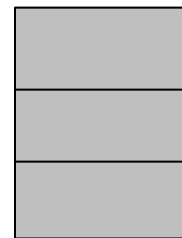
c.



\_\_\_\_\_ third



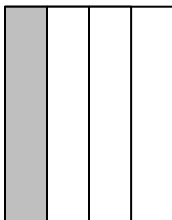
\_\_\_\_\_ thirds



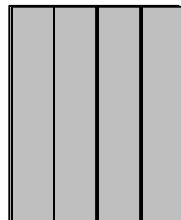
\_\_\_\_\_ thirds

d. Circle the shape above that has a shaded area that shows 1 whole.

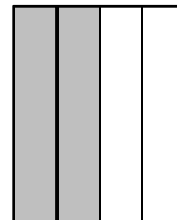
e.



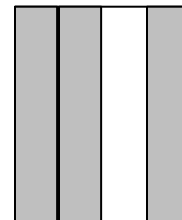
\_\_\_\_\_ fourth



\_\_\_\_\_ fourths



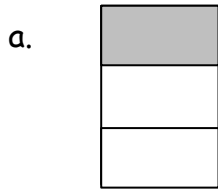
\_\_\_\_\_ fourths



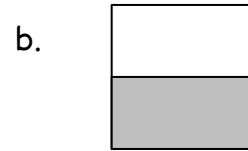
\_\_\_\_\_ fourths

f. Circle the shape above that has a shaded area that shows 1 whole.

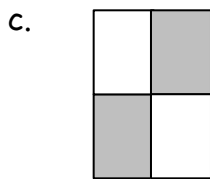
2. What fraction do you need to color to shade 1 whole?



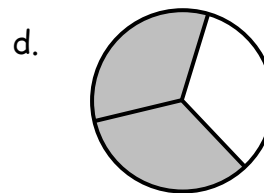
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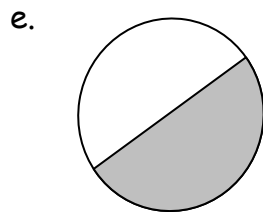
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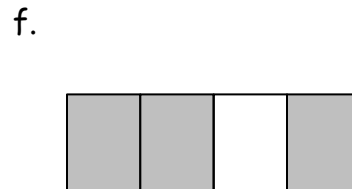
\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

3. Draw to complete each shape.

a. This is 1 half.  
Draw 1 whole.



b. This is 1 third.  
Draw 1 whole.



c. This is 1 fourth.  
Draw 1 whole.

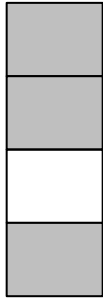


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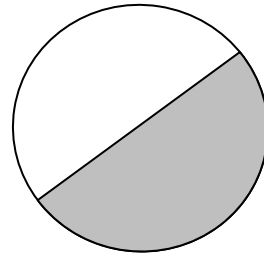
1. What fraction do you need to color to shade 1 whole?

a.



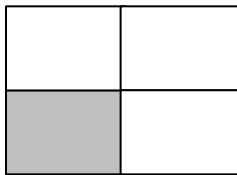
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b.



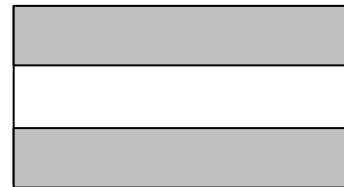
\_\_\_\_\_

c.



\_\_\_\_\_

d.



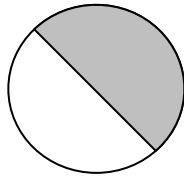
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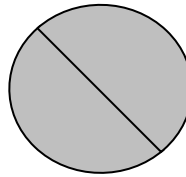
Date \_\_\_\_\_

1. For parts a, c, and e, identify the shaded area.

a.



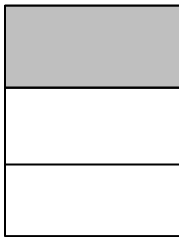
\_\_\_\_\_ half



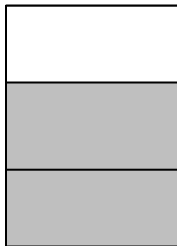
\_\_\_\_\_ halves

b. Circle the shape above that has a shaded area that shows 1 whole.

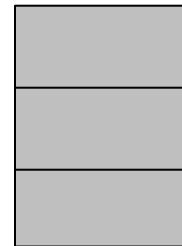
c.



\_\_\_\_\_ third



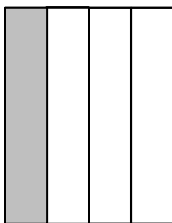
\_\_\_\_\_ thirds



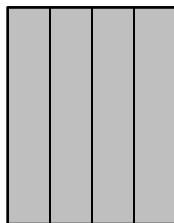
\_\_\_\_\_ thirds

d. Circle the shape above that has a shaded area that shows 1 whole.

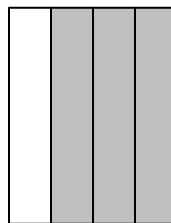
e.



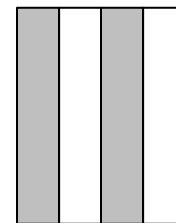
\_\_\_\_\_ fourth



\_\_\_\_\_ fourths



\_\_\_\_\_ fourths



\_\_\_\_\_ fourths

f. Circle the shape above that has a shaded area that shows 1 whole.

2. What fraction do you need to color to shade 1 whole?

a.



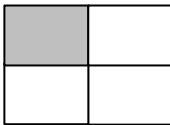
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b.



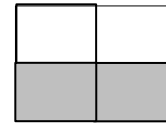
\_\_\_\_\_

c.



\_\_\_\_\_

d.



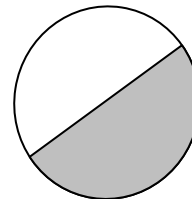
\_\_\_\_\_

e.



\_\_\_\_\_

f.



\_\_\_\_\_

3. Draw to complete each shape.

a. This is 1 half.  
Draw 1 whole.

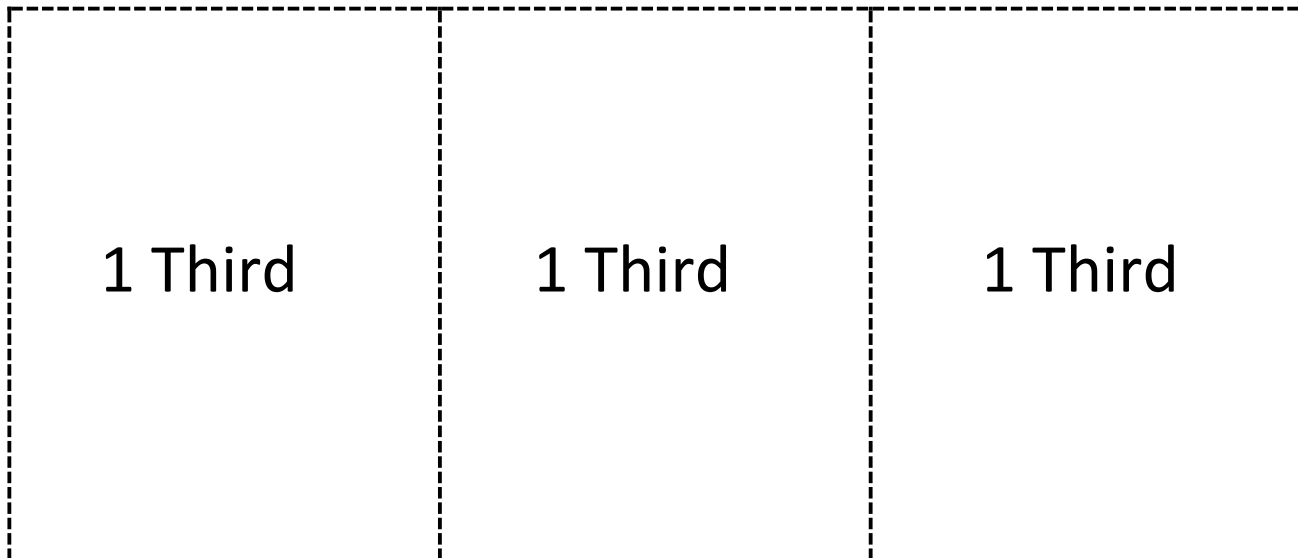
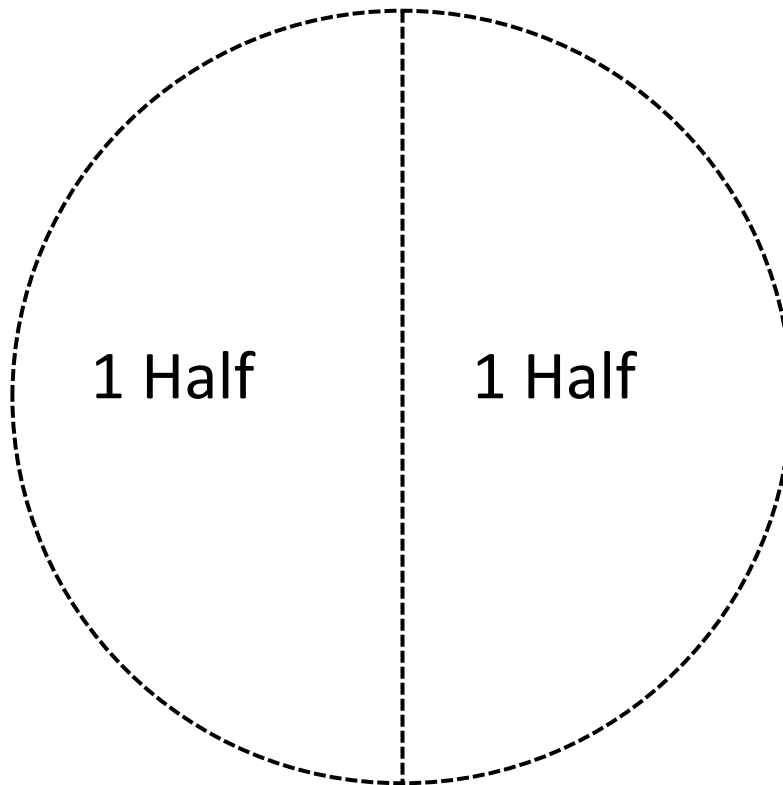


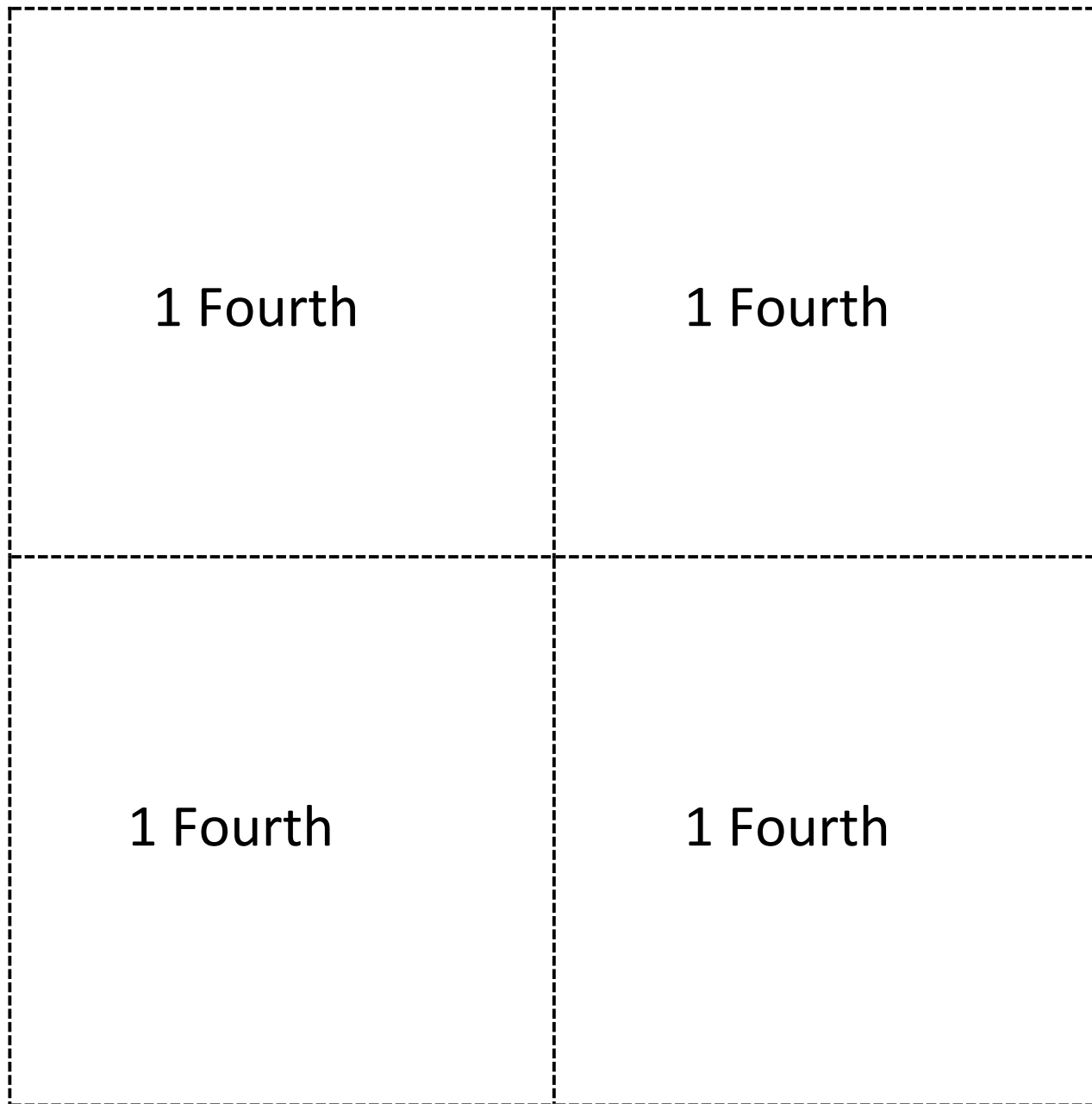
b. This is 1 third.  
Draw 1 whole.

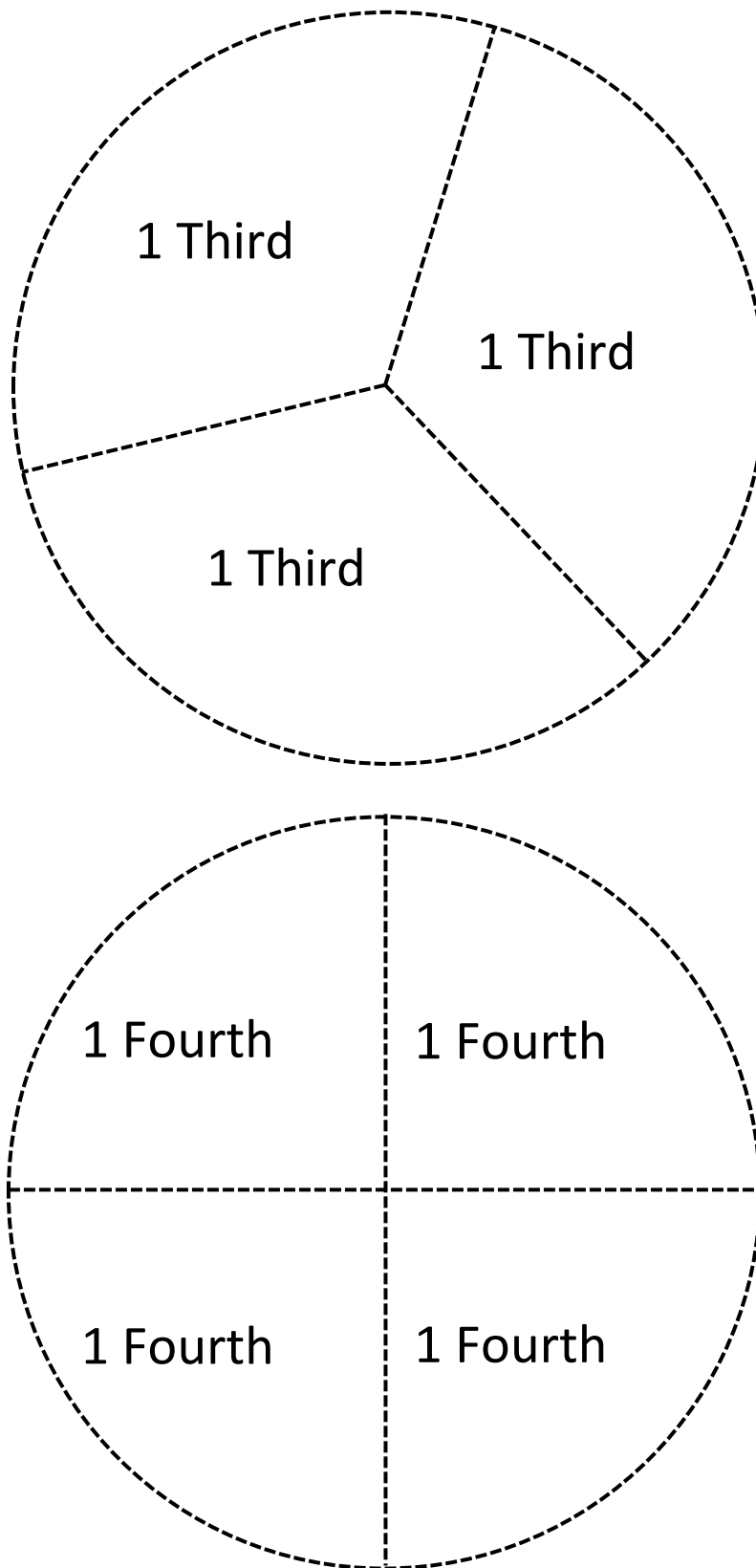


c. This is 1 fourth.  
Draw 1 whole.









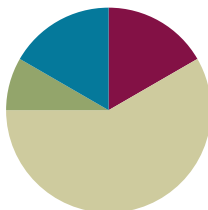


## Lesson 12

**Objective:** Recognize that equal parts of an identical rectangle can have different shapes.

### Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(35 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (10 minutes)

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

### Addition with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $234 + 266$  horizontally on the board.) Let's use a chip model to add. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T:  $234 + 266$  is...?

S: 500!

Continue with the following possible sequence:  $123 + 189$ ,  $195 + 235$ ,  $212 + 189$ ,  $341 + 279$ , and  $454 + 378$ .

### Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

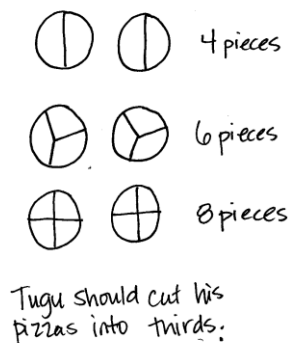
Materials: (S) Core Fluency Practice Sets from G2–M8–Lesson 3

Note: During G2–M8–Topic D 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 and Practice Sets provided in G2–M8–Lesson 3.

### Application Problem (5 minutes)

Tugu made two pizzas for himself and his 5 friends. He wants everyone to have an equal share of the pizza. Should he cut the pizza into halves, thirds, or fourths?



#### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Scaffold the Application Problem for below grade level students by helping them draw the problem a step at a time through questioning: “What would 2 pizzas look like? What if you cut them in half? What would 2 pizzas look like if they were cut in thirds?”

Note: This reinforces yesterday’s lesson that three thirds equals a whole.

### Concept Development (35 minutes)

Materials: (T) 2 Problem Set shape templates, 2 equally sized construction paper squares (S) Geoboard and rubber bands, 2 construction paper square per pair in two different colors, 2 construction paper rectangles per pair in 2 different colors (cut to one half the construction paper square), Problem Set shape template

Note: Students complete the Problem Set as a class during the Concept Development.

Note: Students will need scissors to complete the homework.

#### Part 1: Dividing a Shape into Equal Parts in More than One Way

T: (Draw a square on the board.) This is a whole square. Student A, come up and partition, or divide, the square into halves.

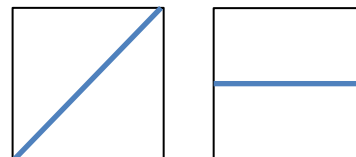
S: (Student A divides the square as shown.)

T: Thumbs up if you agree with Student A. Good. 2 halves make?

S: 1 whole!

T: Here is another whole square that is the same size. (Draw a square next to the one already on the board.) Watch as I partition this square into halves.

T: (Divide the square diagonally.) Turn and talk: Is the square split into halves?



S: Yes. It's like the parts we shaded yesterday. → I think it is because there are still 2 equal halves. → Yes, because if you fold it in half, the pieces are the same size.

T: This square is split into halves because there are two triangles that are the exact same size.

T: Use your geoboard and one rubber band to create the biggest square possible. (Allow students time to work.) This is one whole. Work with your partner to see how many different ways you can show 2 halves.

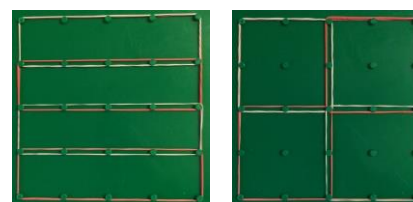
S: (Work with geoboards to produce halves as shown on right.)



T: Now, use the same geoboard square to show fourths. Again, work with your partner to find at least two ways to show your square split into fourths.

S: (Work to create fourths as shown on right.)

T: Show me the last way you divided your square on your geoboard. Are all of your fourths the same shape?



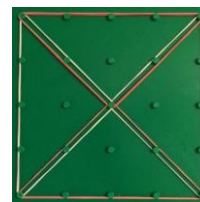
MP.1

S: We made four squares! → I have rectangles, and they have squares. → Look, I made triangles!

T: Equal shares can have different shapes. What were some of the shapes you discovered?

S: Rectangles. → Triangles. → Squares.

T: Good. Let's take a look at some equally sized rectangles on our Problem Set. Look at Problem 1. Draw lines to show equal halves, thirds, and fourths of a whole rectangle.



S: (Work on the Problem Set. Circulate to help those who need support.)

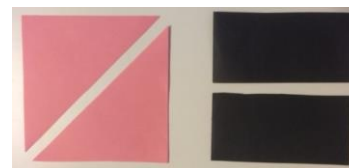
## Part 2: Proving the Equality of Halves with Different Shapes

T: Let's use paper squares to show halves in two different ways. (Give each student a paper square. Partners should have one of each color.) First, how can we tell if your square is the same size as your partner's?

S: We can put one on top of the other.

T: Do that to prove that they are the same size. (Pause as they verify the wholes are the same.)

T: If you have a pink square, fold to make triangular halves. If you have a black square, fold to make rectangular halves. Draw a line on the fold. (Demonstrate.)



S: (Fold paper squares and draw a line on the fold.)

T: We want to know if the way each of these squares is divided shows halves, two equal pieces of equally sized squares.

T: Cut each square into halves. (Demonstrate.)

S: (Cut on the line of each square so that they have a rectangular half and a triangle half.)



- T: (Hold the halves side by side.) What do you notice about the halves we cut from each square?
- S: One half is a rectangle, and one half is a triangle.
- T: Do these pieces show half of the same size square even though they are different shapes?
- S: I don't know. → I don't think so, because one is a rectangle and one is a triangle.
- T: (Tape the rectangle to the board.) Watch as I cut the triangle into fourths. (Fold the triangle in half and in half again. Then cut along the folds.) I'm going to see if the triangle half fits on top of the rectangle half to see if they are the same. (Position the four triangular pieces so that they fit exactly on top of the rectangle.)
- T: You try it.
- S: (Fold and cut.)
- T: How do we know the triangle half is the same as the rectangle half?
- S: It's like magic. → It's not the same shape, but it covers the same amount of space. → The four pink parts cover the black half without any gaps or overlaps. → The way the triangles fit perfectly shows that the pink and black halves are the same size
- T: Look at Problem 2 on your Problem Set. Build the original whole square using the rectangle half and the half represented by your four small triangles. Draw it in the space below.
- S: (Work on the Problem Set.)
- T: (Circulate to help those who need support.)



### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Guide English language learners through the lesson by being explicit with language. For instance, as you ask students to show two halves, show a picture of an apple cut into two equal pieces, and point to the halves as you give the direction.

### Part 3: Creating Multiple Shapes Using Equal Shares

- T: Let's use the halves of our paper squares to make new shapes. Here are some brown rectangular halves. Each partner should have a brown half and a black half.
- T: Make a different polygon out of your rectangular halves. (Allow students time to work.)
- T: Tell your partner what polygon you made.
- S: I made a long rectangle. → Mine looks like an L. It has six sides. → I have an octagon!
- T: How did the square change?
- S: The square is now a rectangle! → We cut it into halves and made new polygons.
- T: What part stayed the same?
- S: The 2 halves stayed the same. → There's still one brown half and one black half.
- T: Yes, even though we moved the halves around to make a new polygon, the shares still show equal halves.



- T: Now, cut each equal part in half and move them to form a new polygon. (Allow students time to work.) What fraction of the whole is one part now?
- S: 1 fourth!
- T: What changed when we switched from halves to fourths?
- S: There are 4 fourths instead of 2 halves. → The halves were rectangles, but the fourths are squares. → I can make a different polygon with the fourths.
- T: What stayed the same?
- S: It's still the same amount of brown and black. → The whole stayed the same. We didn't lose any parts or add any parts. We just cut them.
- T: That's right, we cut up the square into halves and then fourths, but the new polygon was made from the original square. Can you still see the square in your head? Could you move the pieces back so it looks like the square again? (Partners move fourths to form the original square.)
- T: Good job. You will all get a chance to do this with a square and a circle from the Problem Set.
- T: (Invite students to work on Problems 3 and 4 independently.)

### Student Debrief (10 minutes)

**Lesson Objective:** Recognize that equal parts of an identical rectangle can have different 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.


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

- (Draw examples from Problem 1(c).) If you split two rectangles of the same size into fourths and make four triangles or four rectangles, which fourth is bigger?


Name Adam Date \_\_\_\_\_

1. Partition the rectangles in 2 different ways to show equal shares.


a. 2 halves



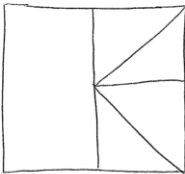
b. 3 thirds



c. 4 fourths



2. Build the original whole square using the rectangle half and the half represented by your 4 small triangles. Draw it in the space below.



3. Use different colored halves of a whole square.

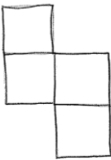
a. Cut the square in half.

b. Rearrange the halves to create a new rectangle with no gaps or overlaps.

c. Cut each equal part in half.

d. Rearrange the new equal shares to create different polygons.

e. Draw one of your new polygons from Part (d) below.



4. Cut out the circle.


a. Cut the circle in half.

b. Rearrange the halves to create a new shape with no gaps or overlaps.

c. Cut each equal share in half.

d. Rearrange the equal shares to create a new shape with no gaps or overlaps.

e. Draw your new shape from Part (d) below. One half is still shaded!



- For Problem 1, if you were to cut out your equal shares in the left column and rearrange them, would they fit on top of the equal shares in the right column? Why?
- For Problem 4, share your drawing with your partner. How many equal shares do you have? What fraction is shaded? When you rearranged your squares to create a new shape, what fraction was shaded?
- If you split two rectangles in half, will the halves always have the same shape? What must the rectangles have in common first?
- (Draw two long, skinny rectangles. Partition one in half diagonally. ) If I moved these halves, could I make a triangle? (After students respond, draw a triangle to show how the halves could be rearranged to make a triangle.) How is it possible that this triangle takes up the same amount of space as this rectangle?

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Partition the rectangles in 2 different ways to show equal shares.

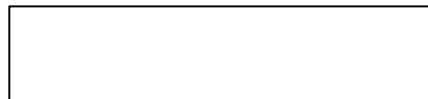
a. 2 halves



b. 3 thirds



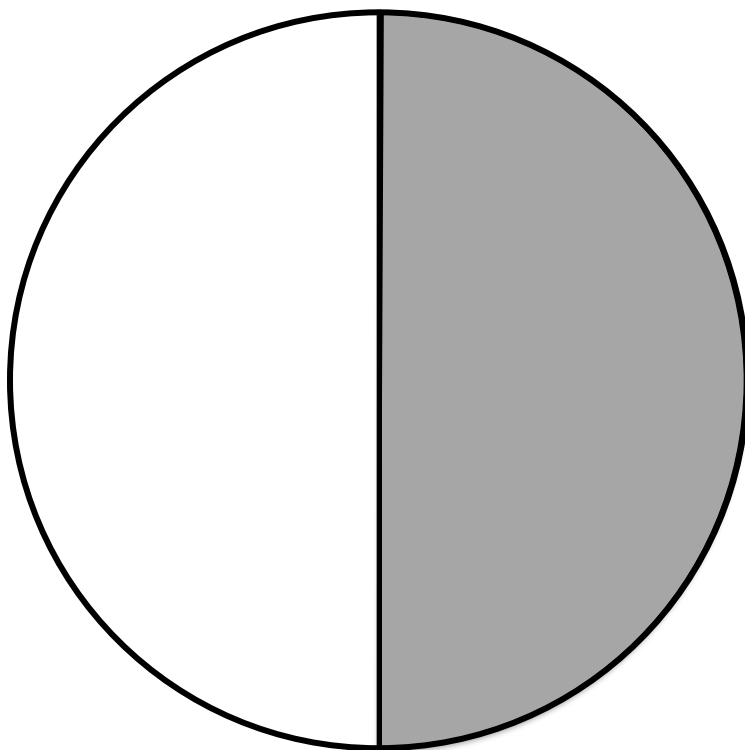
c. 4 fourths



2. Build the original whole square using the rectangle half and the half represented by your 4 small triangles. Draw it in the space below.

3. Use different colored halves of a whole square.
  - a. Cut the square in half.
  - b. Rearrange the halves to create a new rectangle with no gaps or overlaps.
  - c. Cut each equal part in half.
  - d. Rearrange the new equal shares to create different polygons.
  - e. Draw one of your new polygons from Part (d) below.
  
4. Cut out the circle.
  - a. Cut the circle in half.
  - b. Rearrange the halves to create a new shape with no gaps or overlaps.
  - c. Cut each equal share in half.
  - d. Rearrange the equal shares to create a new shape with no gaps or overlaps.
  - e. Draw your new shape from Part (d) below. One half is still shaded!



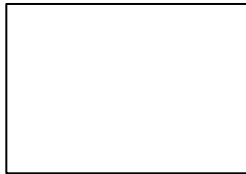


Name \_\_\_\_\_

Date \_\_\_\_\_

1. Partition the rectangles in 2 different ways to show equal shares.

a. 2 halves



b. 3 thirds



c. 4 fourths

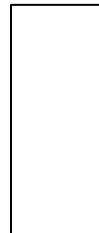


Name \_\_\_\_\_

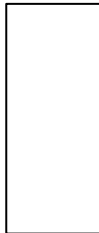
Date \_\_\_\_\_

1. Partition the rectangles in 2 different ways to show equal shares.

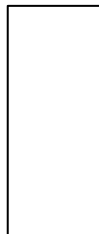
a. 2 halves



b. 3 thirds



c. 4 fourths



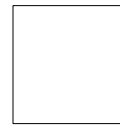
d. 2 halves



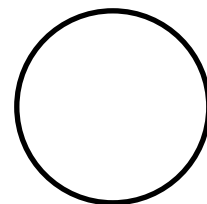
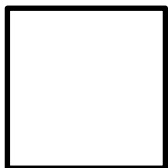
e. 3 thirds



f. 4 fourths



2. Cut out the square at the bottom of this page.
  - a. Cut the square in half. Shade one half using your pencil.
  - b. Rearrange the halves to create a new rectangle with no gaps or overlaps.
  - c. Cut each equal part in half.
  - d. Rearrange the new equal shares to create different polygons.
  - e. Draw one of your new polygons from Part (d) below. One half is shaded!
  
3. Cut out the circle at the bottom of this page. Shade one half.
  - a. Cut the circle in half. Shade one half using your pencil.
  - b. Rearrange the halves to create a new shape with no gaps or overlaps.
  - c. Cut each equal share in half.
  - d. Rearrange the equal shares to create a new shape with no gaps or overlaps.
  - e. Draw your new shape from Part (d) below. One half is still shaded!





## Topic D

## Application of Fractions to Tell Time

2.MD.7, 2.G.3, 2.NBT.2, 2.NBT.5, 2.NBT.6

<b>Focus Standard:</b>	2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
	2.G.3	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
<b>Instructional Days:</b>	4	
<b>Coherence</b>	<b>-Links from:</b> G1–M5	Identifying, Composing, and Partitioning Shapes
	<b>-Links to:</b> G3–M2	Place Value and Problem Solving with Units of Measure

In Topic D, students apply fraction and skip-counting skills to telling time. The Topic starts with Lesson 13, in which students make paper clocks from templates. After a brief review of the clock using a geared instructional clock, students fold their paper clock face in half and trace along the fold line to delineate the 2 halves. They then mark the top of the fold with 12 and the bottom with 6. Students next fold the clock in half again so that the two fold points meet, creating quarters. Students trace along this second fold line and mark 3 and 9 at the new fold points. In the end, they label the remaining numbers and attach hands in order to use it as a practice clock.

Having constructed this tool, students then practice telling time to the nearest half and quarter hour. They relate 30 minutes to a half hour and 15 minutes to a quarter hour, associating, for example, “half past 7” with 7:30, or 2:45 with “a quarter to 3.”

In Lesson 14, students start to relate each of the 12 numbers on the clock face with intervals of 5 minutes. They use skip-counting to count up to and down from 60 by fives in preparation for telling time to the nearest 5 minutes. Next, they learn to tell time by counting on the clock face numbers for the minute hand, as well as relating the position of the hour hand to the correct hour.

Lesson 15 continues the same process, now adding the complexity of a.m. and p.m. Students view pictures showing everyday activities along with the time represented in digital clock form and determine whether the time shown in the picture would be a.m. or p.m.

In Lesson 16, students apply their subtraction skills to solve problems involving time intervals. Given two times, they must calculate how much time has passed between them, whether in whole hours or a half hour (e.g., the elapsed time between 3:00 p.m. and 7:00 p.m., or 6:30 a.m. and 7:00 a.m.). Finally, they close the year determining the time interval in days before they become third-graders.

### A Teaching Sequence Towards Mastery of Application of Fractions to Tell Time

**Objective 1: Construct a paper clock by partitioning a circle into halves and quarters, and tell time to the half hour or quarter hour.**  
(Lesson 13)

**Objective 2: Tell time to the nearest five minutes.**  
(Lesson 14)

**Objective 3: Tell time to the nearest five minutes; relate *a.m.* and *p.m.* to time of day.**  
(Lesson 15)

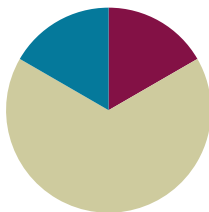
**Objective 3: Solve elapsed time problems involving whole hours and a half hour.**  
(Lesson 16)

## Lesson 13

**Objective:** Construct a paper clock by partitioning a circle into halves and quarters, and tell time to the half hour or quarter hour.

### Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Concept Development	(40 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (10 minutes)

- Rename for the Smaller Unit **2.NBT.1** (1 minutes)
- Subtraction with Renaming **2.NBT.7** (9 minutes)

#### Rename for the Smaller Unit (1 minute)

Note: This fluency activity reviews using place value understanding to rename units in preparation for subtraction with chips and the algorithm during Fluency Practice in G2–M8–Lessons 15 and 16.

T: I'm going to give you a number of hundreds and tens. I want you to rename 1 of the hundreds for 10 tens and then tell me how many hundreds and tens. Ready?

T: (Write 1 hundred, 1 ten = \_\_\_\_ tens.) Say the number sentence.

S: 1 hundred 1 ten = 11 tens.

T: (Write 2 hundreds = 1 hundred, \_\_\_\_ tens.) Say the number sentence.

S: 2 hundreds = 1 hundred, 10 tens.

T: (Write 2 hundreds = 1 hundred, 9 tens \_\_\_\_ ones.) Say the number sentence.

S: 2 hundreds = 1 hundred, 9 tens, 10 ones.

Repeat the process for 3 hundreds, 3 tens and 4 hundreds, 4 tens.

#### Subtraction with Renaming (9 minutes)

Materials: S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $132 - 118$  horizontally on the board.) Let's use a chip model to subtract. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T:  $132 - 118$  is...?

S: 14!

Continue with the following possible sequence:  $183 - 129$ ,  $278 - 159$ ,  $347 - 183$ ,  $563 - 271$ ,  $646 - 295$ , and  $438 - 239$ .

### Concept Development (40 minutes)

Materials: (T) Large instructional clock with gears, partitioned circle template, document camera (if available), crayon, sentence strips to post vocabulary: *half past*, *a quarter past*, *a quarter to* (S) Partitioned circle template printed on cardstock, scissors, crayon, brad fastener, personal white board

Note: To allow ample time for the Concept Development, there is no Application Problem in this lesson.

Call students to the carpet. Use a geared demonstration clock to review the hour and minute hands and how they move in relation to each other, as well as the meaning of the numbers on the clock. Then review the whole hour, starting at twelve o'clock.

#### Part 1: Brief Review Using Geared Clock

T: (Show 12:00.) Where is the minute hand?

S: At the 12.

T: Where is the hour hand?

S: At the 12.

T: What time is it?

S: Twelve o'clock!

T: When the minute hand moves all the way around the clock, it has been 60 minutes or 1 whole hour. When 1 hour passes, what time will it be? (Move the minute hand a full rotation.)

S: One o'clock!

Show various hours on the clock, and have students name them.

T: (Show 1:00 again.) When half an hour has passed, the minute hand is halfway around the circle. (Move the minute hand.) Tell me when to stop.

S: Stop!

T: At what number did the minute hand stop?

S: At the 6!

T: And the hour hand is halfway between the 1 and...?

S: 2!

T: What fraction of the whole hour has passed?



- S: Half an hour.
- T: Yes. This is why we call this time half past the hour. Let's read this time together as half past 1.
- S: It is half past one.
- T: Does anyone know another way to read this time?
- S: One thirty!
- T: Yes! What time is it one half hour later? (Move the minute hand.)
- S: Two o'clock!

Repeat the process of showing a whole hour, having students name it, and then showing the half hour and having students name it both ways.

## Part 2: Constructing a Paper Clock

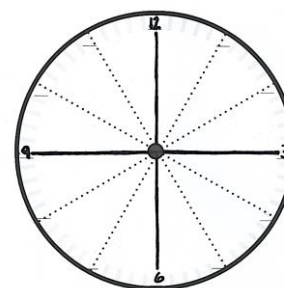
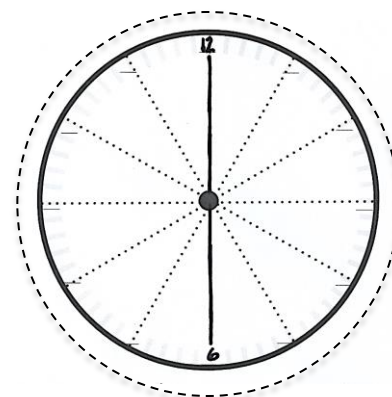
Distribute the partitioned circle template and scissors to students seated at desks or tables.

- T: Cut out the circle in front of you just outside the dark line along the dotted line. (Model as students do the same. Cutting on the dotted line leaves a small edge around the outline of the clock to write 15, 30, 45, and 60 in part 4 of the lesson.)
- T: Now fold the circle in half along one set of dotted lines. (Model as students do the same.)
- T: Unfold your circle and look at it. How many equal parts do we have now?
- S: 2!
- T: What fraction is each equal part?
- S: One half!
- T: Yes! Let's trace along the folded line to clearly show the 2 halves. (Allow students time to trace.)
- T: What number is at the top of the clock?
- S: 12!
- T: Let's write that in. (Write 12 on the top line as students do the same.)
- T: How about at the bottom of the clock?
- S: 6!
- T: Let's fill that in. (Write 6 on the bottom line as students do the same.)
- T: Now let's take our circle and fold it in half again along the same line as before. And then let's fold it in half one more time. That means that we will fold along the flat part so the rounded parts are matching each other. (Demonstrate.)



### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Some students who struggle with fine motor cutting skills would benefit from using a pre-cut circle. Have some ready for the lesson for these students to use.



MP.3

- T: Unfold the circle. (Pause for students to unfold.) What fraction is each part now?
- S: Fourths!
- T: Interesting. How did we get from halves to fourths? Turn and talk.
- S: When we folded the half, we split it in half again. Now we have 4 equal parts. → A half cut in half makes a fourth. → If you split 2 equal shares in half, then you'll have 4 equal shares.
- T: That's right! We had 2 halves and now we have 4 fourths! Let's trace along this second folded line. (Pause.)
- T: Now that we can see the 4 quarters, let's use them to help us tell time.

Guide students through filling in the 3 and 9. Then guide them through cutting out and attaching the clock hands with the brad fastener.

### Part 3: Using a Paper Clock to Tell Time to the Half or Quarter Hour

- T: Show me twelve o'clock. (Check as students do so.)
- T: Now move your minute hand to the 3. (Allow students time to move the hands.)
- T: What fraction of an hour passes when the minute hand moves from the 12 to the 3? Turn and talk.
- S: A quarter. → One-fourth.
- T: Yes! It moved one-fourth, or a quarter, of an hour. So, when the minute hand points to 3, we say it's a **quarter past** the hour.



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Highlight the critical vocabulary for English language learners. For instance, show pictures for *circle*, *half*, and *fourth*. Posting the vocabulary with the pictures will help students to follow the lesson as well as to engage in partner talk.

Practice telling a quarter past the hour by showing various hours on the geared clock. For each new hour, move the minute hand and ask students to say *stop* when you reach a quarter past the hour. This reinforces the 3 as the point on the clock that denotes the first quarter hour. Have students read each time as *a quarter past* \_\_\_\_\_. Also, have students note the movement of the hour hand in conjunction with the minute hand.

- T: Your clocks should still show a quarter past three. Move the minute hand to show where the next quarter hour ends? (Check as students do so.)
- T: At what number did the minute hand stop?
- S: 6!
- T: Think back to what we learned earlier. What fraction of the hour has passed when the minute hand is on 6? Turn and talk.
- S: A half hour. → 2 quarters of an hour. → 30 minutes!
- T: Yes! Let's keep going. Where does the next quarter hour end? Move the minute hand to show where the next quarter hour ends. (Check as students do so.)
- T: At what number did the minute hand stop?
- S: 9!
- T: What fraction of the hour has passed when the minute hand is on 9? Turn and talk.
- S: I see that it's 3 quarters past the 12. → I counted three equal parts, so 3 quarters.
- T: Yes! 3 quarters past the hour. And, how many quarters would be left until the next hour?

S: 1 quarter!

T: Correct! So, when we tell the time, we usually call it a **quarter to** the hour. For example, now my clock shows one o'clock (Show on the geared clock. Then move hands to show 1:45.), and now it shows a quarter to two.

Practice telling a quarter to the hour using the geared clock. For each new hour, move the minute hand and ask students to say *stop* when you reach a quarter to the hour. This reinforces the 9 as the point on the clock that denotes the third quarter hour, or a quarter to the hour. Have students read each time as *a quarter to* \_\_\_\_\_. Also, have students note the movement of the hour hand in conjunction with the minute hand.

#### Part 4: Relating Minutes to a Half and a Quarter Hour

T: Let's fill in the missing numbers on our clocks. (Model with your clock as students do the same.)

T: Who remembers what each little mark on the side of the clock means?

S: One minute!

T: And how many minutes are between one number and the next? (Count with the students.)

S: 5 minutes!

T: So, we can skip count by...?

S: Fives!

T: Let's count by fives to see how many minutes are in this quarter hour. (Move finger along edge of clock and count together.)

S: 5, 10, 15.

T: Write 15 on the outside of the circle next to the number 3. (Model as students do the same.)

T: How many minutes are in a quarter hour?

S: 15 minutes!

T: Let's keep counting by fives. (Move finger from the 3 to the 6 and count together.)

S: 20, 25, 30.

T: Write 30 below the 6. (Model as students do the same.)

T: Keep going. (Move finger from the 6 to the 9.)

S: 35, 40, 45.

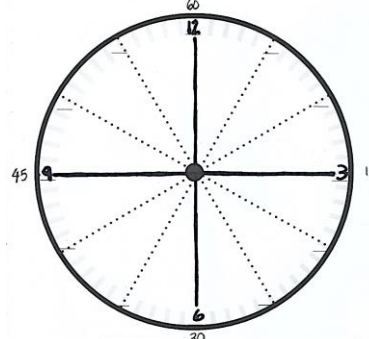
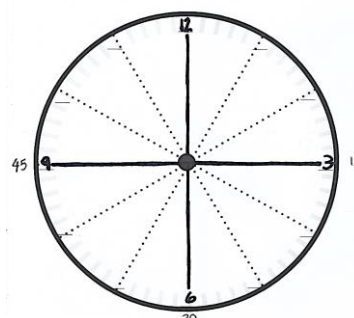
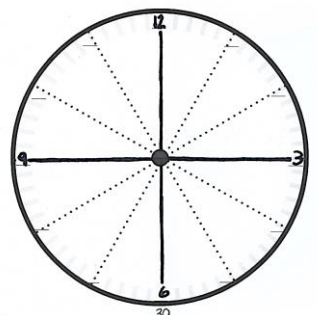
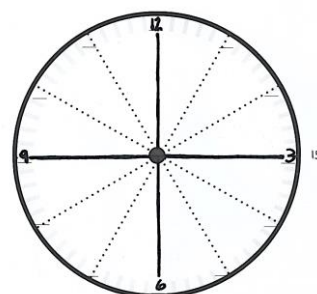
T: Write 45 on the outside of the circle next to the 9. (Model as students do the same.)

T: Let's do the last quarter hour. (Move finger from the 9 to the 12.)

S: 50, 55, 60.

T: Write 60 above the 12. (Model as students do the same.)

T: When the minute hand moves through all 4 quarters, we have



completed what whole unit?

S: One hour!

T: (Show 6:15 on the geared clock.) How many minutes past the hour is it? Turn and talk.

S: It would be 5, 10, 15..., so 15 minutes. → Three fives is 15, so 15 minutes. → It's 15 minutes past the hour.

T: Yes! The 3 represents 15 minutes past the hour, 3 groups of 5 minutes. And what fraction of the hour does it also represent?

S: A quarter. → A fourth.

T: Yes! A quarter of an hour is also 15 minutes.

T: Turn and talk. When the minute hand points at the 6, how many minutes past the hour is it?

S: It's another quarter, so  $15 + 15$  is 30, so 30 minutes. → An hour is 60 minutes, and 60 is 6 tens, and half of 6 is 3, so 30 minutes. → 5, 10, 15, 20, 25, 30. 30 minutes. → Half of 60 is 30, so 30 minutes.

T: Yes! Half an hour is 30 minutes. Great!

Repeat for the 9 as well.

Show various times on the geared clock and have students name the time using both the posted vocabulary and the minutes (e.g., 4:15 and a quarter past four, 2:30 and half past two.) Then, name times, alternating word form and number form, and have students show the time on their clocks and write it on their boards, using both words and numbers.

T: On your boards, write the time shown on your clocks in both words and numbers. Remember, we write the hour, then a colon, then the number of minutes. (Model the first few as students do the same.)

Check to ensure that the hour hands are positioned correctly, especially with *a quarter to two*. As they demonstrate proficiency, instruct students to work on the Problem Set. Allow early finishers to shade each quarter of their clock a different color.


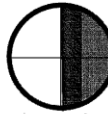

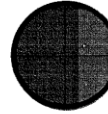
Note: Teachers may want to collect the clocks after students write their names on them, as they will be used again for the next lesson.

### 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 solve these problems using the RDW approach used for Application Problems.



Name Erick Date \_\_\_\_\_

1. Tell what fraction of each clock is shaded in the space below using the words *quarter, quarters, half, or halves*.

 quarter  1 half  
2 quarters  3 quarters  2 halves

2. Write the time shown on each clock.

a.  6:00 b.  6:15

c.  3:30 d.  9:30

## Student Debrief (10 minutes)

**Lesson Objective:** Construct a paper clock by partitioning a circle into halves and quarters, and tell time to the half hour or quarter hour.

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.

- For Problem 1, when telling time, what word(s) do you use to describe 1 fourth past the hour? What about 2 fourths past the hour? And, 3 fourths past the hour?
- For Problem 2(b), how much time has passed? What fraction of the whole hour is 15 minutes? What fraction of the hour is left?
- For Problem 2(c), if it is 3:30, why isn't the hour hand pointed directly at the number 3?
- For Problem 3, explain how you know that 3:45 and a quarter till four represent the same time. Turn and talk.
- What is similar about describing these two times: 12:15 and 12:45?
- Using what you know about halves and quarters, how much time do you think has passed from 1:15 to 1:45?

3. Match each time to the correct clock by drawing a line.

- Quarter to 4
- Half past 8
- 8:30
- 3:45
- 1:15

4. Draw the minute hand on the clock to show the correct time.

## Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name \_\_\_\_\_

Date \_\_\_\_\_



Lesson 13:

Construct a paper clock by partitioning a circle into halves and quarters, and tell time to the half hour or quarter hour.

Date:

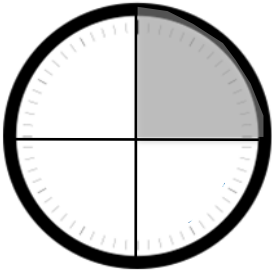
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engage<sup>ny</sup>8.D.10

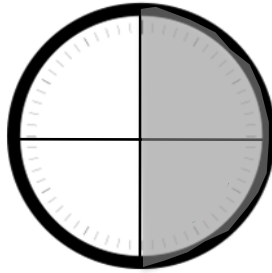
Name \_\_\_\_\_

Date \_\_\_\_\_

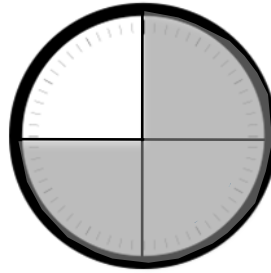
- 1.
- a. Tell what fraction of each clock is shaded in the space below using the words *quarter*, *quarters*, *half*, or *halves*.



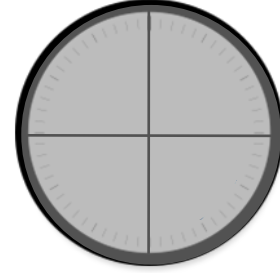
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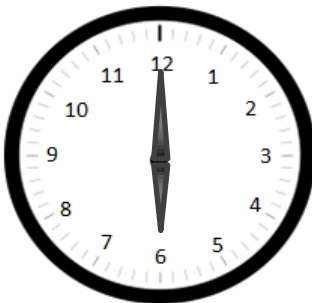
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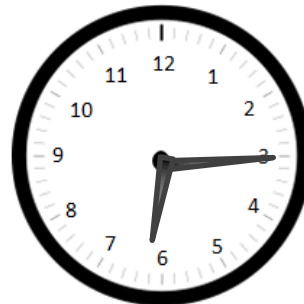
2. Write the time shown on each clock.

a.



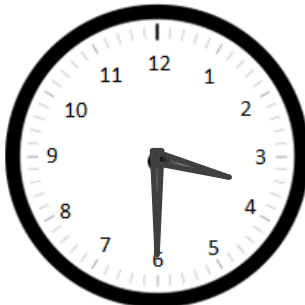
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b.



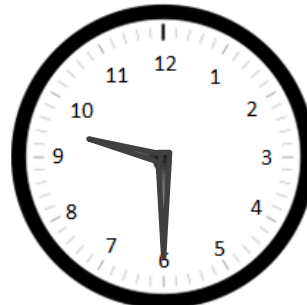
\_\_\_\_\_

c.



\_\_\_\_\_

d.

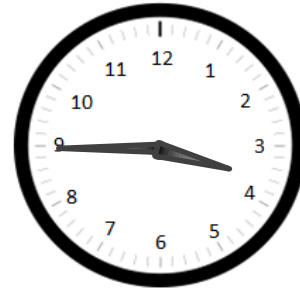


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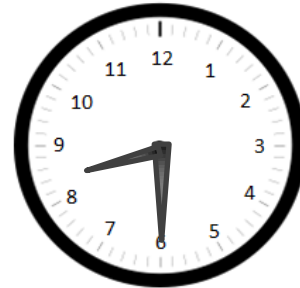


3. Match each time to the correct clock by drawing a line.

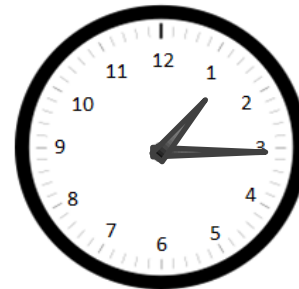
▪ Quarter to 4



▪ Half past 8



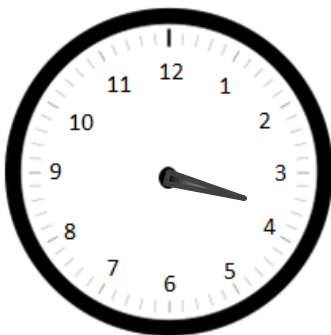
▪ 8:30



▪ 3:45

▪ 1:15

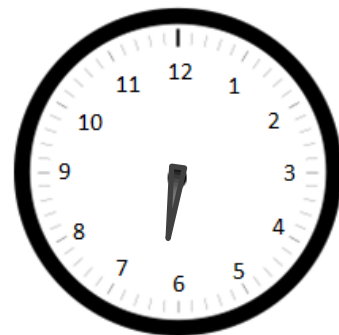
4. Draw the minute hand on the clock to show the correct time.



3:45



11:30



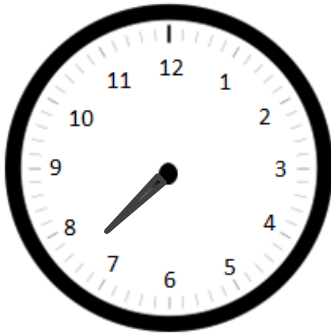
6:15



Name \_\_\_\_\_

Date \_\_\_\_\_

1. Draw the minute hand on the clock to show the correct time.



Half past 7



12:15

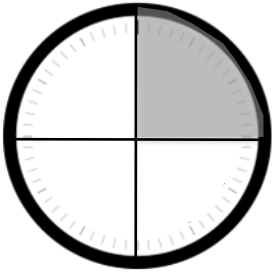


A quarter to 3

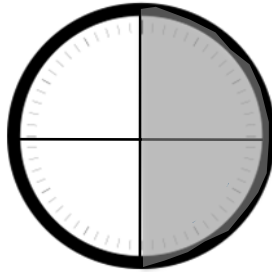
Name \_\_\_\_\_

Date \_\_\_\_\_

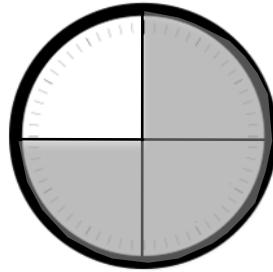
1. Tell what fraction of each clock is shaded in the space below using the words *quarter*, *quarters*, *half*, or *halves*.



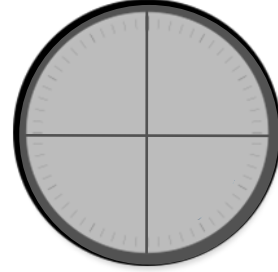
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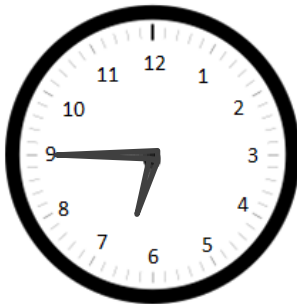
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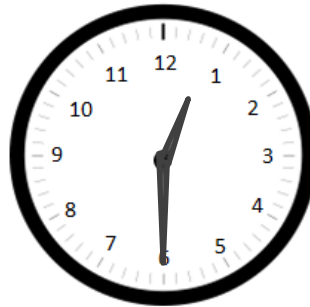
2. Write the time shown on each clock.

a.



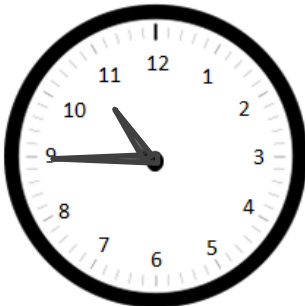
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b.



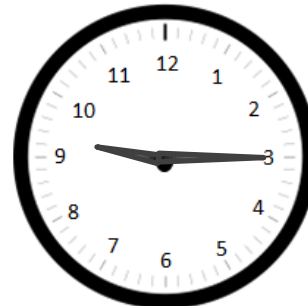
\_\_\_\_\_

c.



\_\_\_\_\_

d.



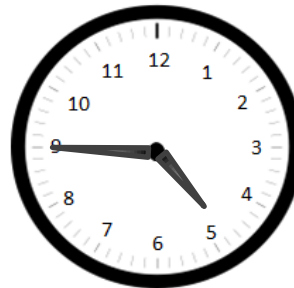
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3. Match each time to the correct clock by drawing a line.

- Quarter to 5



- Half past 5



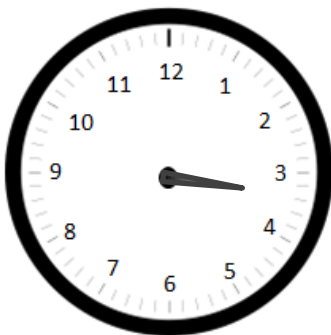
- 5:15

- Quarter after 5

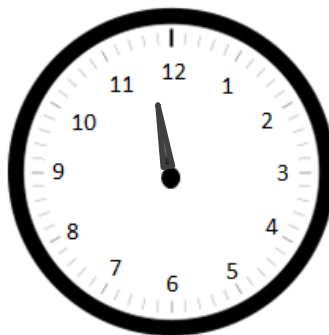


- 4:45

4. Draw the minute hand on the clock to show the correct time.



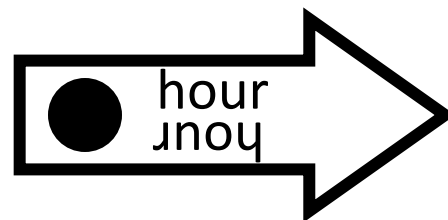
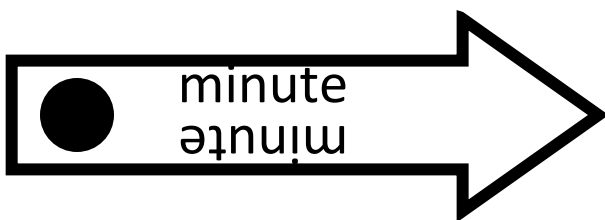
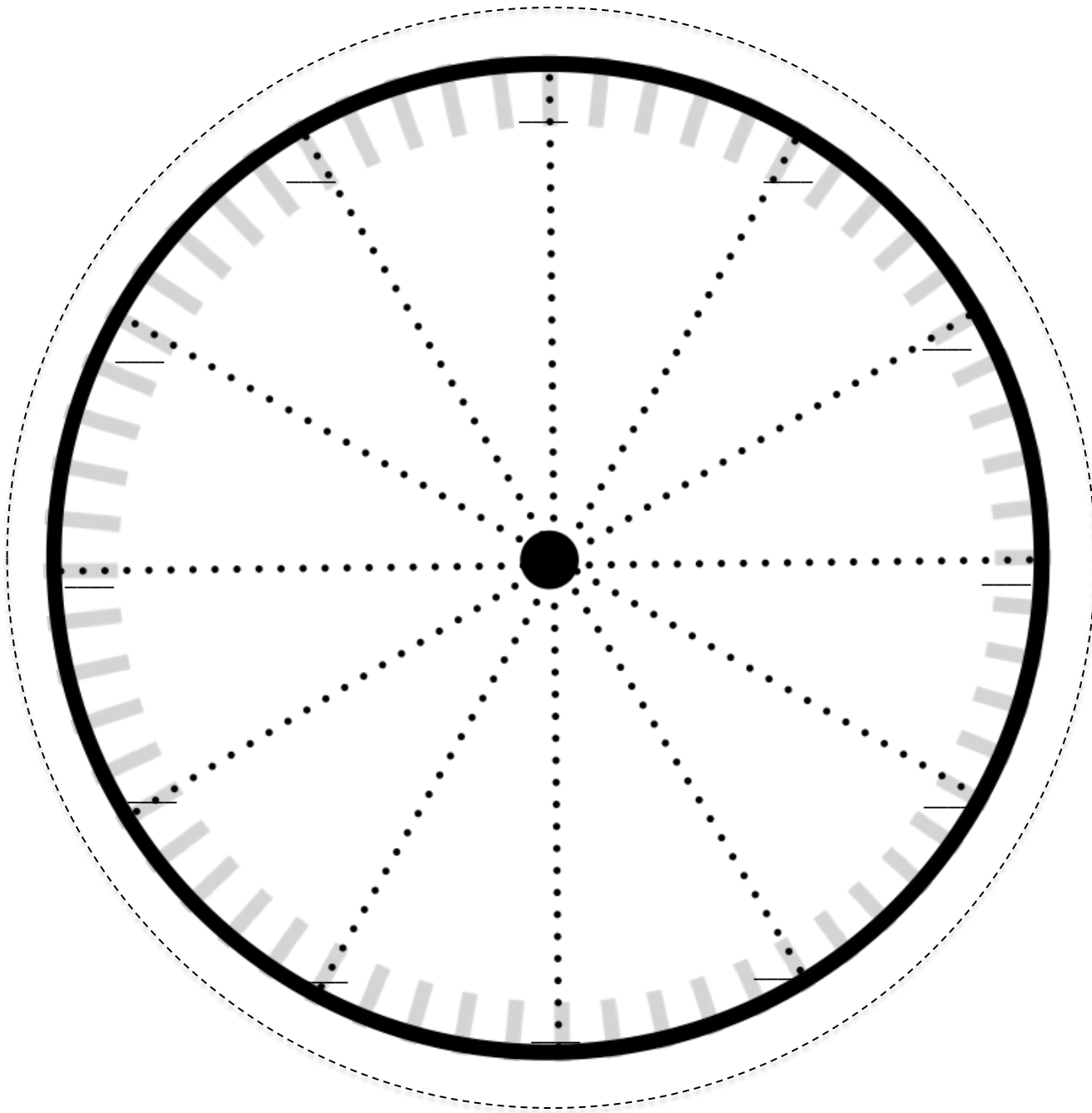
3:30



11:45



6:15

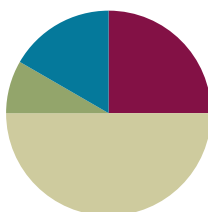


## Lesson 14

Objective: Tell time to the nearest five minutes.

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Concept Development	(30 minutes)
■ Application Problem	(5 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (15 minutes)

- Subtraction with Renaming **2.NBT.7** (5 minutes)
- Happy Counting by Fives **2.NBT.2** (1 minute)
- Sprint: Adding and Subtracting by 5 **2.OA.2** (9 minutes)

### Subtraction with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $367 - 185$  horizontally on the board.) Let's use a chip model to subtract. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T:  $367 - 185$  is...?

S: 182!

Continue with the following possible sequence:  $456 - 274$ ,  $625 - 295$ ,  $817 - 319$ ,  $528 - 229$ ,  $804 - 372$ , and  $905 - 253$ .

### Happy Counting by Fives (1 minute)

T: Let's do some Happy Counting!

T: Let's count by fives, starting at 0. Ready? (Rhythmically point up until a change is desired. Show a closed hand then point down. Continue, mixing it up.)

S: 0, 5, 10, 15, 20. (Switch directions.) 15, 10. (Switch directions.) 15, 20, 25, 30, 35, 40. (Switch directions.) 35, 30, 25. (Switch directions.) 30, 35, 40, 45. (Switch directions.) 40, 35, 30. (Switch directions.) 35, 40, 45, 50, 55, 60. (Switch directions.) 55, 50, 45, 40, 35. (Switch directions.) 40, 45, 50. (Switch directions.) 45, 40, 35, 30, 25, 20, 15. (Switch directions.) 20, 25, 30, 35, 40, 45, 50, 55, 60.

### Sprint: Adding and Subtracting by 5 (9 minutes)

Materials: (S) Adding and Subtracting by 5 Sprint

Note: Students add and subtract by 5 to gain automaticity counting by fives in preparation for counting minutes in the lesson.

### Concept Development (30 minutes)

Materials: (T) Large instructional geared clock, clock from G2–M8–Lesson 13, student clock (optional)  
(S) Clocks from G2–M8–Lesson 13, student clocks (optional), personal white boards

Distribute the clocks from G2–M8–Lesson 13.

T: How many minutes is each number on the clock worth?

S: 5 minutes!

T: How many fives does it take to get all the way around the clock? (Count together.)

S: 1 five, 2 fives, 3 fives, ...12 fives!

T: Let's count minutes around the clock by fives.

T: (Count with students by fives around the clock face, starting with the 1.)

T: When we get to the 12, it's 60 minutes later. One hour equals 60 minutes, so we can say it's a new hour!

T: Now, let's show some times with our clocks.

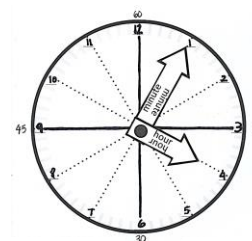
Show 4:05 on the geared instructional clock.

T: Set your clocks to look like mine.

T: How many minutes have passed since four o'clock?

S: 5 minutes.

T: Yes. We say this time like this, four oh five, and we write it like this.  
(Write 4:05.)



Continue moving the minute hand around the clock, asking students to read the time at each five-minute interval. At each stop, draw students' attention to the position of the hour hand relative to the minute hand.

T: (Stop when students reach 4:55.) Notice how very close the hour hand is to the 5. But is it five o'clock yet?

S: No!

T: Turn and talk. What time is it now?

- S: It's five minutes before five. → It's 4:55.
- T: Yes! The hour hand takes a full hour to move from one number to the next, so it moves a little bit every minute. It has made almost the whole journey around the clock when the minute hand is on the 11.
- T: How many more minutes are needed to complete the hour?
- S: 5 minutes!
- T: What time is it now?
- S: Five o'clock!

Repeat with more examples of hour-hand settings if students are unclear on the concept.

T: Now, let's read some times!

Show 7:35 on the geared instructional clock.

- T: What time is this? Talk with a partner. You may use your student clock to figure it out.
- S: The hour hand is after the 7, and the minute hand is on the 7. 5, 10, 15, 20, 25, 30, 35. It's 7:35. → The hour hand is past the 7, so 30, 35... 7:35.
- T: Excellent! I noticed some people are using what they learned about fractions and the minutes to start at half past, or 30, and counting by 5 from there. Very clever!

MP.3

Continue to state times in number and word form (e.g., 8:10, a quarter to two) with the following sequence: 9:35, 1:10, a quarter after three, 2:50, etc., giving students ample practice reading time and setting time on their clocks. Have them record the times, as well, on their personal boards. Let students suggest times to read, until they demonstrate proficiency. Then instruct them to work on the Problem Set and Application Problem.

### 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 solve these problems using the RDW approach used for Application Problems.

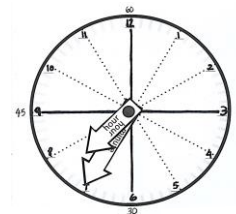
### Application Problem (5 minutes)

Brownies take 45 minutes to bake. Pizza takes half an hour less than brownies to warm up. How long does pizza take to warm up?

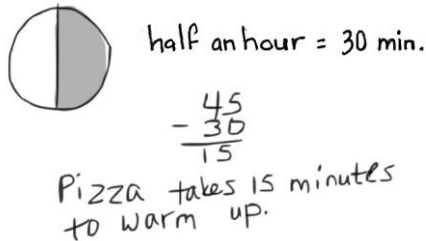


#### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Provide students with disabilities and students who are below grade level with extra practice using an online animated clock such as that found at <http://www.mathsisfun.com/time-clocks-analog-digital.html>. English language learners would also benefit from using such a clock that not only gives the digital time along with the analog clock, but writes the time out as well.



Note: This problem offers students a chance to practice using the content from G2–M8–Lessons 13 and 14. Students may work together or independently to solve. They may draw a picture or use their clocks to help them solve the problem.



### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Challenge above grade level students by extending the Application Problem. Ask them how long it takes to heat up a sandwich in the oven if it only takes one third the time it takes to bake brownies. As them to explain what strategy they used to find the answer.

## Student Debrief (10 minutes)

**Lesson Objective:** Tell time to the nearest five minutes.

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.

- For Problem 3, 3:35, how did you use the numbers on the face of the clock and skip-counting to draw the hands correctly?
- For Problem 3, 4:40, how could you use your knowledge of equal parts to figure out where to draw the minute hand?
- For Problem 3, what difference do you notice between the hour hands for 6:25 and 6:55? Why?
- For Problem 4, is the analog clock showing 12:55 or 1:55? How do you know?
- How did the Application Problem connect to today's lesson?

Name Ellie Date \_\_\_\_\_

1. Fill in the missing numbers.

60, 55, 50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0







2. Fill in the missing numbers on the face of the clock to show the minutes.





**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

3. Draw the hour and minute hands on the clocks to match to correct time.

 3:05	 3:35
 4:10	 4:40
 6:25	 6:55

4. What time is it?

 7:25	 12:55
--	--

**A**

# Correct \_\_\_\_\_

Add or subtract.

1	$0 + 5 =$		23	$10 + 5 =$	
2	$5 + 5 =$		24	$15 + 5 =$	
3	$10 + 5 =$		25	$20 + 5 =$	
4	$15 + 5 =$		26	$25 + 5 =$	
5	$20 + 5 =$		27	$30 + 5 =$	
6	$25 + 5 =$		28	$35 + 5 =$	
7	$30 + 5 =$		29	$40 + 5 =$	
8	$35 + 5 =$		30	$45 + 5 =$	
9	$40 + 5 =$		31	$0 + 50 =$	
10	$45 + 5 =$		32	$50 + 50 =$	
11	$50 - 5 =$		33	$50 + 5 =$	
12	$45 - 5 =$		34	$55 + 5 =$	
13	$40 - 5 =$		35	$60 - 5 =$	
14	$35 - 5 =$		36	$55 - 5 =$	
15	$30 - 5 =$		37	$60 + 5 =$	
16	$25 - 5 =$		38	$65 + 5 =$	
17	$20 - 5 =$		39	$70 - 5 =$	
18	$15 - 5 =$		40	$65 - 5 =$	
19	$10 - 5 =$		41	$100 + 50 =$	
20	$5 - 5 =$		42	$150 + 50 =$	
21	$5 + 0 =$		43	$200 - 50 =$	
22	$5 + 5 =$		44	$150 - 50 =$	

**B**

Improvement \_\_\_\_\_

# Correct \_\_\_\_\_

Add or subtract.

1	$5 + 0 =$		23	$10 + 5 =$	
2	$5 + 5 =$		24	$15 + 5 =$	
3	$5 + 10 =$		25	$20 + 5 =$	
4	$5 + 15 =$		26	$25 + 5 =$	
5	$5 + 20 =$		27	$30 + 5 =$	
6	$5 + 25 =$		28	$35 + 5 =$	
7	$5 + 30 =$		29	$40 + 5 =$	
8	$5 + 35 =$		30	$45 + 5 =$	
9	$5 + 40 =$		31	$50 + 0 =$	
10	$5 + 45 =$		32	$50 + 50 =$	
11	$50 - 5 =$		33	$5 + 50 =$	
12	$45 - 5 =$		34	$5 + 55 =$	
13	$40 - 5 =$		35	$60 - 5 =$	
14	$35 - 5 =$		36	$55 - 5 =$	
15	$30 - 5 =$		37	$5 + 60 =$	
16	$25 - 5 =$		38	$5 + 65 =$	
17	$20 - 5 =$		39	$70 - 5 =$	
18	$15 - 5 =$		40	$65 - 5 =$	
19	$10 - 5 =$		41	$50 + 100 =$	
20	$5 - 5 =$		42	$50 + 150 =$	
21	$0 + 5 =$		43	$200 - 50 =$	
22	$5 + 5 =$		44	$150 - 50 =$	

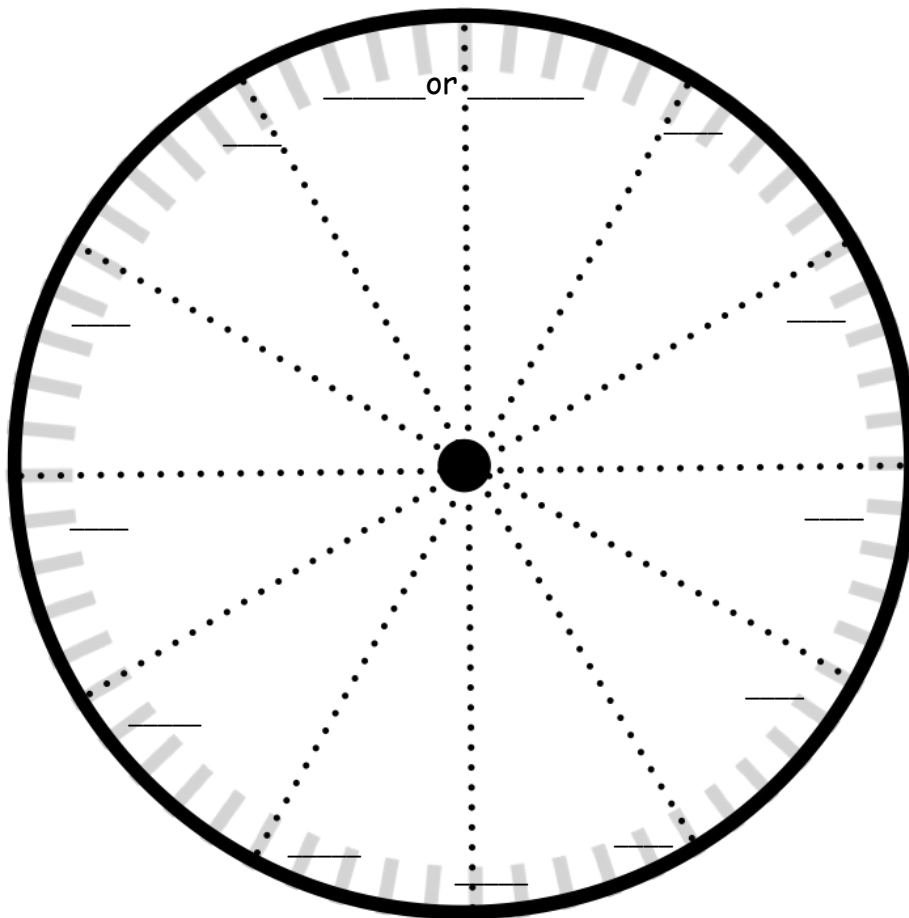
Name \_\_\_\_\_

Date \_\_\_\_\_

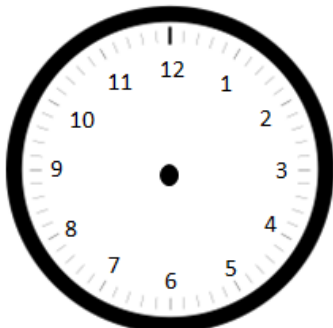
1. Fill in the missing numbers.

60, 55, 50, \_\_\_\_\_, 40, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 20, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

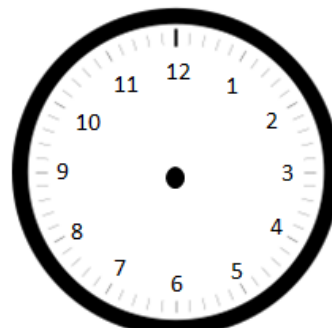
2. Fill in the missing numbers on the face of the clock to show the minutes.



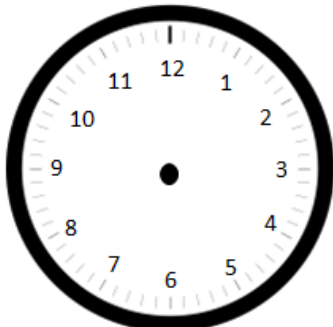
3. Draw the hour and minute hands on the clocks to match to correct time.



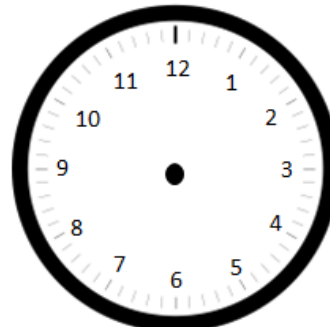
3:05



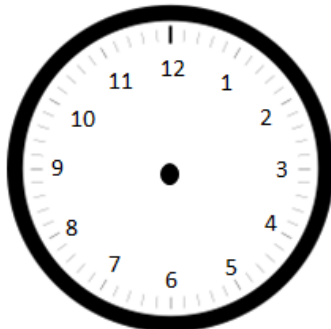
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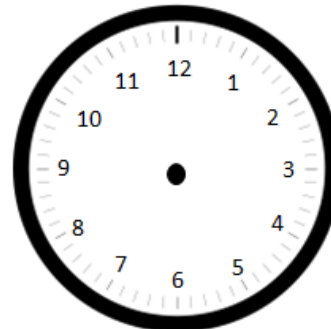
4:10



4:40

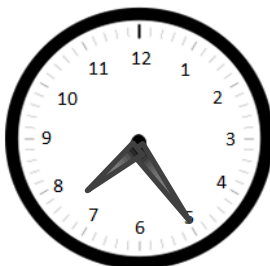


6:25



6:55

4. What time is it?



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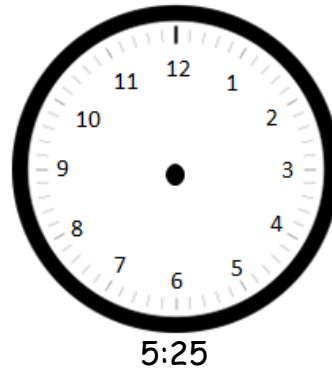
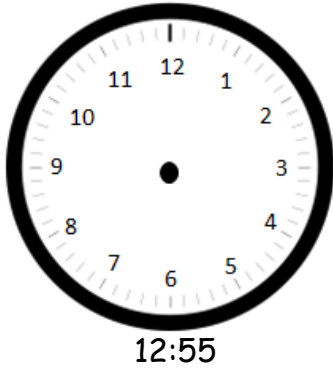


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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Draw the hour and minute hands on the clocks to match to correct time.



Name \_\_\_\_\_

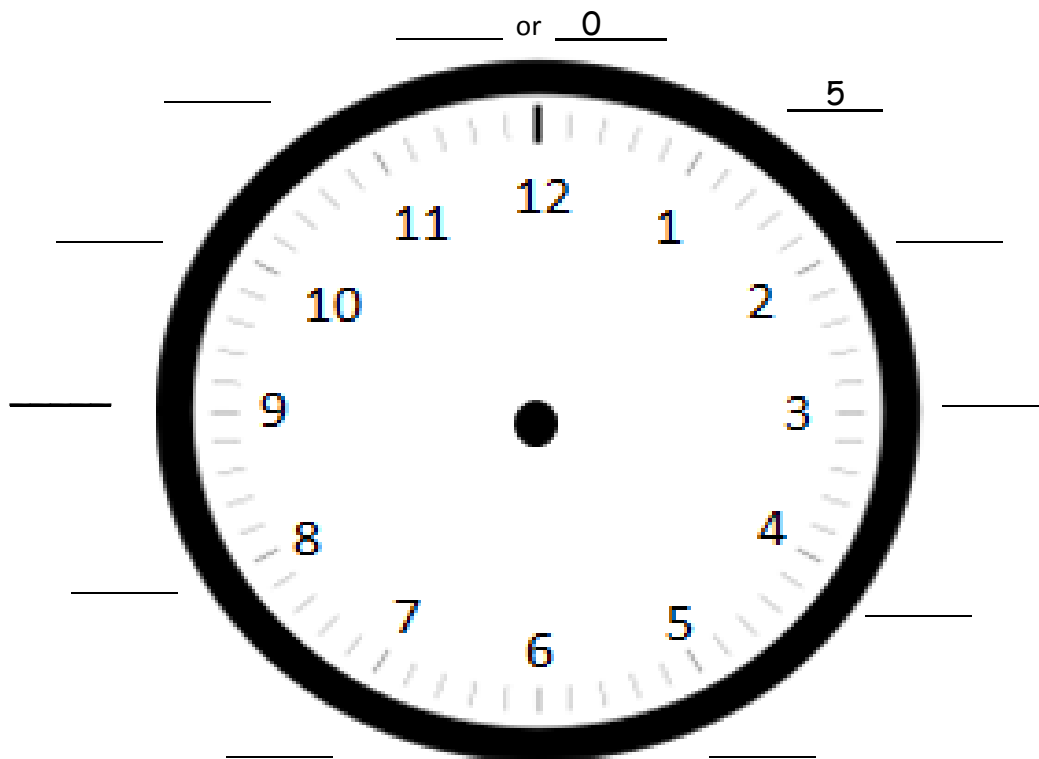
Date \_\_\_\_\_

1. Fill in the missing numbers.

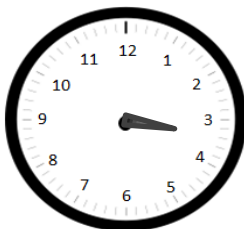
0, 5, 10, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 35, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 45, 40, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 20, 15, \_\_\_\_\_, \_\_\_\_\_

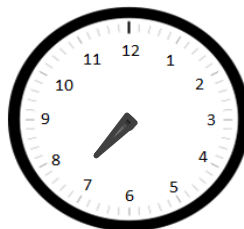
2. Fill in the missing minutes on the face of the clock.



3. Draw the minute hands on the clocks to match to correct time.



3:25



7:15

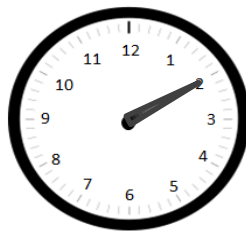


9:55

4. Draw the hour hands on the clocks to match the correct time.



12:30

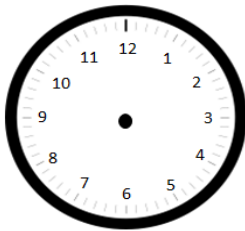


10:10

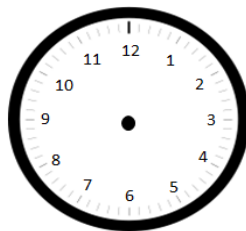


3:45

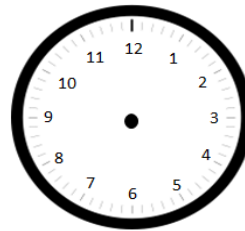
5. Draw the hour and minute hands on the clocks to match to correct time.



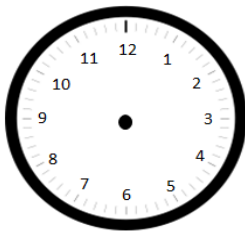
6:55



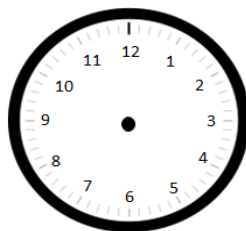
1:50



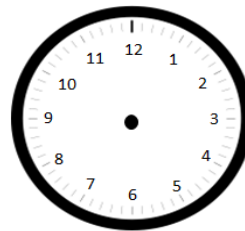
8:25



4:40

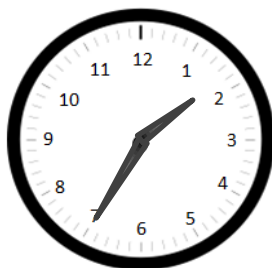


7:45



2:05

6. What time is it?



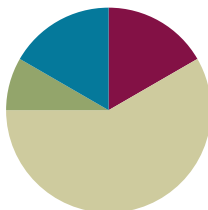


## Lesson 15

**Objective:** Tell time to the nearest five minutes; relate *a.m.* and *p.m.* to time of day.

### Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(35 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (10 minutes)

- Subtraction with Renaming **2.NBT.7** (5 minutes)
- Happy Counting by Fives **2.NBT.2** (1 minute)
- Grade 2 Core Fluency Differentiated Practice Sets **2.OA.2** (4 minutes)

### Subtraction with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $300 - 118$  horizontally on the board.) Let's use a chip model to subtract. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T:  $300 - 118$  is...?

S: 182!

Continue with the following possible sequence:  $500 - 276$ ,  $700 - 347$ ,  $803 - 239$ ,  $506 - 271$ ,  $800 - 108$ , and  $900 - 507$ .

### Happy Counting by Fives (1 minute)

T: Let's do some Happy Counting!

T: Let's count by fives, starting at 0. Ready? (Rhythmically point up until a change is desired. Show a

closed hand then point down. Continue mixing it up.)

- S: 0, 5, 10, 15, 20. (Switch directions.) 15, 10. (Switch directions.) 15, 20, 25, 30, 35, 40. (Switch directions.) 35, 30, 25. (Switch directions.) 30, 35, 40, 45. (Switch directions.) 40, 35, 30. (Switch directions.) 35, 40, 45, 50. (Switch directions.) 45, 40, 35. (Switch directions.) 40, 45, 50. (Switch directions.) 45, 40, 35, 30, 25, 20, 15.

## Grade 2 Core Fluency Differentiated Practice Sets (4 minutes)

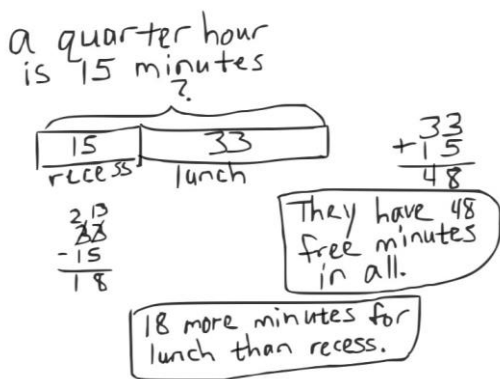
Materials: (S) Core Fluency Practice Sets from G2–M8–Lesson 3

Note: During G2–M8–Topic D and for the remainder of the year, each day’s fluency 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 and Practice Sets provided in G2–M8–Lesson 3.

## Application Problem (5 minutes)

At Memorial School, students have a quarter hour for morning recess and 33 minutes for a lunch break. How much free time do they have in all? How much more time for lunch than recess do they have?

Note: Students have the opportunity to solve another two-step problem involving addition and subtraction with time. At this stage, some will not need to draw a tape diagram, but for those who struggle, encourage them to do so.



### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

For students who are below grade level, scaffold the Application Problem by guiding them through the problem-solving process through questioning. Give them a number bond template and ask, “Are we looking for a part or the whole when we want to know how much free time students have in all? What do they have more time for: recess or lunch? How can we find out how much more time they have for lunch?”

## Concept Development (35 minutes)

Materials: (T) Story template as a display or booklet, document projector (if available) (S) Story template as a booklet (optional), crayons (optional)

Note: Students will be asked to tell the current time of day. The vignette uses an example of a morning class.

Adjust the questions to fit if math is scheduled for the afternoon.

Images are provided in a format that can either be printed as a full-size book to be read to the whole class, as a booklet to be distributed, or as images to project. The four-on-a-page template appears before the full-page version in this document. Copies of either version may be given to the students if resources are available, and they can color them in school or at home to make a home connection. The pictures can also be either cut out and ordered by the students or left in chronological order as they appear.

If you are showing the book to the group, gather students in the center of the room.

MP.7

- T: Look at the classroom clock. What time is it now?
- S: (Tell time to nearest five minutes.)
- T: Where does the clock tell us if it is morning or at night?
- S: The clock doesn't tell that. → The sun is shining, so it is morning. → We know it is morning because we just got to school. → We haven't had lunch yet, so it must be morning.
- T: Will the clock look exactly like this again today?
- S: I'm not sure. → Yes! It will show [insert time] again tonight.
- T: That's right. The clock will look just like it does now at [insert time] tonight.
- T: (Hold up analog clock showing time that school starts.) What time does this clock show?
- S: (Tell time.)
- T: What do we do at [time] each morning?
- S: That's the beginning of school!
- T: What do you do around this time each evening?
- S: Get ready for bed. → Finish my homework. → Take a shower.

Repeat using a few other important times in the class schedule, and include both morning and afternoon times.

- T: Which comes first in the alphabet, A or P?
- S: A!
- T: Yes! Which comes first in a day, the morning or the afternoon?
- S: The morning!
- T: Yes! That's an easy way to remember a.m. and p.m.  
(Write *a.m.* and *p.m.* on the board.)
- T: We use **a.m.** as a short way to talk about the time between 12:00 midnight and 12:00 noon, or morning.
- T: We use **p.m.** as a way to talk about the time between 12:00 noon and midnight.
- T: Remember that a digital clock shows the time like we are used to writing it. Turn and talk. Why do you think it's called a digital clock?
- S: Because it's electronic, like a digital camera.  
→ Because it shows the digits of the hour and minutes.



#### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Support English language learners' oral language by providing them with sentence starters to aid them in sharing their ideas with a partner.  
"The sky would be \_\_\_\_\_ if it was 10 p.m." and "When it is 5 a.m., I am \_\_\_\_\_."

T: Yes! It shows the time using digits instead of hands pointing to a number.

T: Let's read our story now.

Distribute booklets or images to sort if you are using them; otherwise, show images with your own book or using a document projector. Have students look at the pictures and put them in order to tell the story. This can be done as a whole class or in small groups.

Relate the time of day shown to a.m. and p.m. throughout. Students will need to recognize and fill in the time and a.m. or p.m. on the line for each picture. Encourage them to discuss how they know whether it is a.m. or p.m. Ask questions like, "What would the sky look like outside if this was p.m. instead of a.m. (or vice versa)?"

If there is time, have the students color the pictures, or send the booklet home to be colored and shared with family.

When students have completed this activity, instruct them to work on 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 solve these problems using the RDW approach used for Application Problems.

### Student Debrief (10 minutes)

**Lesson Objective:** Tell time to the nearest five minutes; relate a.m. and p.m. to time of day.

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.

Name Nang Date \_\_\_\_\_


1. Choose whether the activity below would happen in the a.m. or the p.m.

a. Waking up for school	<u>AM</u> / PM
b. Eating dinner	AM / <u>PM</u>
c. Reading a bedtime story	AM / <u>PM</u>
d. Making breakfast	<u>AM</u> / PM
e. Having a play date after school	AM / <u>PM</u>
f. Going to bed	AM / <u>PM</u>
g. Eating a piece of cake	AM / <u>PM</u>
h. Eating lunch	<u>AM</u> / PM

2. Draw the hands on the analog clock to match the time on the digital clock. Then, circle a.m. or p.m. based on the description given.


a. Brushing your teeth after you wake up

7:10 a.m. or p.m.



b. Finishing homework


5:55 a.m. or p.m.



3. Write what you might be doing if it were a.m. or p.m.


a. AM waking up

b. PM brushing my teeth



4. What time does the clock show?

3:55



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

- For Problem 2(a), how did you determine where to place the minute hand?
- For Problem 2(b), where did you draw the hour hand? Why?
- Explain to your partner the difference between **a.m.** and **p.m.**
- What is the difference between 12 a.m. and 12 p.m.? What might you be doing at those times?
- When you are sleeping at night, are you sleeping during the a.m. or p.m.? Explain your thinking.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name \_\_\_\_\_ Date \_\_\_\_\_

1. Choose whether the activity below would happen in the a.m. or the p.m.

a. Waking up for school                      a.m. / p.m.

b. Eating dinner                                a.m. / p.m.

c. Reading a bedtime story                a.m. / p.m.

d. Making breakfast                         a.m. / p.m.

e. Having a play date after school        a.m. / p.m.

f. Going to bed                                 a.m. / p.m.

g. Eating a piece of cake                    a.m. / p.m.

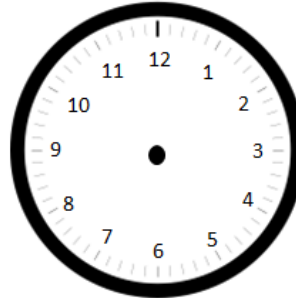
h. Eating lunch                                a.m. / p.m.

2. Draw the hands on the analog clock to match the time on the digital clock. Then, circle **a.m.** or **p.m.** based on the description given.

- a. Brushing your teeth after you wake up

7:10

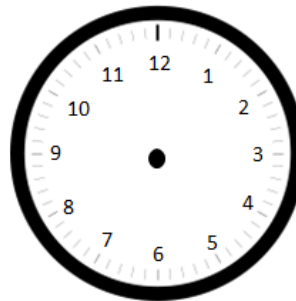
a.m. or p.m.



- b. Finishing homework

5:55

a.m. or p.m.



3. Write what you might be doing if it were **a.m.** or **p.m.**.

a. **a.m.** \_\_\_\_\_

b. **p.m.** \_\_\_\_\_



4. What time does the clock show?

\_\_\_\_\_ : \_\_\_\_\_



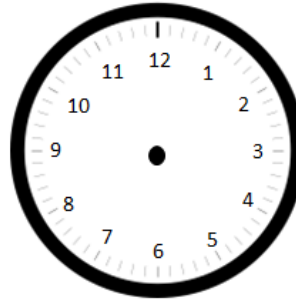
Name \_\_\_\_\_

Date \_\_\_\_\_

1. Draw the hands on the analog clock to match the time on the digital clock. Then, circle **a.m.** or **p.m.** based on the description given.

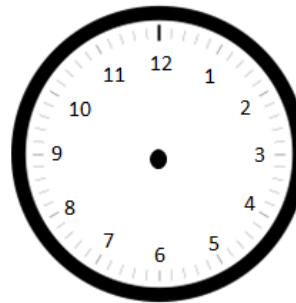
- a. The sun is rising

6:10      a.m. or p.m.



- b. Walking the dog

3:40      a.m. or p.m.







Name \_\_\_\_\_ Date \_\_\_\_\_

1. Choose whether the activity below would happen in the a.m. or the p.m.

a. Eating breakfast	a.m. / p.m.	b. Doing homework	a.m. / p.m.
c. Setting the table for dinner	a.m. / p.m.	d. Waking up in the morning	a.m. / p.m.
e. After-school dance class	a.m. / p.m.	f. Eating lunch	a.m. / p.m.
g. Going to bed	a.m. / p.m.	h. Heating up dinner	a.m. / p.m.

2. Write the time displayed on the clock. Then choose whether the activity below would happen in the a.m. or the p.m.

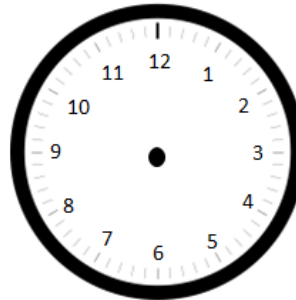
<p>a. Brushing your teeth before school</p>  <p>____:____ a.m. / p.m.</p>	<p>b. Eating dessert after dinner</p>  <p>____:____ a.m. / p.m.</p>
--	---

3. Draw the hands on the analog clock to match the time on the digital clock. Then, circle a.m. or p.m. based on the description given.

- a. Brushing your teeth before bedtime

8:15

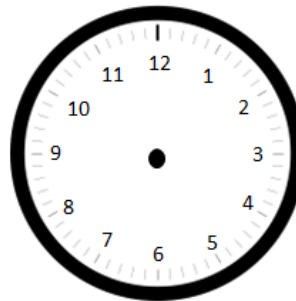
a.m. or p.m.



- b. Recess after lunch

12:30

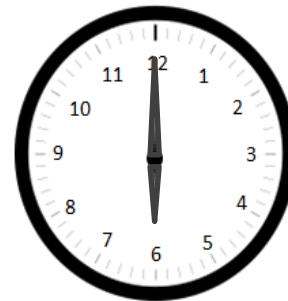
a.m. or p.m.



4. Write what you might be doing if it were a.m. or p.m.

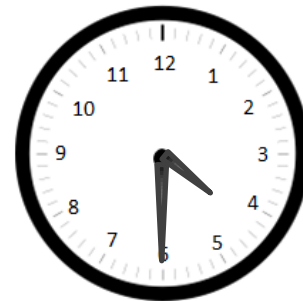
a. a.m. \_\_\_\_\_

b. p.m. \_\_\_\_\_

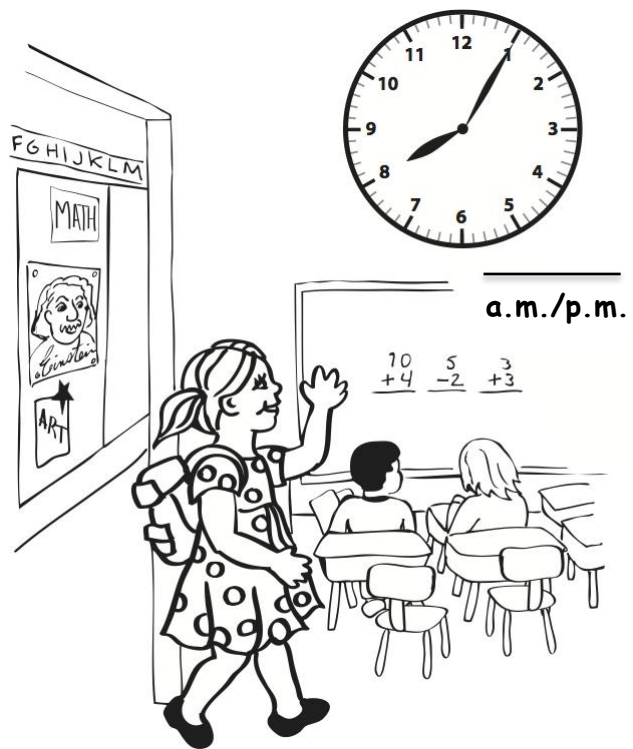
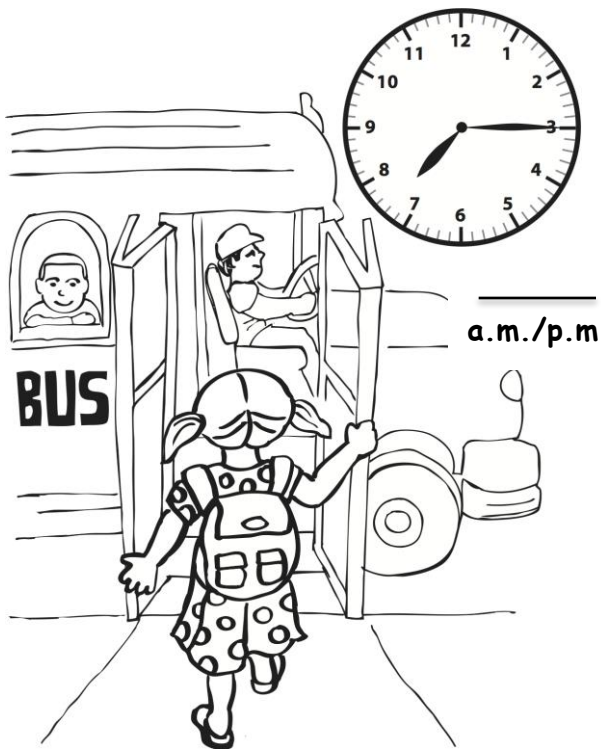
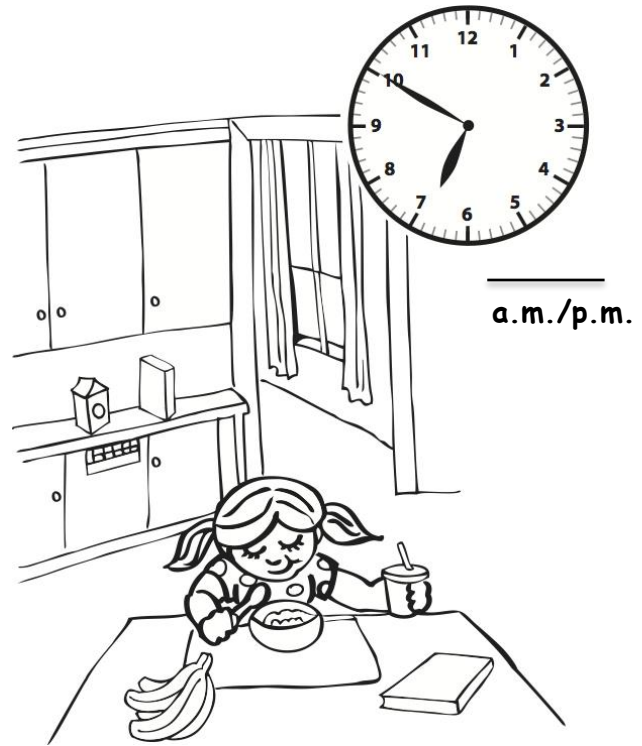


c. a.m. \_\_\_\_\_

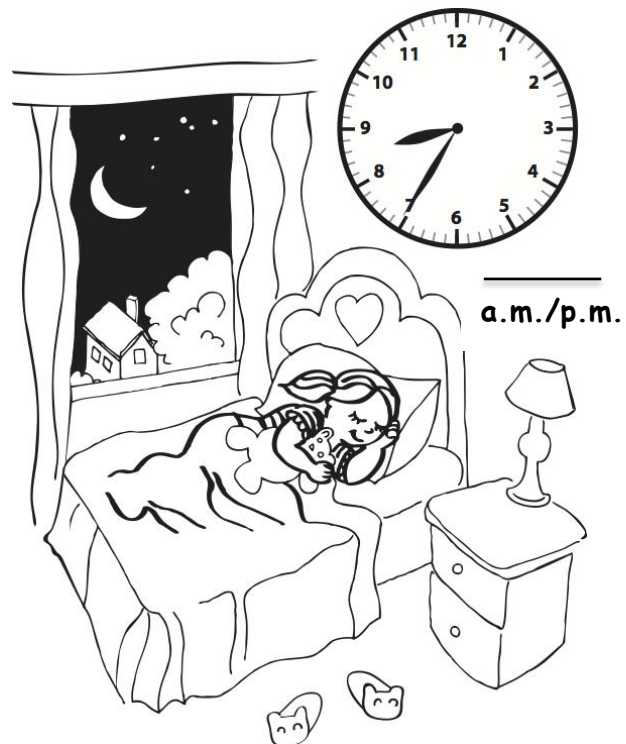
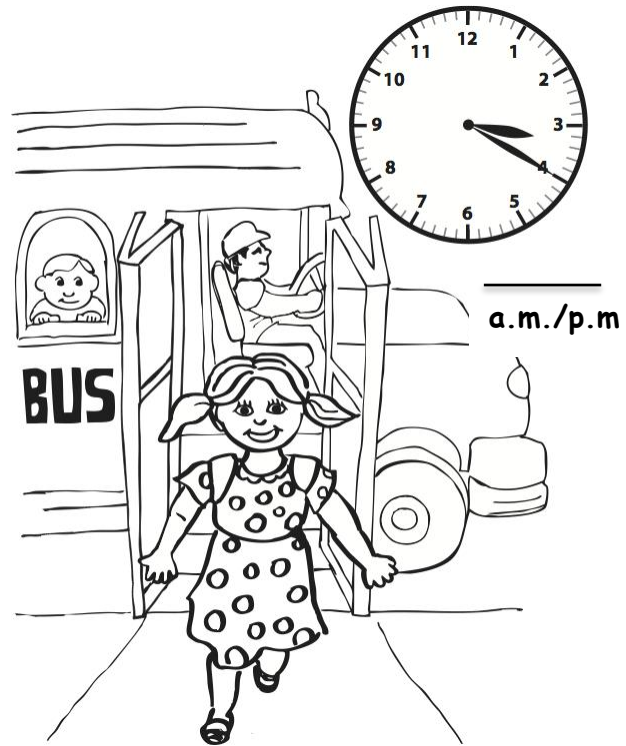
d. p.m. \_\_\_\_\_



Write the time, and circle a.m. or p.m.



Write the time, and circle a.m. or p.m.





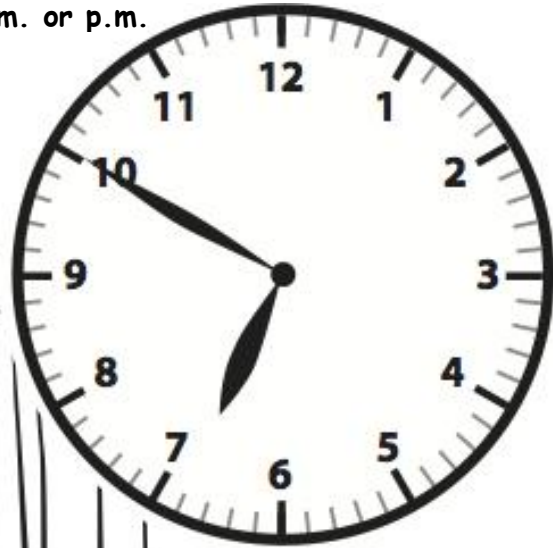
Write the time, and circle a.m. or p.m.



\_\_\_\_\_

a.m. / p.m.

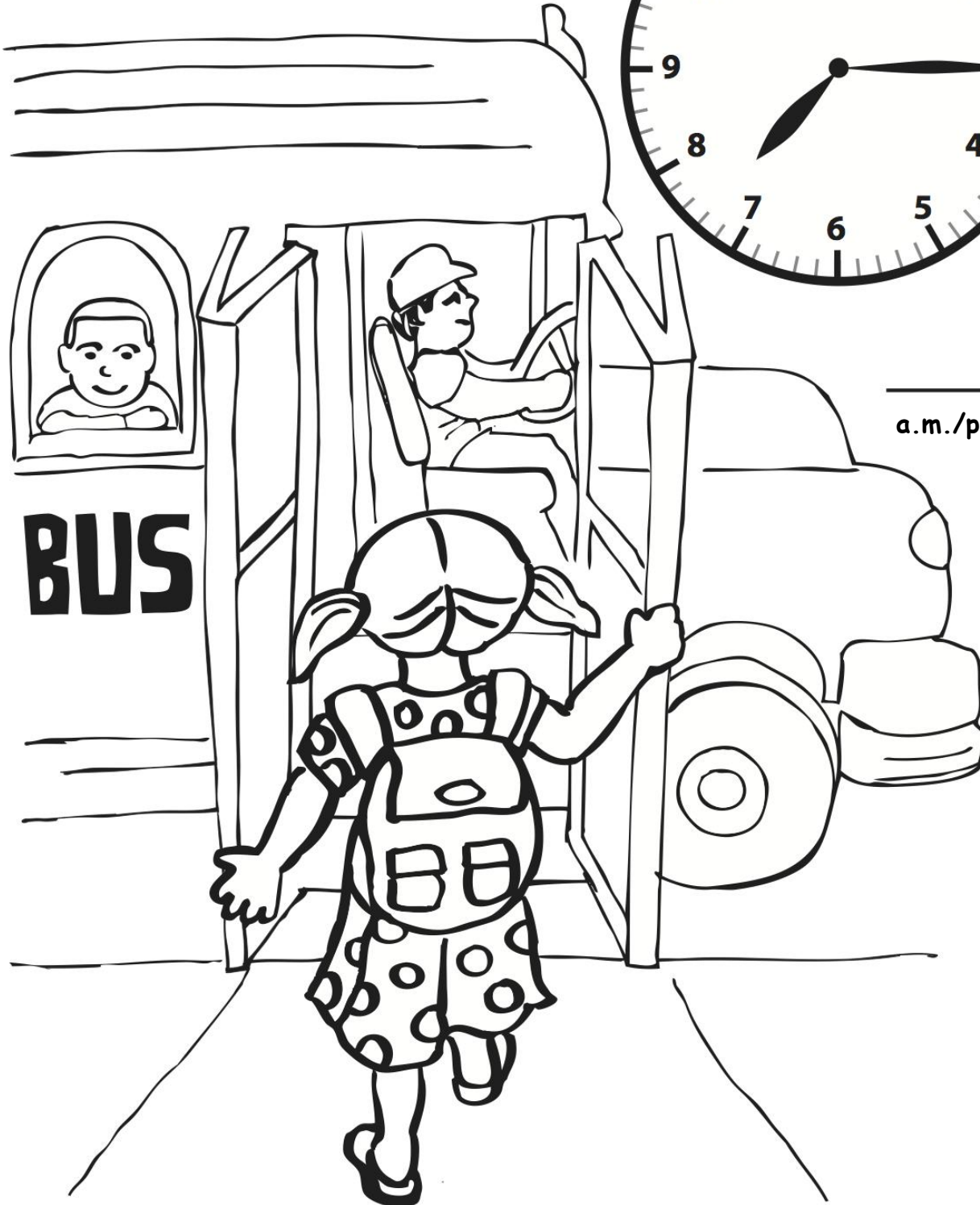
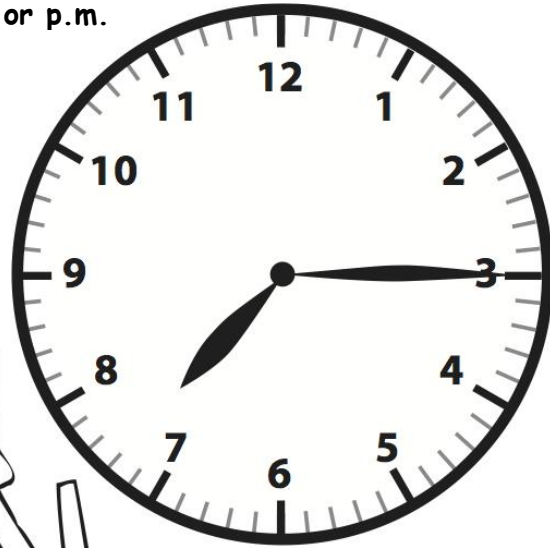
Write the time, and circle a.m. or p.m.



\_\_\_\_\_ a.m./p.m.



Write the time, and circle a.m. or p.m.



\_\_\_\_\_ a.m./p.m.

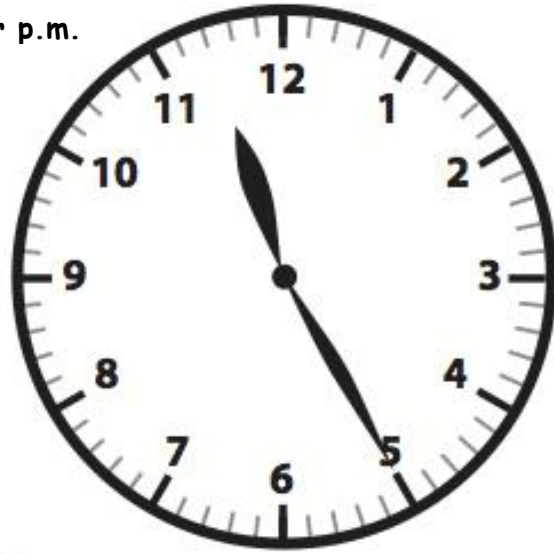
Write the time, and circle a.m. or p.m.



a.m./p.m.



Write the time, and circle a.m. or p.m.



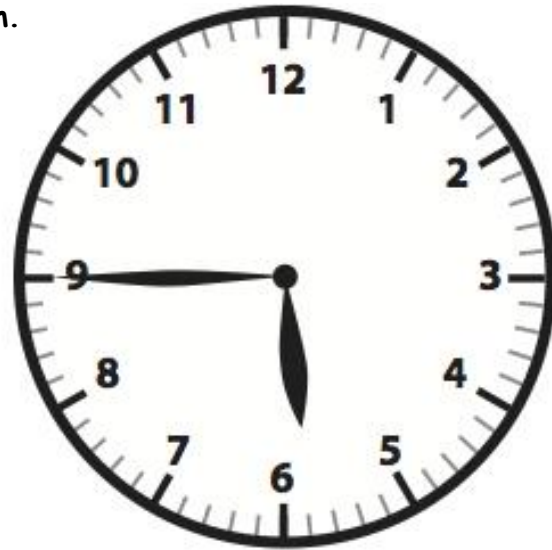
\_\_\_\_\_

a.m./p.m.

Write the time, and circle a.m. or p.m.



Write the time, and circle a.m. or p.m.



\_\_\_\_\_ a.m./p.m.



Write the time, and circle a.m. or p.m.



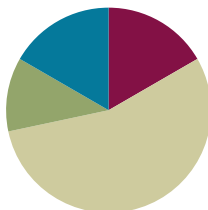
\_\_\_\_\_ a.m./p.m.

## Lesson 16

**Objective:** Solve elapsed time problems involving whole hours and a half hour.

### Suggested Lesson Structure

■ Fluency Practice	(10 minutes)
■ Application Problem	(7 minutes)
■ Concept Development	(33 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (10 minutes)

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

### Subtraction with Renaming (5 minutes)

Materials: (S) Personal white board, place value chart

Note: This fluency drill reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, and reinforce place value understandings by having students say their answer in both unit form and the regular way. Students will use their personal boards and a place value chart to solve.

T: (Write  $600 - 356$  horizontally on the board.) Let's use a chip model to subtract. On your boards, record your work using the algorithm.

S: (Solve on their personal boards.)

T:  $600 - 356$  is...?

S: 244!

Continue with the following possible sequence:  $406 - 218$ ,  $507 - 269$ ,  $314 - 185$ ,  $672 - 274$ , and  $842 - 296$ .

### Grade 2 Core Fluency Differentiated Practice Sets (5 minutes)

Materials: (S) Core Fluency Practice Sets from G2–M8–Lesson 3

Note: During G2–M8–Topic D 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 and Practice Sets provided in G2–M8–Lesson 3.

### Application Problem (7 minutes)

On Saturdays, Jean may only watch cartoons for one hour. Her first cartoon lasts 14 minutes, and the second lasts 28 minutes. After a 5-minute break, Jean watches a 15-minute cartoon. How much time does Jean spend watching cartoons? Did she break her time limit?

$$\begin{array}{r} 14 \\ + 28 \\ \hline 42 \end{array} \quad \begin{array}{r} 42 \\ + 15 \\ \hline 57 \end{array}$$

Jean spends 57 minutes watching cartoons. She didn't break her time limit.



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Scaffold the Application Problem for below grade level students by encouraging them to draw what they know, or by providing them with a blank number bond to use. Help them to make sense of the 5-minute break in the problem: "When Jean took a break was she watching cartoons? Should we count those 5-minutes?"

Note: This problem provides an opportunity to practice mental addition and double-digit addition within 100. Students must pay careful attention to not add in the 5-minute break. If they do, they will think Jean has broken the time limit.

### Concept Development (33 minutes)

Materials: (T) Demonstration clock (can be clock from G2–M8–Lessons 13–14) (S) Student clocks, personal white boards, 1 piece of chart paper and a few markers (per group)

Draw analog clocks representing 7:00 and 7:30 on the board, or show two demonstration clocks set to those times. Then, display the time on the board or on clocks for each of the following problems.

#### Problem 1

Kalpna gets up at 7:00 a.m. She leaves the house at 7:30 a.m. How long does it take her to get ready?

T: Read the problem.

S: (Read the problem chorally.)

T: (Pause.) How long does it take Kalpna to get ready?

S: 30 minutes. → Half an hour.

T: How did you figure this problem out? Turn and talk.

S: I used my clock and saw the fraction, half an hour. → 7:30 is 30 minutes after 7:00. You just look at the minutes and subtract. 30 minus 0 is easy, 30. → I skip-counted by fives until I got to 7:30.

T: Great! Let's try another problem.



7:00 a.m.



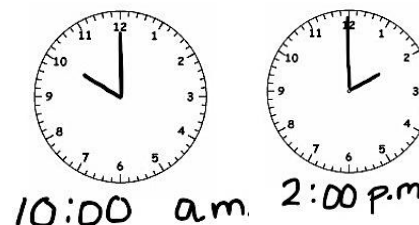
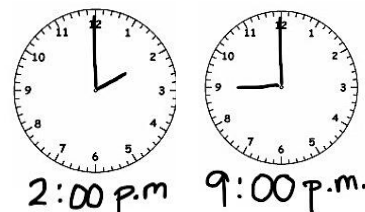
7:30 a.m.

**Problem 2**

Tony goes bowling on Saturday at 2:00 p.m. He gets home at 9:00 p.m. How long did he stay out?

Have students read the problem chorally.

- T: Work with a partner to try to solve this problem. (Allow students time to work.)
- T: How long did Tony stay out?
- S: 7 hours!
- T: How did you figure that out?
- S: I counted on the clock: 3, 4, 5, 6, 7, 8, 9, so 7 hours. → I subtracted 2 from 9 to get 7 hours. → I knew that halfway around the clock was 8 p.m., and that is 6 hours. And, I only needed 1 more hour, so 7 hours.

**Problem 3**

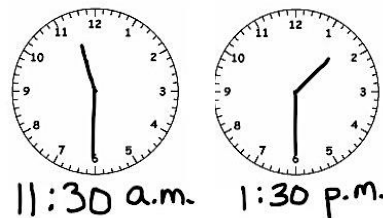
The students arrive at the museum at 10:00 a.m. They leave at 2:00 p.m. How long are the students at the museum?

- T: Read the problem, and then solve it with a partner. (Allow students time to work.)
- T: How long are the students at the museum?
- S: 4 hours!
- T: How do you know?
- S: I counted 11, 12, 1, 2, so 4 hours. → I know that it's 2 hours from 10 to 12, and then another 2 hours from 12 to 2. Since  $2 + 2 = 4$ , it was 4 hours. → I went back in time. It's 2 hours from 2 to noon, and then 2 hours from noon to 10.
- T: Let's try another problem that goes from a.m. to p.m.

**Problem 4**

A movie starts at 11:30 a.m. It finishes at 1:30 p.m. How long does the movie last?

- T: Work with a partner to try to solve this problem. (Allow students time to work.)
- T: How long does the movie last?
- S: 2 hours.
- T: How did you figure it out?
- S: I couldn't just subtract, because it's not 10 hours long. It goes from a.m. to p.m. → I used my clock. One hour, 2 hours.... It's 2 hours! → It turns into p.m. at 12. So, from 11:30 a.m. to



### NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Scaffold Problem 4 for students who might need it by creating a number line starting with 11:30 a.m. (marked with a.m. and perhaps a picture of a shining sun to signal daytime) and extend it to 1:30 p.m. (also with the sun shining to signal daytime) for students to use. For Problem 5, make your number line extend from 8:00 p.m. (with a crescent moon) extending to 3:30 a.m. (with a crescent moon to signal nighttime). Use the clocks and the number line together to show how to count elapsed time.

12:30 p.m. is an hour, and then it's another hour to 1:30 p.m. 2 hours!

- T: Some students noticed that we are going from a.m. to p.m., so we can't just subtract. We have to count the hours forward. Remember, you can use your clocks to help if you like.

### Problem 5

Beth goes to bed at 8:00 p.m. She wakes up at 3:30 a.m. to go to the airport. How much time did she sleep?

- T: Work with a partner to figure this out. (Allow students time to work.)

T: How long, or how much time, did Beth sleep?

S: Seven and a half hours. → Seven hours and 30 minutes.

T: For this problem, could we use the arrow way with hours and minutes to make solving easier? Turn and talk.

S: Yes. First, I figured out how long it is until midnight, or 12:00 a.m., which is 4 hours. Then, it's another 3 and a half till 3:30. So, 7 and a half hours. → I know that halfway around the clock is 6 hours. Then, I just added another hour and a half to get to 3:30. All together that's 7 and a half hours.

8:00 p.m.  $\xrightarrow{+4\text{hr}}$  12:00 a.m.  $\xrightarrow{+3\text{h}30\text{min}}$  3:30 a.m.  
7 h 30 min

### Problem 6

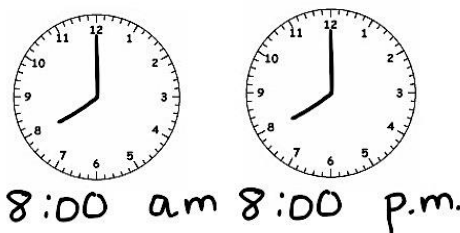
Draw or show two clocks, one showing 8:00 a.m. and one showing 8:00 p.m.

- T: Are these clocks showing the same time or two different times?

S: Different! → They're the same except one clock shows a.m. and one clock shows p.m.

T: Turn and talk. If these times occur on the same day, how much time has passed between the first time and the second?

S: (Count hours.) 12 hours. → I know it's 12 hours in half a day, so 12 hours. → The difference between the same time of day in a.m. or p.m. is 12 hours.



Continue with the following problems: 4:30 p.m. and 1:30 p.m., 7:00 a.m. and 2:30 a.m.

### Challenge Question

Organize desks into groups of three or four, as students will complete this last activity in cooperative groups. Distribute a piece of chart paper and a few markers to each group.

T: Can you believe it, this is our last math lesson of the year! I have one final question for you: In how many days will you be third-graders?

T: As a team, use what you know about months, weeks, and days to solve this problem.

T: Let's review. How many days in a week?

S: 7 days.

T: About how many weeks in a month?

S: 4 weeks.



- T: And about how many days in a month?
- S: It depends on the month, usually 31. → Sometimes 30 and sometimes 31, except for February.
- T: Yes! Our last day of school is [month, day, year]. And our first day next year is [month, day, year].
- T: On your chart paper, use pictures, words, and/or numbers to solve the problem. Get to work!

If time permits, have students present their solutions and explain their thinking. Otherwise, hang charts around the room, and have a quick gallery walk before distributing the last 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 solve these problems using the RDW approach used for Application Problems.

Note: There may not be time for the Problem Set and the challenge question. If time runs short, select the option that best fits your students' needs.

### Student Debrief (10 minutes)

**Lesson Objective:** Solve elapsed time problems involving whole hours and a half hour.

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.

- For Problem 1(e), explain to your partner how you figured out how much time passed between 7:00

Name Maria Date \_\_\_\_\_

1. How much time has passed?



a. 6:30 a.m. → 7:00 a.m. 30 minutes



b. 4:00 p.m. → 9:00 p.m. 5 hours



c. 11:00 a.m. → 5:00 p.m. 6 hours

d. 3:30 a.m. → 10:30 a.m. 7 hours

e. 7:00 p.m. → 1:30 a.m. 6 hours and 30 minutes

f.  →  5 hours

g.  →  12 hours

h.  →  18 hours

2. Solve.

a. Tracy arrives at school at 7:30 a.m. She leaves school at 3:30 p.m. How long is Tracy at school?

8 hours

b. Anna spent 3 hours at dance practice. She finished at 6:15 p.m. What time did she start?

3:15 p.m.

c. Andy finished baseball practice at 4:30 p.m. His practice was 2 hours long. What time did his baseball practice start?

2:30 p.m.

d. Marcus took a road trip. He left on Monday at 7:00 a.m. and drove until 4:00 p.m. On Tuesday, Marcus drove from 6:00 a.m. to 3:30 p.m. How long did he drive on Monday and Tuesday?

9 hours + 9 hours 30 mins  
18 hours and 30 mins

p.m. and 1:30 a.m. What were you most likely doing during that time?

- For Problem 1(h), Jovan argues that the elapsed time is 6 hours. Why is he incorrect? What most likely happened?
- For Problem 2(a), if Tracy leaves and comes home on the half hour, why isn't she in school for 8 and a half hours?
- For Problem 2(d), what observations can you make about the times Marcus drove on Monday and Tuesday? Does this make solving easier for you?

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name \_\_\_\_\_

Date \_\_\_\_\_

1. How much time has passed?

a. 6:30 a.m. → 7:00 a.m. \_\_\_\_\_

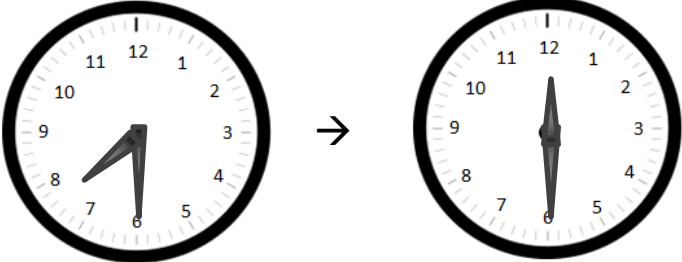
b. 4:00 p.m. → 9:00 p.m. \_\_\_\_\_

c. 11:00 a.m. → 5:00 p.m. \_\_\_\_\_

d. 3:30 a.m. → 10:30 a.m. \_\_\_\_\_

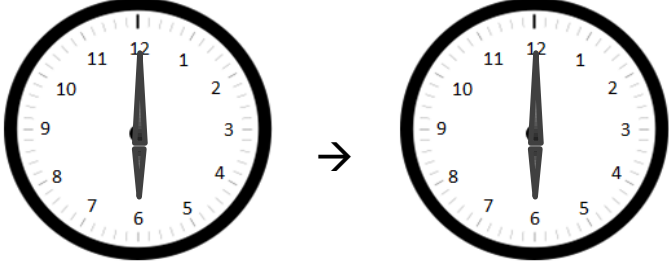
e. 7:00 p.m. → 1:30 a.m. \_\_\_\_\_

f.



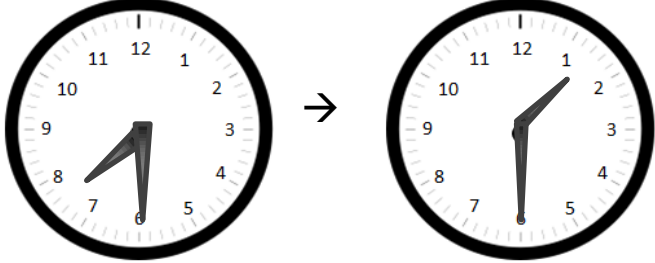
\_\_\_\_\_

g.



\_\_\_\_\_

h.



\_\_\_\_\_

2. Solve.

- a. Tracy arrives at school at 7:30 a.m. She leaves school at 3:30 p.m. How long is Tracy at school?
  
  
  
  
  
  
  
  
  
  
- b. Anna spent 3 hours at dance practice. She finished at 6:15 p.m. What time did she start?
  
  
  
  
  
  
  
  
  
  
- c. Andy finished baseball practice at 4:30 p.m. His practice was 2 hours long. What time did his baseball practice start?
  
  
  
  
  
  
  
  
  
  
- d. Marcus took a road trip. He left on Monday at 7:00 a.m. and drove until 4:00 p.m. On Tuesday, Marcus drove from 6:00 a.m. to 3:30 p.m. How long did he drive on Monday and Tuesday?

Name \_\_\_\_\_

Date \_\_\_\_\_

1. How much time has passed?

a. 3:00 p.m. → 11:00 p.m. \_\_\_\_\_

b. 5:00 a.m. → 12:00 p.m. (noon) \_\_\_\_\_

c. 9:30 p.m. → 7:30 a.m. \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

1. How much time has passed?

a. 2:00 p.m. → 8:00 p.m. \_\_\_\_\_

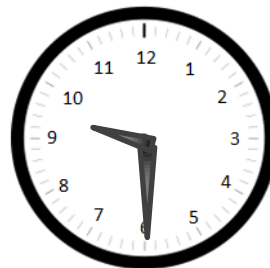
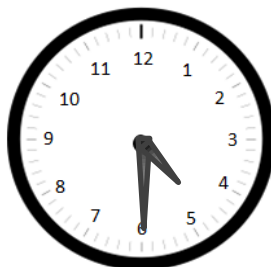
b. 7:30 a.m. → 12:00 p.m. (noon) \_\_\_\_\_

c. 10:00 a.m. → 4:30 p.m. \_\_\_\_\_

d. 1:30 p.m. → 8:30 p.m. \_\_\_\_\_

e. 9:30 a.m. → 2:00 p.m. \_\_\_\_\_

f.

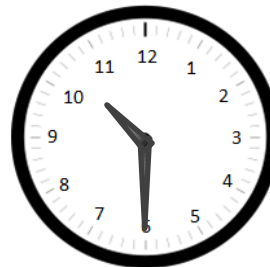
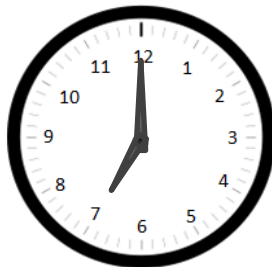


\_\_\_\_\_

p.m.

p.m.

g.

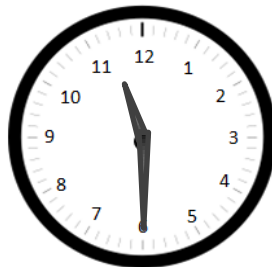


\_\_\_\_\_

a.m.

a.m.

h.



\_\_\_\_\_

a.m.

p.m.

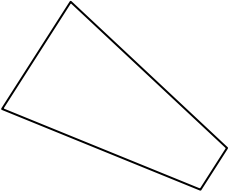
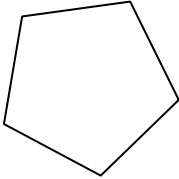
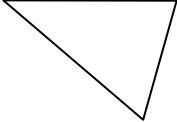
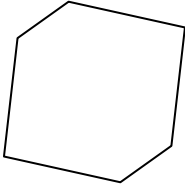
2. Solve.

- a. Kylie started basketball practice at 2:30 p.m. and finished at 6:00 p.m. How long was Kylie at basketball practice?
- b. Jamal spent 4 and a half hours at his family picnic. It started at 1:30 p.m. What time did Jamal leave?
- c. Christopher took 2 hours doing his homework. He finished at 5:30 p.m. What time did he start his homework?
- d. Henry slept from 8 p.m. to 6:30 a.m. How many hours did Henry sleep?

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Complete the chart. Use the word bank below to identify the name of each shape. Not all of the names will be used.

a.	b.	c.	d.
			
_____ sides	_____ sides	_____ sides	_____ sides
_____ angles	_____ angles	_____ angles	_____ angles
<b>Name of shape:</b>	<b>Name of shape:</b>	<b>Name of shape:</b>	<b>Name of shape:</b>

**Word Bank**

hexagon      cube      square      triangle      pentagon      quadrilateral

- e. Sarah and Henry were asked to draw a hexagon. Sarah believes that only her drawing is correct. Explain why both shapes are hexagons.



Sarah's Hexagon



Henry's Hexagon

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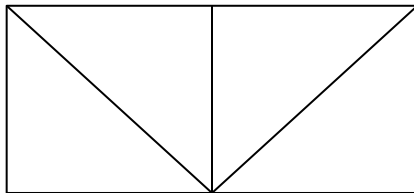
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- 2.
- Draw a shape with three sides. Make one of the angles of the shape a right angle. Which shape in Problem 1 has the same number of angles?
  - Draw a shape with 4 right angles. Which shape in Problem 1 has the same number of angles?
3. Solve the following problems.
- Draw the shape that is one face of a cube.
  - How many faces are on a cube? \_\_\_\_\_
  - How many corners are on a cube? \_\_\_\_\_
  - How many edges are on a cube? \_\_\_\_\_
4. Complete each statement by circling the correct answer based on the figure below.



- One small triangle is what portion of the figure?  
**1 fourth      1 half      1 third**
- One square is what portion of the figure?  
**1 fourth      1 half      1 whole**
- One rectangle that is not a square is what portion of the figure?  
**1 half      1 fourth      1 whole**

Mid-Module Assessment Task  
Standards Addressed

## Topics A–B

**Reason with shapes and their attributes.<sup>1</sup>**

- 2.G.1** Recognize and draw shapes having specific attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagon, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
- 2.G.3** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

**Evaluating Student Learning Outcomes**

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop *on their way to proficiency*. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for each student is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the student CAN do now and what they need to work on next.

<sup>1</sup> Time is revisited using an analog clock as part of the work with 2.G.3. Clock faces provide an excellent application of partitioning the whole into halves, etc., and to the corresponding angle sizes.

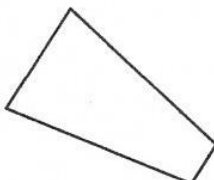
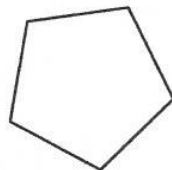
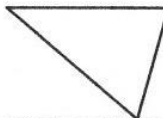
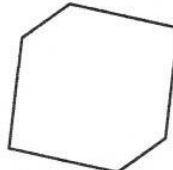
## A Progression Toward Mastery

Assessment Task Item and Standards Assessed	STEP 1 Little evidence of reasoning without a correct answer.  (1 Point)	STEP 2 Evidence of some reasoning without a correct answer.  (2 Points)	STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)	STEP 4 Evidence of solid reasoning with a correct answer.  (4 Points)
1  2.G.1	The student answers one out of five parts correctly.	The student answers two out of five parts correctly.	The student answers three to four out of five parts correctly.	The student correctly answers: a. 4, 4, <i>quadrilateral</i> . b. 5, 5, <i>pentagon</i> . c. 3, 3, <i>triangle</i> . d. 6, 6, <i>hexagon</i> . e. That both images have 6 sides and/or 6 angles.
2  2.G.1	The student answers one out of four parts correctly.	The student answers two out of four parts correctly.	The student answers three out of four parts correctly.	The student draws appropriate shapes and correctly answers: a. <i>Triangle</i> . b. <i>Quadrilateral</i> .
3  2.G.1	The student answers one out of four parts correctly.	The student answers two out of four parts correctly.	The student answers three out of four parts correctly.	The student correctly: a. Draws a square. b. Answers 6. c. Answers 8. d. Answers 12.
4  2.G.3	The student is unable to answer any of the questions.	The student answers one out of three parts correctly.	The student answers two out of three parts correctly.	The student correctly circles: a. <i>1 fourth</i> . b. <i>1 half</i> . c. <i>1 whole</i> .

Name Sam

Date \_\_\_\_\_

1. Complete the chart. Use the word bank below to identify the name of each shape. Not all of the names will be used.

a.	b.	c.	d.
			
<u>4</u> sides	<u>5</u> sides	<u>3</u> sides	<u>6</u> sides
<u>4</u> angles	<u>5</u> angles	<u>3</u> angles	<u>6</u> angles
Name of shape: <u>quadrilateral</u>	Name of shape: <u>pentagon</u>	Name of shape: <u>triangle</u>	Name of shape: <u>hexagon</u>

Word Bank

hexagon

cube

square

triangle

pentagon

quadrilateral

- e. Sarah and Henry were asked to draw a hexagon. Sarah believes that only her drawing is correct. Explain why both shapes are hexagons.



Sarah's Hexagon

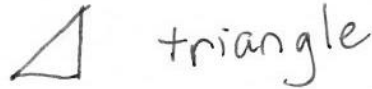


Henry's Hexagon

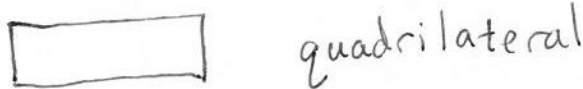
They both have 6 sides and 6 angles.

2.

- a. Draw a shape with three sides. Make one of the angles of the shape a right angle. Which shape in Problem 1 has the same number of angles?



- b. Draw a shape with 4 right angles. Which shape in Problem 1 has the same number of angles?



3. Solve the following problems.

- a. Draw the shape that is one face of a cube.

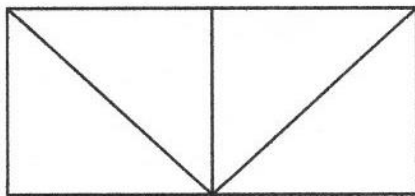


- b. How many faces are on a cube? 6

- c. How many corners are on a cube? 8

- d. How many edges are on a cube? 12

4. Complete each statement by circling the correct answer based on the figure below.



- a. One small triangle is what portion of the figure?

1 fourth    1 half    1 third

- b. One square is what portion of the figure?

1 fourth    1 half    1 whole

- c. One rectangle, that is not a square, is what portion of the figure?

1 half    1 fourth    1 whole

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Match each description to the correct shape name by drawing a line. Draw an example for each shape to the right.

five angles

**triangle**

three sides

**quadrilateral**

four angles

**hexagon**

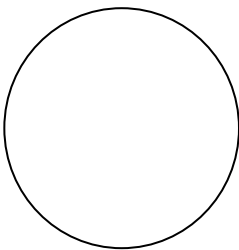
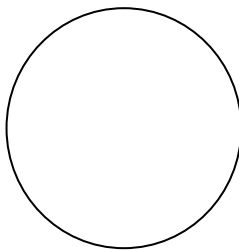
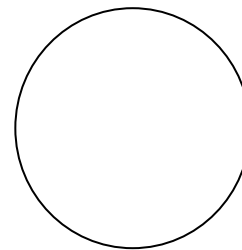
six square faces

**pentagon**

six sides

**cube**

2. Partition each whole circle into equal shares of 2 halves, 3 thirds, and 4 fourths.

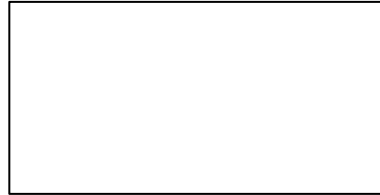
**2 halves****3 thirds****4 fourths**

3. Solve.

- a. 1 whole = \_\_\_\_\_ halves      1 whole = \_\_\_\_\_ thirds      \_\_\_\_\_ fourths = 1 whole

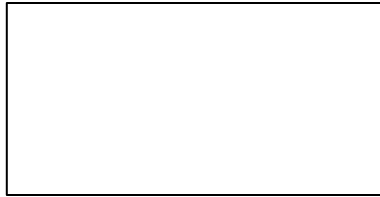
- b. Use vertical lines to partition rectangle:  
A into halves.

**A**



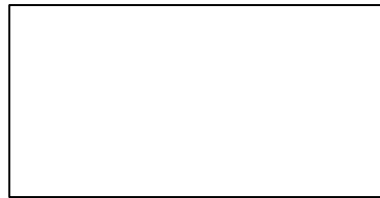
B into thirds.

**B**



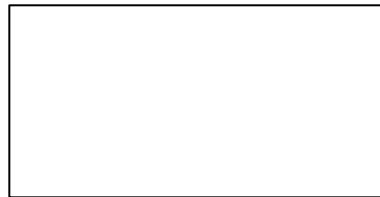
C into fourths.

**C**



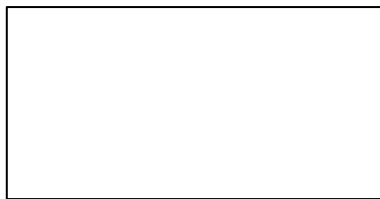
- c. Use horizontal lines to partition rectangle:  
D into halves.

**D**



E into thirds.

**E**

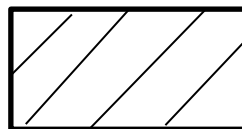
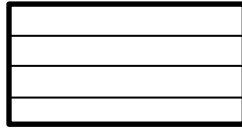
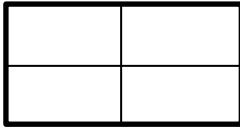


F into fourths.

**F**



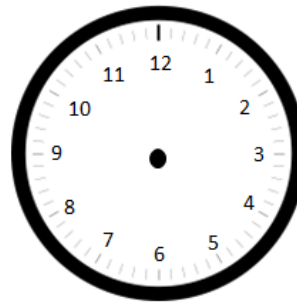
- d. Circle all of the rectangles that are partitioned into fourths, and cross out any rectangle that is not partitioned into fourths.



4. Draw the hands on the analog clock to match the time shown on the digital clock. Then, circle a.m. or p.m. based on the description given.

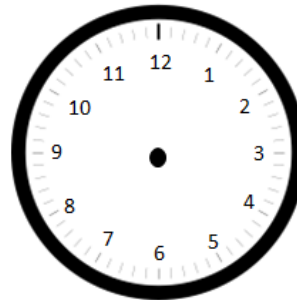
- a. Time to go to school.

8:10 a.m. or p.m.



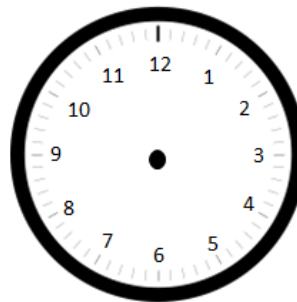
- b. Time for lunch.

12:25 a.m. or p.m.



- c. Time for dinner.

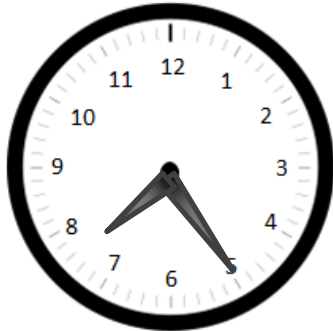
5:45 a.m. or p.m.





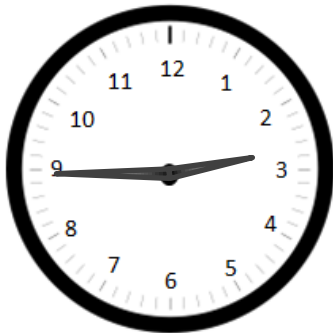
5. Write the time shown on each analog clock.

a.



\_\_\_\_\_

b.



\_\_\_\_\_

c.



\_\_\_\_\_

### End-of-Module Assessment Task Standards Addressed

### Topics A–D

#### Work with time and money.

- 2.MD.7** Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

#### Reason with shapes and their attributes.<sup>1</sup>

- 2.G.1** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
- 2.G.3** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

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A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop *on their way to proficiency*. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for each student is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the student **CAN** do now and what they need to work on next.

<sup>1</sup> Time is revisited using an analog clock as part of the work with 2.G.3. Clock faces provide an excellent application of partitioning the whole into halves, etc., and to the corresponding angle sizes.

## A Progression Toward Mastery

Assessment Task Item and Standards Assessed	STEP 1 Little evidence of reasoning without a correct answer.  (1 Point)	STEP 2 Evidence of some reasoning without a correct answer.  (2 Points)	STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)	STEP 4 Evidence of solid reasoning with a correct answer.  (4 Points)
1  2.G.1	The student correctly answers one out of five parts correctly.	The student correctly answers two out of five parts correctly.	The student correctly answers three to four out of five parts correctly.	The student correctly: <ul style="list-style-type: none"> <li>Matches <i>triangle</i> to <i>three sides</i> and draws a triangle.</li> <li>Matches <i>quadrilateral</i> to <i>four angles</i> and draws a quadrilateral.</li> <li>Matches <i>hexagon</i> to <i>six sides</i> and draws a hexagon.</li> <li>Matches <i>pentagon</i> to <i>five angles</i> and draws a pentagon.</li> <li>Matches <i>cube</i> to <i>six squares</i> and draws a cube.</li> </ul>
2  2.G.3	The student is unable to answer any parts correctly.	The student correctly answers one out of three parts correctly.	The student correctly answers two out of three parts correctly.	The student correctly: <ul style="list-style-type: none"> <li>Partitions the first circle into halves.</li> <li>Partitions the middle circle into thirds.</li> <li>Partitions the last circle into fourths.</li> </ul>
3  2.G.3	The student correctly answers one out of four parts correctly.	The student correctly answers two out of four parts correctly.	The student correctly answers three out of four parts correctly.	The student correctly: <ol style="list-style-type: none"> <li>Solves 2, 3, 4.</li> <li>Using vertical lines, partitions rectangle A into halves, B into thirds, and C into fourths.</li> <li>Using horizontal</li> </ol>



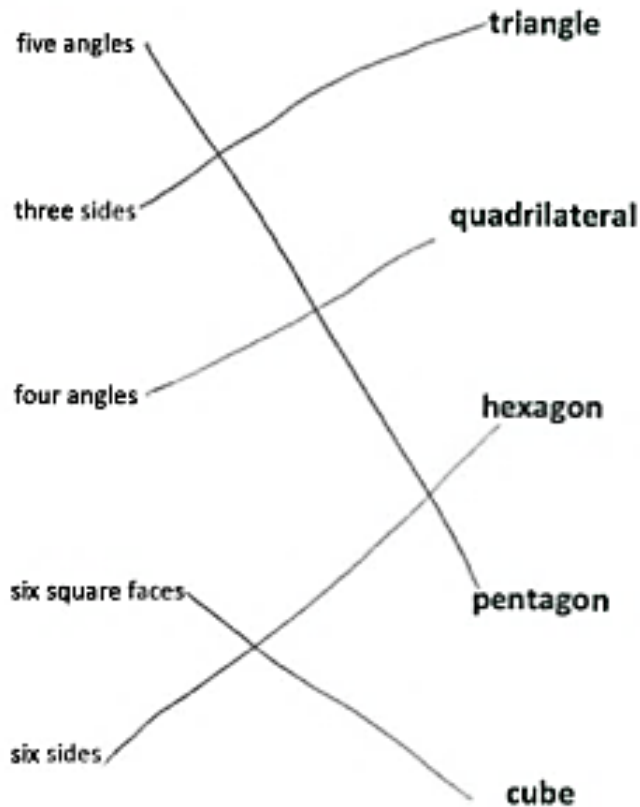
## A Progression Toward Mastery

				<p>lines, partitions rectangle D into halves, E into thirds, and F into fourths.</p> <p>d. Circles the first, second, and fourth rectangles, and crosses out the third rectangle.</p>
<p><b>4</b></p> <p><b>2.MD.7</b></p>	The student is unable to answer any of the parts correctly.	The student correctly answers one out of three parts correctly.	The student correctly answers two out of three parts correctly.	<p>The student correctly draws clock hands and circles:</p> <p>a. <i>a.m.</i></p> <p>b. <i>p.m.</i></p> <p>c. <i>p.m.</i></p>
<p><b>5</b></p> <p><b>2.MD.7</b></p>	The student is unable to answer any of the parts correctly.	The student correctly answers one out of three parts correctly.	The student correctly answers two out of three parts correctly.	<p>The student correctly answers:</p> <p>a. 7:25</p> <p>b. 2:45</p> <p>c. 12:55</p>

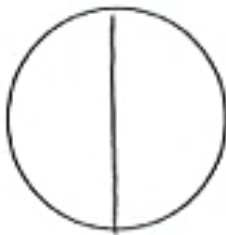
Name Samantha

Date \_\_\_\_\_

1. Match each description to the correct shape name by drawing a line. Draw an example for each shape to the right.



2. Partition each whole circle into equal shares of 2 halves, 3 thirds, and 4 fourths.



2 halves



3 thirds



4 fourths

3. Solve.

a. 1 whole = 2 halves      1 whole = 3 thirds      4 fourths = 1 whole

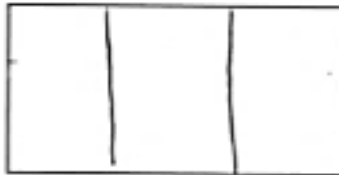
b. Use vertical lines to partition rectangle:  
A into halves.

A



B into thirds.

B



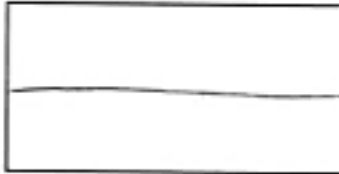
C into fourths.

C



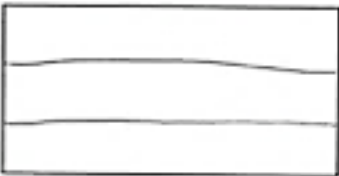
c. Use horizontal lines to partition rectangle:  
D into halves.

D



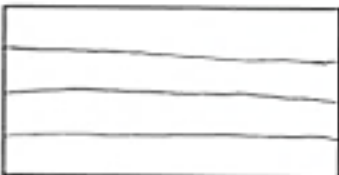
E into thirds.

E

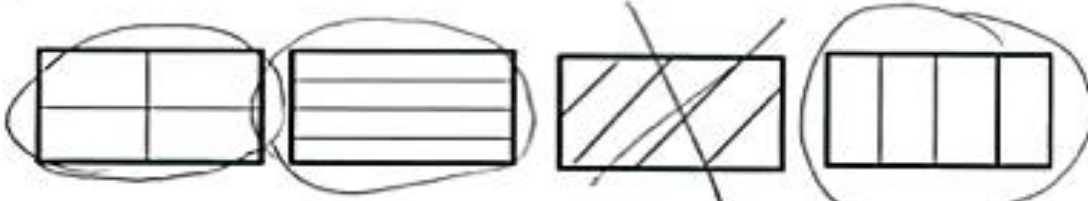


F into fourths.

F



- d. Circle all of the rectangles that are partitioned into fourths, and cross out any rectangle that is not partitioned into fourths.



4. Draw the hands on the analog clock to match the time shown on the digital clock. Then, circle a.m. or p.m. based on the description given.

- a. Time to go to school.



- b. Time for lunch.



- c. Time for dinner.



5. Write the time shown on each analog clock.

a.



7:25

b.



2:45

c.



12:55