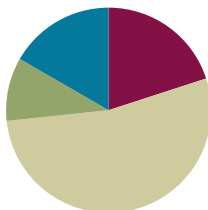


Lesson 3

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)
Total Time	(60 minutes)



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, hundreds place value chart (Fluency Template)

Note: This fluency activity 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 answers in both unit form and in standard form. Students use their personal white boards and a place value chart to solve.

- T: Slide the place value chart template into your personal white boards.
- T: (Write $159 + 17$ horizontally on the board.) Let's use a chip model to add. On your personal white boards, record your work using the algorithm.
- S: (Solve.)
- 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

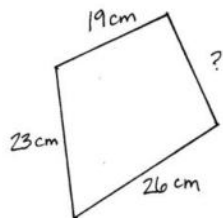
Note: During Topic A and for the remainder of the year, each day's Fluency Practice includes an opportunity for review and mastery of the sums and differences with totals through 20 by means of the Core Fluency Practice Sets or Sprints. Five options are provided in this lesson for the Core Fluency Practice 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.

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?



$$19 + 23 + 26 = ?$$

$$\begin{array}{r} 19 \\ + 23 \\ \hline 42 \\ + 26 \\ \hline 68 \end{array}$$



The fourth side is 18 cm long.

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

$$68 + 20 - 2 = 86$$

$$20 - 2 = 18$$



NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

To help students working below grade level 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.

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 to the 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 to the 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?

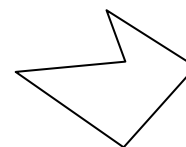
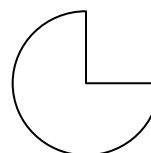
S: A quadrilateral!

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.)

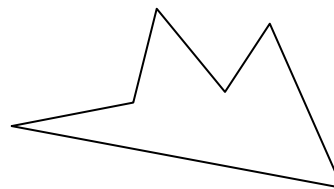


NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

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 a drawn pentagon.

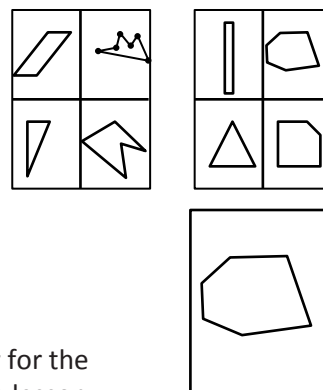
MP.3

- T: Good. Now, show your partner the six straight sides of your polygon. Remember to place your finger at the starting point so you don't count the same side twice as you count around the figure.
- 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 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 the examples to the right) using the above vignette as necessary or appropriate.

Find a Friend: Instruct students to quietly 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 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 the image above.)
- 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 the 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 students named the shapes. 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 should 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.

Any combination of the questions below may be used 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.

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 3 Problem Set 2•8

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 polygon with 4 angles.

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.

COMMON CORE Lesson 3: Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons. 11/10/14 engage^{ny} 8.A.4.1

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 3 Problem Set 2•8

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

COMMON CORE Lesson 3: Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons. 11/10/14 engage^{ny} 8.A.4.2

Exit Ticket (3 minutes)

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

Name _____

Date _____

1.	$10 + 9 =$	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 polygon with 4 angles.

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 _____

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 polygon with 3 angles.

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

--	--

Ones	
Tens	
Hundreds	

Workspace:

hundreds place value chart