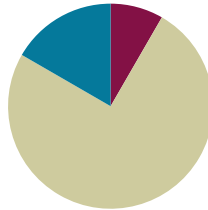


Lesson 4

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)
Total Time	(60 minutes)



Fluency Practice (5 minutes)

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

Addition with Renaming (5 minutes)

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

Note: This fluency activity reviews the application of a chip model while recording with the algorithm. Allow students work time between each problem, 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 board.
- T: (Write $167 + 47$ vertically on the board.) Let's use a chip model to add. On your personal white board, record your work using the algorithm.
- S: (Solve.)
- 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) Chart 2 from Lesson 1, index card, square tile, drawing of rhombus (S) 1 piece of $8\frac{1}{2}'' \times 11''$ white paper, centimeter rulers (Template), index card, highlighter

Note: Students need crayons or 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 below provide a solid foundation to the definitions that are a part of 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 four-sided polygon with four angles.

Trapezoid: A quadrilateral with at least one pair of parallel sides.

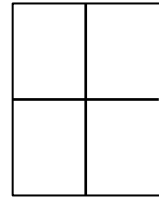
Parallelogram: A quadrilateral with two pairs of parallel sides.

Rectangle: A quadrilateral with four square corners.

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

Rhombus: A quadrilateral with 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 the image to the right.) For precision, students should use a pencil so that they have the option to erase as they draw the shapes.

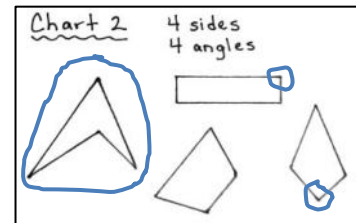


Part 1: Drawing Square Corners and Parallel Lines

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?

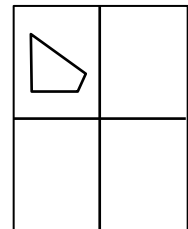
S: The ones on my index card are all the same. → The corners on my card are in the shape of an L.
→ The ones on the chart are big and small.

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.)

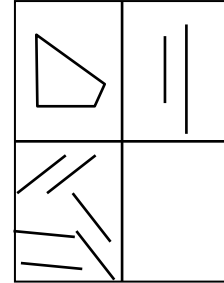
T: Thumbs up if you agree. Let's use our index card to check to see if Student A found a square corner. (Put the corner of the index card in the corner of the shape, and show students how to check by seeing if the lines of the shape line up with the edges of the index card.)



- 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 straightedge of your card to draw two more lines to complete your quadrilateral.

As time permits, students 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 vertical line using a pencil.)
- T: Without moving your ruler, use the opposite edge to draw a second straight line of any length. (See the image to the 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 an 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 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.

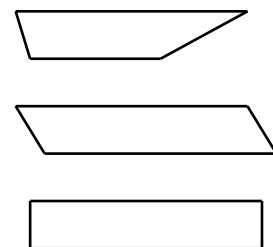
- Exclusive: A trapezoid is a quadrilateral with exactly one pair of parallel sides.
- Inclusive: A trapezoid is a quadrilateral with at least one pair of parallel sides.

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

As time permits, direct 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 horizontal 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 the three examples shown to the right.)
- S: (Use rulers to join the ends of both lines, forming a trapezoid.)



MP.6

MP.6

- T: You made a four-sided polygon. What do we call it?
- S: A quadrilateral!
- T: Compare your quadrilateral with those of your neighbors.
- 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!**

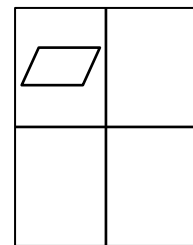
Part 3: Drawing and Identifying a Parallelogram

- 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 a ruler to join the ends of both lines, forming a parallelogram, as shown to the 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 that 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!



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 personal white 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 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 a ruler to join the ends of both lines, forming a rectangle, as shown to the 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 B, use your index card to check the corner angles to see if they are all square corners.

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

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

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

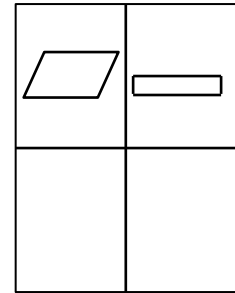
T: Just like a square, there is another quadrilateral that has four equal sides. It looks like this. (Draw a rhombus on the board.)

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.

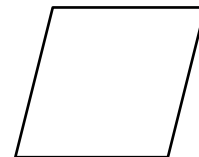
T: Yes! We call a quadrilateral with four equal sides a **rhombus**. It does have equal sides like a square, but it doesn't have to have square corners.

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



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

Help English language learners practice using the new geometric vocabulary. Make a game of it. Show students the shape, and ask them to say its name, or ask them to match shapes with their names and say the names 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 should 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.

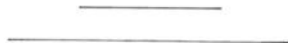
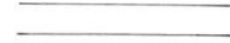
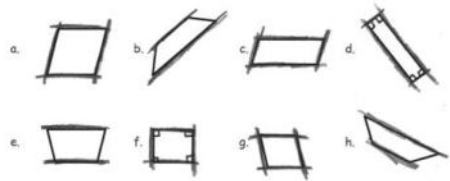
Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set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

Any combination of the questions below may be used 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.

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 4 Problem Set 2•8

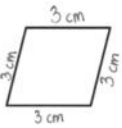
Name Jasmine Date _____

- 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.

- Trace the parallel lines on each quadrilateral using a crayon. For each shape with two sets of parallel lines, use two different colors. Use your index card to find each square corner and box it.

- Draw a parallelogram with no square corners.


COMMON CORE Lesson 4: Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids. engage ny 8.A.5.3
Date: 11/9/14

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 4 Problem Set 2•8

- 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?

 All sides are the same length.
 This is a rhombus.
- A square is a special rectangle. What makes it special?
A square is a special rectangle because it has 4 square corners and all 4 sides are the same length.

COMMON CORE Lesson 4: Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids. engage ny 8.A.5.3
Date: 11/9/14

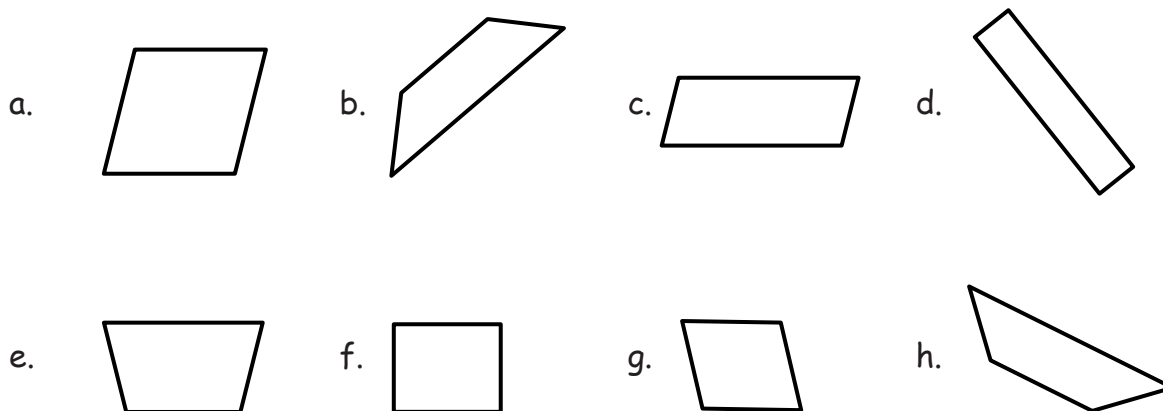
- What did all the shapes we talked about today have in common? (They all were quadrilaterals, or four-sided polygons, with four sides and four corners or angles.)
- Use some of the new vocabulary words you learned today to describe to your partner the attributes of a rectangle. A trapezoid. A **parallelogram**. 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 with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

Name _____ Date _____

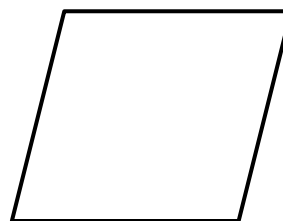
1. Use your ruler to draw 2 parallel lines that are not the same length.
2. Use your ruler to draw 2 parallel lines that are the same length.
3. Trace the parallel lines on each quadrilateral using a crayon. For each shape with two sets of parallel lines, use two different colors. Use your index card to find each square corner, and box it.



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?



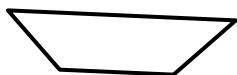
7. A square is a special rectangle. What makes it special?

Name _____

Date _____

Use crayons to trace the parallel sides on each quadrilateral. Use your index card to find each square corner, and box it.

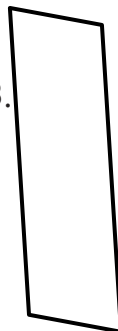
1.



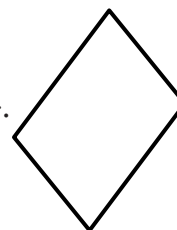
2.



3.



4.



Name _____ Date _____

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

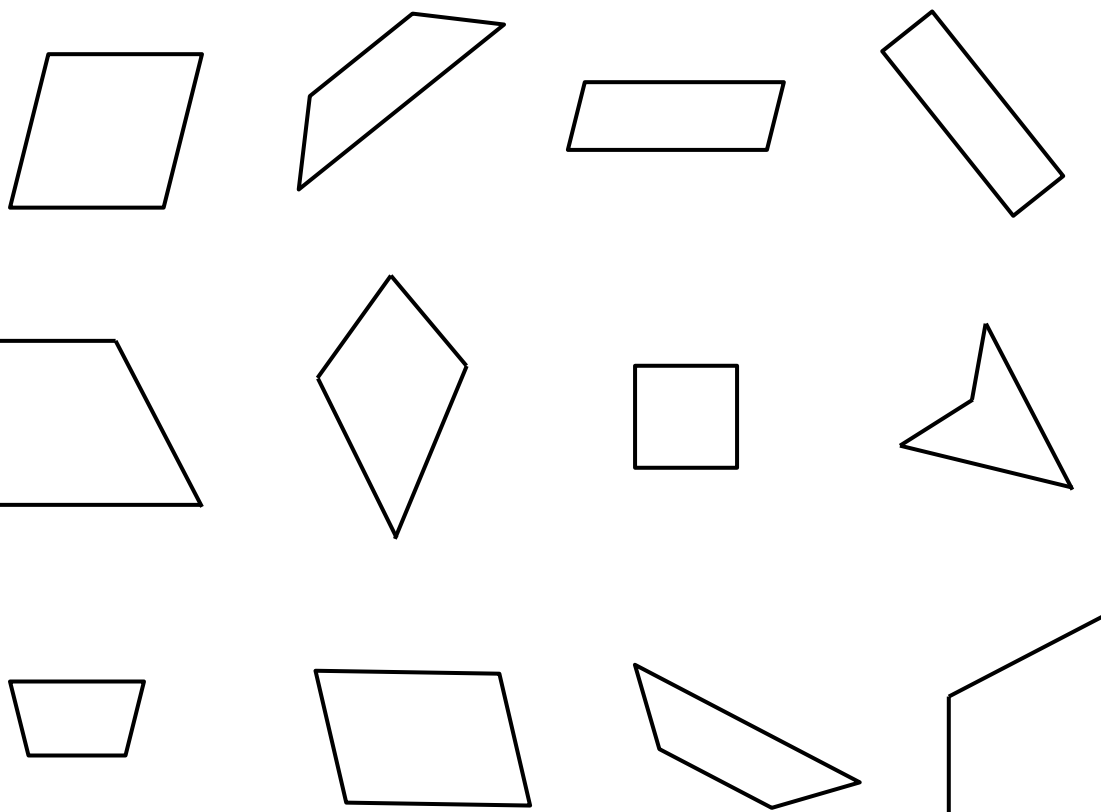
2. Use your ruler to draw 2 parallel lines that are the same length.

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?

6. Color each quadrilateral with 4 square corners and two sets of parallel sides red.
Color each quadrilateral with no square corners and no parallel sides blue.
Circle each quadrilateral with one or more sets of parallel sides green.



Copy onto heavy tag board and cut.

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

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

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

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

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

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

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

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

centimeter rulers