Grade 3
Student Workbook

New York State Common Core
Mathematics Curriculum

GRADE 3 • MODULE 7
Geometry and Measurement Word Problems

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Lena’s family visits Little Tree Apple Orchard. Use the RDW process to solve the problems about Lena’s visit to the orchard. Use a letter to represent the unknown in each problem.

1. The sign below shows information about hayrides at the orchard.

<table>
<thead>
<tr>
<th>Hayrides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult ticket . . . . . . . . . $7</td>
</tr>
<tr>
<td>Child ticket . . . . . . . . . $4</td>
</tr>
<tr>
<td>Leaves every 15 minutes starting at 11:00.</td>
</tr>
</tbody>
</table>

a. Lena’s family buys 2 adult tickets and 2 child tickets for the hayride. How much does it cost Lena’s family to go on the hayride?

b. Lena’s mom pays for the tickets with $5 bills. She receives $3 in change. How many $5 bills does Lena’s mom use to pay for the hayride?

c. Lena’s family wants to go on the fourth hayride of the day. It’s 11:38 now. How many minutes do they have to wait for the fourth hayride?
2. Lena picked 17 apples and her brother picked 19. Lena’s mom has a pie recipe that requires 9 apples. How many pies can Mom make with the apples that Lena and her brother picked?

3. Lena’s dad gives the cashier $30 to pay for 6 liters of apple cider. The cashier gives him $6 in change. How much does each liter of apple cider cost?

4. The apple orchard has 152 apple trees. There are 88 trees with red apples. The rest of the trees have green apples. How many more trees have red apples than green apples?
Use the RDW process to solve the problem below. Use a letter to represent the unknown.

Sandra has her sticker collection in 7 albums. Each album has 40 stickers in it. She starts a new album that has 9 stickers in it. How many total stickers does she have in her collection?
Max’s family takes the train to visit the city zoo. Use the RDW process to solve the problems about Max’s trip to the zoo. Use a letter to represent the unknown in each problem.

1. The sign below shows information about the train schedule into the city.

<table>
<thead>
<tr>
<th>Train Fare–One Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult.................................. $8</td>
</tr>
<tr>
<td>Child................................... $6</td>
</tr>
<tr>
<td>Leaves every 15 minutes starting at 6:00 a.m.</td>
</tr>
</tbody>
</table>

a. Max’s family buys 2 adult tickets and 3 child tickets. How much does it cost for Max’s family to take the train into the city?

b. Max’s father pays for the tickets with $10 bills. He receives $6 in change. How many $10 bills does Max’s father use to pay for the train tickets?

c. Max’s family wants to take the fourth train of the day. It’s 6:38 a.m. now. How many minutes do they have to wait for the fourth train?
2. At the city zoo, they see 17 young bats and 19 adult bats. The bats are placed equally into 4 areas. How many bats are in each area?

3. Max’s father gives the cashier $20 to pay for 6 water bottles. The cashier gives him $8 in change. How much does each water bottle cost?

4. The zoo has 112 species of reptiles and amphibians in their exhibits. There are 72 species of reptiles and the rest are amphibians. How many more species of reptiles are there than amphibians in the exhibits?
Lesson 2 Problem Set

Name __________________________ Date __________________

Use the RDW process to solve. Use a letter to represent the unknown in each problem.

1. Leanne needs 120 tiles for an art project. She has 56 tiles. If tiles are sold in boxes of 8, how many more boxes of tiles does Leanne need to buy?

2. Gwen pours 236 milliliters of water into Ravi’s beaker. Henry pours 189 milliliters of water into Ravi’s beaker. Ravi’s beaker now contains 800 milliliters of water. How much water was in Ravi’s beaker to begin with?

3. Maude hung 3 pictures on her wall. Each picture measures 8 inches by 10 inches. What is the total area of the wall covered by the pictures?
4. Kami scored a total of 21 points during her basketball game. She made 6 two-point shots and the rest were three-point shots. How many three-point shots did Kami make?

5. An orange weighs 198 grams. A kiwi weighs 85 grams less than the orange. What is the total weight of the fruit?

6. The total amount of rain that fell in New York City in two years was 282 centimeters. In the first year, 185 centimeters of rain fell. How many more centimeters of rain fell in the first year than in the second year?
Use the RDW process to solve the problem below. Use a letter to represent the unknown.

Jaden’s bottle contains 750 milliliters of water. He drinks 520 milliliters at practice, then another 190 milliliters on his way home. How many milliliters of water are left in Jaden’s bottle when he gets home?
Lesson 2: Solve word problems in varied contexts using a letter to represent the unknown.

Use the RDW process to solve. Use a letter to represent the unknown in each problem.

1. A box containing 3 small bags of flour weighs 950 grams. Each bag of flour weighs 300 grams. How much does the empty box weigh?

2. Mr. Cullen needs 91 carpet squares. He has 49 carpet squares. If the squares are sold in boxes of 6, how many more boxes of carpet squares does Mr. Cullen need to buy?

3. Erica makes a banner using 4 sheets of paper. Each paper measures 9 inches by 10 inches. What is the total area of Erica’s banner?
4. Monica scored 32 points for her team at the Science Bowl. She got 5 four-point questions correct, and the rest of her points came from answering three-point questions. How many three-point questions did she get correct?

5. Kim’s black kitten weighs 175 grams. Her gray kitten weighs 43 grams less than the black kitten. What is the total weight of the two kittens?

6. Cassias and Javier’s combined height is 267 centimeters. Cassias is 128 centimeters tall. How much taller is Javier than Cassias?
Name ________________________________ Date ____________________

Use the RDW process to solve the problems below. Use a letter to represent the unknown in each problem. When you are finished, share your solutions with a partner. Discuss and compare your strategies with your partner’s strategies.

1. Monica measures 91 milliliters of water into 9 tiny beakers. She measures an equal amount of water into the first 8 beakers. She pours the remaining water into the ninth beaker. It measures 19 milliliters. How many milliliters of water are in each of the first eight beakers?

2. Matthew and his dad put up 8 six-foot lengths of fence on Monday and 9 six-foot lengths on Tuesday. What is the total length of the fence?

3. The total weight of Laura’s new pencils is 112 grams. One pencil rolls off the scale. Now the scale reads 105 grams. What is the total weight of 7 new pencils?
Lesson 3: Share and critique peer solution strategies to varied word problems.

Date: 1/29/14

4. Mrs. Ford’s math class starts at 8:15. They do 3 fluency activities that each last 4 minutes. Just when they finish all of the fluency, the fire alarm goes off. When they return to the room after the drill, it is 8:46. How many minutes did the fire drill last?

5. On Saturday, the baker bought a total of 150 pounds of flour in five-pound bags. By Tuesday, he had 115 pounds of flour left. How many five-pound bags of flour did the baker use?

6. Fred cut an 84 centimeter rope into 2 parts and gave his sister one part. Fred’s part is 56 centimeters long. His sister cut her rope into 4 equal pieces. How long is one of his sister’s pieces of rope?
Name ________________________________ Date ______________

Use the RDW process to solve the problem below. Use a letter to represent the unknown.

Twenty packs of fruit snacks come in a box. Each pack weighs 6 ounces. Students eat some. There are 48 ounces of fruit snacks left in the box. How many ounces of fruit snacks did the students eat?
Lesson 3 Homework

Name ______________________________________ Date __________________

Use the RDW process to solve the problems below. Use a letter to represent the unknown in each problem.

1. Jerry pours 86 milliliters of water into 8 tiny beakers. He measures an equal amount of water into the first 7 beakers. He pours the remaining water into the eighth beaker. It measures 16 milliliters. How many milliliters of water are in each of the first 7 beakers?

2. Mr. Chavez’s third-graders go to gym class at 11:15. Students rotate through three activities for 8 minutes each. Lunch begins at 12:00. How many minutes are left from the end of the gym activities until lunch begins?

3. A box contains 100 pens. In each box there are 38 black pens and 42 blue pens, while the rest are green pens. Mr. Cane buys 6 boxes of pens. How many green pens does he have in total?
4. Greg has $56. Tom has $17 more than Greg. Jason has $8 less than Tom.
   a. How much money does Jason have?

   b. How much money do the 3 boys have in total?

5. Laura cuts 64 inches of ribbon into two parts and gives her mom one part. Laura’s part is 28 inches long. Her mom cuts her ribbon into 6 equal pieces. How long is one of her mom’s pieces of ribbon?
Lesson 3:
Share and critique peer solution strategies to varied word problems.

Date: 1/29/14

Student A

Total Pencils

| 9 | 9 | 9 | 9 | 9 |

6 x 9
54 pencils

Pencils She Gave Away

\[
\begin{align*}
24 \times 2 \\
(6 \times 4) \times 2 \\
6 \times (4 \times 2) \\
6 \times 8 \\
48 \text{ pencils}
\end{align*}
\]

\[
\begin{array}{c}
414 \\
\underline{\hspace{1cm}84}
\end{array}
\]

\[
\begin{array}{c}
-48 \\
\hline
06
\end{array}
\]

Mrs. Mashburn has 6 pencils left.

Student B

Total Pencils

\[
\begin{array}{c}
p \\
54
\end{array}
\]

\[
\begin{array}{c}
9 \\
9 \\
9 \\
9 \\
9
\end{array}
\]

\[p = 6 \times 9 \]

54 pencils

Pencils She Gave Away

\[
\begin{align*}
g &= 24 \times 2 \\
g &= 48 \text{ pencils}
\end{align*}
\]

\[
\begin{array}{c}
414 \\
\underline{\hspace{1cm}84}
\end{array}
\]

\[
\begin{array}{c}
-48 \\
\hline
06
\end{array}
\]

Mrs. Nashburn has 6 pencils left.
Lesson 3: Share and critique peer solution strategies to varied word problems.

Date: 1/29/14

Student C

Mrs. Mashburn has 6 pencils left.
1. Cut out all the polygons (A–L) in the template. Then use the polygons to complete the following chart.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Write the letters of the polygons in this group.</th>
<th>Sketch 1 polygon from the group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: 3 Sides</td>
<td>Polygons: Y, Z</td>
<td>![Triangle Sketch]</td>
</tr>
<tr>
<td>4 Sides</td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td>1 Set of Parallel Sides</td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td>2 Sets of Parallel Sides</td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td>4 Right Angles</td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td>4 Right Angles and 4 Equal Sides</td>
<td>Polygons:</td>
<td></td>
</tr>
</tbody>
</table>
2. Write the letters of the polygons that are quadrilaterals. Explain how you know these polygons are quadrilaterals.

3. Sketch a polygon below from the group that has 2 sets of parallel sides. Trace 1 pair of parallel sides red. Trace the other pair of parallel sides blue. What makes parallel sides different from sides that are not parallel?

4. Draw a diagonal line from one corner to the opposite corner of each polygon you drew in the chart using a straightedge. What new polygon(s) did you make by drawing the diagonal lines?
List as many attributes as you can to describe each polygon below.

L

M
1. Complete the chart by answering true or false.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Polygon</th>
<th>True or False</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Sides</td>
<td>![Triangle]</td>
<td>True</td>
</tr>
<tr>
<td><strong>4 Sides</strong></td>
<td>![Quadrilateral]</td>
<td></td>
</tr>
<tr>
<td><strong>2 Sets of Parallel Sides</strong></td>
<td>![Parallelogram]</td>
<td></td>
</tr>
<tr>
<td><strong>4 Right Angles</strong></td>
<td>![Kite]</td>
<td></td>
</tr>
<tr>
<td><strong>Quadrilateral</strong></td>
<td>![Rectangle]</td>
<td></td>
</tr>
</tbody>
</table>
2. Each quadrilateral below has at least 1 set of parallel sides. Trace each set of parallel sides with a colored pencil.

b. Using a straightedge, sketch a different quadrilateral with at least 1 set of parallel sides.
Lesson 4: Compare and classify quadrilaterals.

Date: 1/29/14
Name __________________________________________ Date ____________________

1. Cut out all the polygons (M–X) in the template. Then use the polygons to complete the following chart.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>List the polygons’ letters from the group.</th>
<th>Sketch 1 polygon from the group.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example:</strong> 3 Sides</td>
<td>Polygons: Y, Z</td>
<td></td>
</tr>
<tr>
<td><strong>All Sides are Equal</strong></td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td><strong>All Sides are Not Equal</strong></td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td><strong>At Least 1 Right Angle</strong></td>
<td>Polygons:</td>
<td></td>
</tr>
<tr>
<td><strong>At Least 1 Set of Parallel Sides</strong></td>
<td>Polygons:</td>
<td></td>
</tr>
</tbody>
</table>
2. Compare Polygon M and Polygon X. What is the same? What is different?

3. Jenny says, “Polygon N, Polygon R, and Polygon S are all regular quadrilaterals!” Is she correct? Why or why not?

4. “I have six equal sides and six equal angles. I have three sets of parallel lines. I have no right angles.”
   a. Write the letter and the name of the polygon described above.
   b. Estimate to draw the same polygon, but with no equal sides.
Jonah draws the polygon below. Use your ruler and right angle tool to measure his polygon. Then answer the questions below.

a. Is Jonah’s polygon a regular polygon? Explain how you know.

b. How many right angles does his polygon have? Circle the right angles on his polygon.

c. How many sets of parallel lines does his polygon have?

d. What is the name of Jonah’s polygon?
Lesson 5 Homework

1. Match the polygons with their appropriate clouds. A polygon can match to more than 1 cloud.

   All sides are equal  All sides are not equal  At least 1 right angle  At least 1 set of parallel sides

   - hexagon
   - rectangle
   - regular octagon
   - square
   - pentagon
   - decagon

Name _____________________________  Date ________________
2. The two polygons below are regular polygons. How are these polygons the same? How are they different?

![Regular polygons](image)

3. Lucia draws the polygons below. Are any of the polygons she drew regular polygons? Explain how you know.

![Polygons](image)
Lesson 5: Compare and classify other polygons.

Date: 1/29/14
Lesson 5: Compare and classify other polygons.

Date: 1/29/14
Lesson 6 Problem Set

Name ________________________________ Date _________________

Use a ruler and a right angle tool to help you draw the figures with the attributes given below.

1. Draw a triangle with 1 right angle.

2. Draw a quadrilateral with 4 right angles and sides that are all 2 inches long.

3. Draw a quadrilateral with at least 1 set of parallel sides. Trace the parallel sides green.
4. Draw a pentagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

5. Draw a hexagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

6. Sam says that he drew a polygon with 2 sides and 2 angles. Can Sam be correct? Use pictures to help you explain your answer.
Use a ruler and a right angle tool to help you draw a shape that matches the attributes of Jeanette’s shape. Label your drawing to explain your thinking.

Jeanette says her shape has 4 right angles and 2 sets of parallel sides. It is not a regular quadrilateral.
Use a ruler and a right angle tool to help you draw the figures with the given attributes below.

1. Draw a triangle that has no right angles.

2. Draw a quadrilateral that has at least 2 right angles.

3. Draw a quadrilateral with 2 equal sides. Label the 2 equal side lengths of your shape.
4. Draw a hexagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

5. Draw a pentagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

6. Cristina describes her shape. She says it has 3 equal sides that are each 4 centimeters in length. It has no right angles. Do your best to draw Cristina’s shape and label the side lengths.
Lesson 6: Draw polygons with specified attributes to solve problems.

Date: 1/29/14
<table>
<thead>
<tr>
<th>Condition</th>
<th>Shape Description</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has at least 1 angle greater than a right angle</td>
<td>is a quadrilateral</td>
<td>Has all equal sides (label side lengths)</td>
</tr>
<tr>
<td>Has at least 1 angle less than a right angle</td>
<td>is a trapezoid</td>
<td>Has at least 2 equal sides (label side lengths)</td>
</tr>
<tr>
<td>Has at least 1 right angle</td>
<td>is a hexagon</td>
<td>Has at least 1 set of parallel sides</td>
</tr>
<tr>
<td>Has more than 4 angles</td>
<td>is a parallelogram</td>
<td>Has no parallel sides</td>
</tr>
</tbody>
</table>
Lesson 6: Draw polygons with specified attributes to solve problems.

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Lesson 7

Objective: Reason about composing and decomposing polygons using tetrominoes.

Suggested Lesson Structure

- Fluency Practice (15 minutes)
- Concept Development (35 minutes)
- Student Debrief (10 minutes)

Total Time (60 minutes)

Fluency Practice (15 minutes)

- Multiply by 5 3.OA.7 (8 minutes)
- Physiometry 3.G.1 (3 minutes)
- Classify the Shape 3.G.1 (4 minutes)

Multiply by 5 (8 minutes)

Materials: (S) Multiply by 5 Pattern Sheet (6–10)

Note: This activity builds fluency with multiplication facts using units of 5. It works toward students knowing from memory all products of two one-digit numbers. See G3–M7–Lesson 1 for directions for administration of Multiply By pattern sheet.

T: (Write 7 × 5 = ___.) Let’s skip-count up by fives. I’ll raise a finger for each five. (Count with fingers to 7 as students count.)

S: 5, 10, 15, 20, 25, 30, 35.

T: Let’s skip-count by fives starting at 25. Why is 25 a good place to start?

S: It’s a fact we already know, so we can use it to figure out a fact we don’t know.

T: (Count up with fingers as students say numbers.)

S: 25 (5 fingers), 30 (6 fingers), 35 (7 fingers).

T: Let’s see how we can skip-count down to find the answer, too. Start at 50 with 10 fingers, 1 for each five. (Count down with fingers as students say numbers.)

S: 50 (10 fingers), 45 (9 fingers), 40 (8 fingers), 35 (7 fingers).

Continue with the following suggested sequence: 9 × 5, 6 × 5, and 8 × 5.

T: (Distribute Multiply by 5 Pattern Sheet.) Let’s practice multiplying by 5. Be sure to work left to right across the page.
Physiometry (3 minutes)

Note: Kinesthetic memory is strong memory. This fluency activity reviews terms from G3–M7–Lessons 4 and 5.

T: Stand up.
S: (Stand up.)
T: (Stretch one arm up, directly at the ceiling. Stretch the other arm parallel to the floor.) What type of angle do you think I’m modeling with my arms?
S: Right angle.
T: Model a right angle with your arms.
S: (Mirror teacher.)
T: (Stretch the arm parallel to the floor towards the ceiling. Move the arm pointing towards the ceiling so that it points towards the opposite wall.) Model another right angle.
S: (Mirror teacher.)
T: How many sides does a triangle have?
S: Three sides.
T: Using your arms, model a triangle with the person standing next to you.
S: (Model triangle in pairs.)
T: What do we call a four-sided figure?
S: Quadrilateral.
T: Use your body to make a quadrilateral with your partner.
S: (Model quadrilateral in pairs.)
T: (Point to a side wall.) Point to the wall that runs parallel to the one I’m pointing to.
S: (Point to the opposite side wall.)
T: (Point at back wall so students point to the front wall.)
T: (Point at front wall so students point to the back wall.)
T: Point to the walls that make a right angle with the wall I’m pointing to.
T: (Point at back wall so students point to the side walls.)
T: (Point at side wall so students point to the front and back walls.)

Repeat with the front wall.

Classify the Shape (4 minutes)

Materials: (S) Personal white boards

Note: This fluency activity reviews G3–M7–Lesson 4.

T: (Project a trapezoid.) How many sides does this shape have?
S: Four sides.
T: Shapes that have four sides are called...?
Lesson 7 Problem Set

Name ________________________________  Date _______________________

1. Use tetrominoes to create at least two different rectangles. Then color the grid below to show how you created your rectangles. You may use the same tetromino more than once.

2. Use tetrominoes to create at least two squares, each with an area of 36 square units. Then color the grid below to show how you created your squares. You may use the same tetromino more than once.

   a. Write a number sentence to show the area of a square above as the sum of the areas of the tetrominoes you used to make the square.

   b. Write a number sentence to show the area of a square above as the product of its side lengths.
3. Use tetrominoes to create at least two different rectangles each with an area of 12 square units. Then color the grid below to show how you created the rectangles. You may use the same tetromino more than once.

![Grid for Lesson 7 Problem Set]

a. Explain how you know the area of each rectangle is 12 square units.

4. Marco created a rectangle with tetrominoes and traced it in the space below. Use tetrominoes to recreate Marco’s rectangle. Then estimate to draw lines inside the rectangle below to show how you recreated Marco’s rectangle.

![Blank space for Marco’s rectangle]
Lesson 7 Exit Ticket

Use your tetrominoes to make a rectangle that has an area of 20 square units. Then color the grid to show how you made your rectangle. You may use the same tetromino more than once.
1. Color tetrominoes on the grid to create three different rectangles. You may use the same tetromino more than once.
2. Color tetrominoes on the grid below:
   
a. To create a square with an area of 16 square units.
   
b. Create at least two different rectangles each with an area of 24 square units.
   
You may use the same tetromino more than once.

3. Explain how you know the rectangles you created in Problem 2(b) have the correct area.
Lesson 7: Reason about composing and decomposing polygons using tetrominoes.

Date: 1/29/14

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Lesson 7: Reason about composing and decomposing polygons using tetrominoes.
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Lesson 8 Problem Set

Name _________________________________  Date _____________________

1. Fold and cut the square on the diagonal. Draw and label your 2 new shapes below.

2. Fold and cut one of the triangles in half. Draw and label your 2 new shapes below.

3. Fold twice and cut your large triangle. Draw and label your 2 new shapes below.

4. Fold and cut your trapezoid in half. Draw and label your 2 new shapes below.
Lesson 8 Problem Set 3.7

5. Fold and cut one of your trapezoids. Draw and label your 2 new shapes below.

6. Fold and cut your second trapezoid. Draw and label your 2 new shapes below.

7. Reconstruct the original square using the seven shapes.
   a. Draw lines inside the square below to show how the shapes go together to form the square. The first one has been done for you.

   ![Square with lines drawn to show shape arrangement]

   b. Describe the process of forming the square. What was easy and what was challenging?
Lesson 8 Exit Ticket

Name ____________________________ Date ___________________

Choose three shapes from your tangram puzzle. Trace them below. Label the name of each shape and describe at least one attribute that they have in common.
Name _________________________________  Date ________________

1. Draw a line to divide the square below into 2 equal triangles.

[Image: Square divided into 2 triangles]

2. Draw a line to divide the triangle below into 2 equal smaller triangles.

[Image: Triangle divided into 2 smaller triangles]

3. Draw a line to divide the trapezoid below into 2 equal trapezoids.

[Image: Trapezoid divided into 2 trapezoids]
4. Draw 2 lines to divide the quadrilateral below into 4 equal triangles.

5. Draw 4 lines to divide the square below into 8 equal triangles.

6. Describe the steps you took to divide the square in Problem 5 into 8 equal triangles.
1. Use at least two tangram pieces to make and draw two of each of the following shapes. Draw lines to show where the tangram pieces meet.
   a. A rectangle that does not have all equal sides.
   b. A triangle.
   c. A parallelogram.
   d. A trapezoid.
2. Use your two smallest triangles to create a square, a parallelogram, and a triangle. Show how you created them below.

3. Create your own shape on a separate sheet of paper using all seven pieces. Describe its attributes below.

4. Trade your outline with a partner to see if you can recreate their shape using your tangram pieces. Reflect on your experience below. What was easy? What was challenging?
Nancy uses her tangram pieces to make a trapezoid without using the square piece. Sketch how she might have created her trapezoid below.
Lesson 9 Homework

Name ___________________________________________  Date _____________________

1. Use at least two tangram pieces to make and draw each of the following shapes. Draw lines to show where the tangram pieces meet.

   a. A triangle.

   b. A square.

   c. A parallelogram.

   d. A trapezoid.
2. Use your tangram pieces to create the cat below. Draw lines to show where the tangram pieces meet.

3. Use the five smallest tangram pieces to make a square. Sketch your square below, and draw lines to show where the tangram pieces meet.
Name ___________________________ Date __________________

1. Use a 2-inch square to answer the questions below.
   a. Trace the square in the space below with a red crayon.

b. Trace the new shape you made with the square in the space below with a red crayon.

c. Which shape has a greater perimeter? How do you know?

d. Color the inside of the shapes in Problems 1(a) and 1(b) with a blue crayon.
e. Which color represents the perimeters of the shapes? How do you know?

f. What does the other color represent? How do you know?

g. Which shape has a greater area? How do you know?

2. Outline the perimeter of the shapes below with a red crayon.

a. Explain how you know you outlined the perimeters of the shapes above.

3. Outline the perimeter of this piece of paper with a highlighter.
Jason paints the outside edges of a rectangle purple. Celeste paints the inside of the rectangle yellow.

a. Use your crayons to color the rectangle that Jason and Celeste painted.

b. Which color represents the perimeter of the rectangle? How do you know?
1. Trace the perimeter of the shapes below with a blue crayon.

   ![Shapes]

   a. Explain how you know you traced the perimeters of the shapes above.

   b. Explain how you could use a string to figure out which shape above has the greatest perimeter.
2. Draw a rectangle on the grid below.

![Rectangle Grid](image)

a. Trace the perimeter of the rectangle with a blue crayon.
b. Color the area of the rectangle red.
c. How is the perimeter of the rectangle different than the area of the rectangle?

3. Maya draws the shape shown below. Noah colors the inside of Maya’s shape as shown. Noah says he colored the perimeter of Maya’s shape. Maya says Noah colored the area of her shape. Who is right? Explain your answer.

![Maya's Shape](image)
Lesson 11: Tessellate to understand perimeter as the boundary of a shape.

Date: 1/29/14

1. Follow the directions below, using the shape you created yesterday.
   a. Tessellate your shape on a blank piece of paper.
   b. Color your tessellation to create a pattern.
   c. Outline the perimeter of your tessellation with a highlighter.
   d. Use a string to measure the perimeter of your tessellation.

2. Compare the perimeter of your tessellation to a partner’s. Whose tessellation has a greater perimeter? How do you know?

3. How could you increase the perimeter of your tessellation?

4. How would overlapping your shape when you tessellated change the perimeter of your tessellation?
Estimate to draw at least four copies of the given regular hexagon to make a new shape, without gaps or overlaps. Outline the perimeter of your new shape with a highlighter. Shade in the area with a colored pencil.
1. Samson tessellates regular hexagons to make the shape below.

   ![Hexagon Tessellation]

   a. Outline the perimeter of Samson’s new shape with a highlighter.

   b. Explain how Samson could use a string to measure the perimeter of his new shape.

   c. How many sides does his new shape have?

   d. Shade in the area of his new shape with a colored pencil.

2. Estimate to draw at least four copies of the given triangle to make a new shape, without gaps or overlaps. Outline the perimeter of your new shape with a highlighter. Shade in the area with a colored pencil.

   ![Triangle Diagram]
3. The marks on the strings below show the perimeters of Shyla’s and Frank’s shapes. Whose shape has a greater perimeter? How do you know?

Shyla’s String: 

Frank’s String: 

4. India and Theo use the same shape to create the tessellations shown below.

India’s Tessellation

Theo’s Tessellation

a. Estimate to draw the shape India and Theo used to make their tessellations.

b. Theo says both tessellations have the same perimeter. Do you think Theo is right? Why or why not?
1. Measure and label the side lengths of the shapes below in centimeters. Then find the perimeter of each shape.

   a.
   ![Square]
   Perimeter = _____ + _____ + _____ + _____
   = ______ cm

   b.
   ![Hexagon]
   Perimeter = _____________________
   = ______ cm

   c.
   ![Parallelogram]
   Perimeter = _____________________
   = ______ cm

   d.
   ![Triangle]
   Perimeter = _____________________
   = ______ cm

   e.
   ![L-shape]
   Perimeter = _____________________
   = ______ cm
2. Carson draws two triangles to create the new shape shown below. Use a ruler to find the side lengths of Carson’s shape in centimeters. Then find the perimeter.

3. Hugh and Daisy draw the shapes shown below. Measure and label the side lengths in centimeters. Whose shape has a greater perimeter? How do you know?

4. Andrea measures one side length of the square below and says she can find the perimeter with that measurement. Explain Andrea’s thinking. Then find the perimeter in centimeters.
Measure and label the side lengths of the shape below in centimeters. Then find the perimeter.

Perimeter = _________________
= ______ cm
1. Measure and label the side lengths of the shapes below in centimeters. Then find the perimeter of each shape.

   a. 
   
   Perimeter = _____ + _____ + _____
   = ______ cm

   b. 
   
   Perimeter = _____________________
   = ______ cm

   c. 
   
   Perimeter = _____________________
   = ______ cm

   d. 
   
   Perimeter = _____________________
   = ______ cm

   e. 
   
   Perimeter = _____________________
   = ______ cm
2. Melinda draws two trapezoids to create the hexagon shown below. Use a ruler to find the side lengths of Melinda’s hexagon in centimeters. Then find the perimeter.

3. Victoria and Eric draw the shapes shown below. Eric says his shape has a greater perimeter because it has more sides than Victoria’s shape. Is Eric right? Explain your answer.

4. Jamal uses his ruler and a right angle tool to draw the rectangle shown below. He says the perimeter of his rectangle is 32 centimeters. Do you agree with Jamal? Why or why not?
Lesson 12:
Express side lengths in whole number units to determine the perimeter of polygons.

Date: 1/29/14

NYS COMMON CORE MATHEMATICS CURRICULUM

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Lesson 13 Problem Set

1. Find the perimeter of the following shapes.

   a. 
   
   \[ P = 3 \text{ in} + 8 \text{ in} + 3 \text{ in} + 8 \text{ in} \]
   
   \[ = _______ \text{ in} \]

   b. 
   
   \[ P = ____ \text{ cm} + ____ \text{ cm} + ____ \text{ cm} + ____ \text{ cm} \]
   
   \[ = _______ \text{ cm} \]

   c. 
   
   \[ P = ____ \text{ cm} + ____ \text{ cm} + ____ \text{ cm} \]
   
   \[ = _______ \text{ cm} \]

   d. 
   
   \[ P = ____ \text{ m} + ____ \text{ m} + ____ \text{ m} + ____ \text{ m} \]
   
   \[ = _______ \text{ m} \]

   e. 
   
   \[ P = ____ \text{ in} + ____ \text{ in} + ____ \text{ in} + ____ \text{ in} + ____ \text{ in} \]
   
   \[ = _______ \text{ in} \]
2. Alan’s rectangular swimming pool is 10 meters long and 16 meters wide. What is the perimeter?

![Rectangular pool diagram]

3. Lila measures each side of the shape below.

   ![Polygon diagram]

   a. What is the perimeter of the shape?

   b. Lila says the shape is a pentagon. Is she correct? Explain why or why not.
Which shape below has the greatest perimeter? Explain your answer.

**Shape A**
- 2 in
- 2 in
- 2 in
- 2 in
- 2 in
- 2 in
- 2 in

**Shape B**
- 4 in
- 2 in
- 3 in
- 4 in
- 2 in
Lesson 13 Homework

NYS COMMON CORE MATHEMATICS CURRICULUM

Name ___________________________________  Date __________________

1. Find the perimeters of the shapes below including the units in your number sentences. Match the letter inside each shape to its perimeter to solve the riddle. The first one has been done for you.

- **q**
  - Perimeter: $P = 7\text{ in} + 7\text{ in} + 7\text{ in}$
  - $P = 21\text{ in}$

- **a**
  - Perimeter: $P = 7\text{ yd} + 7\text{ yd} + 9\text{ yd}$

- **m**
  - Perimeter: $P = 4\text{ in} + 4\text{ in} + 4\text{ in} + 4\text{ in}$

- **u**
  - Perimeter: $P = 3\text{ m} + 4\text{ m} + 7\text{ m}$

- **r**
  - Perimeter: $P = 6\text{ ft} + 6\text{ ft} + 6\text{ ft} + 9\text{ ft}$

- **s**
  - Perimeter: $P = 5\text{ cm} + 5\text{ cm} + 7\text{ cm}$

- **e**
  - Perimeter: $P = 5\text{ cm} + 5\text{ cm} + 8\text{ cm} + 8\text{ cm}$

What kind of meals do math teachers eat?

24 21 20 28 36 26 16 26 28 15 24
2. Alicia’s rectangular garden is 33 feet long and 47 feet wide. What is the perimeter of Alicia’s garden?

3. Jaques measured the side lengths of the shape below.

   a. Find the perimeter of Jaques’ shape.

   b. Jaques says his shape is an octagon. Is he right? Why or why not?
Note: Each template page must be copied separately for students to cut out the cards.

<table>
<thead>
<tr>
<th>9 cm</th>
<th>9 cm</th>
<th>3 in</th>
<th>3 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 cm</td>
<td>6 cm</td>
<td>3 in</td>
<td>3 in</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>7 ft</th>
<th>7 ft</th>
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<th>11 yd</th>
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</thead>
<tbody>
<tr>
<td>7 ft</td>
<td>10 ft</td>
<td>13 yd</td>
<td></td>
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<th>8 m</th>
<th>14 cm</th>
<th>14 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 m</td>
<td>8 m</td>
<td>7 cm</td>
<td>7 cm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>6 yd</th>
<th>6 yd</th>
<th>4 cm</th>
<th>4 cm</th>
</tr>
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<tbody>
<tr>
<td>5 yd</td>
<td>5 yd</td>
<td>6 cm</td>
<td>6 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5 m</th>
<th>3 m</th>
<th>9 in</th>
<th>9 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 m</td>
<td>3 m</td>
<td>9 in</td>
<td></td>
</tr>
<tr>
<td>5 m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 13: Explore perimeter as an attribute of plane figures and solve problems.

Date: 1/29/14
Lesson 14 Problem Set

Name ___________________________ Date ________________

1. Label the unknown side lengths of the regular shapes below. Then find the perimeter of each shape.

   a. 8 in  
      \[ \text{Perimeter} = \_\_\_\_\_ \text{in} \]

   b. 7 ft  
      \[ \text{Perimeter} = \_\_\_\_\_ \text{ft} \]

   c. 9 m  
      \[ \text{Perimeter} = \_\_\_\_\_ \text{m} \]

   d. 6 in  
      \[ \text{Perimeter} = \_\_\_\_\_ \text{in} \]

2. Label the missing side lengths of the rectangle below. Then find the perimeter of the rectangle.

   2 cm \hspace{1cm} \text{Perimeter} = \_\_\_\_\_ \text{cm}

   7 cm
3. David draws a regular octagon and labels a side length as shown below. Find the perimeter of David’s octagon.

![Regular Octagon](image)

6 cm

4. Paige paints an 8 inch by 9 inch picture for her mom’s birthday. What is the total length of wood that Paige needs to make a frame for the picture?

5. Mr. Spooner draws a regular hexagon on the board. One of the sides measures 4 centimeters. Giles and Xander find the perimeter. Their work is shown below. Whose work is correct? Explain your answer.

<table>
<thead>
<tr>
<th>Giles’ Work</th>
<th>Xander’s Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter = 4 cm + 4 cm + 4 cm + 4 cm + 4 cm + 4 cm</td>
<td>Perimeter = 6 × 4 cm</td>
</tr>
<tr>
<td>Perimeter = 24 cm</td>
<td>Perimeter = 24 cm</td>
</tr>
</tbody>
</table>
Travis traces a regular pentagon on his paper. Each side measures 7 centimeters. He also traces a regular hexagon on his paper. Each side of the hexagon measures 5 centimeters. Which shape has a greater perimeter? Show your work.
Lesson 14 Homework

NYS COMMON CORE MATHEMATICS CURRICULUM 3•7

Name ________________________________ Date ______________________

1. Label the unknown side lengths of the regular shapes below. Then find the perimeter of each shape.

   a. 4 in
      
      Perimeter = ______ in

   b. 8 cm
      
      Perimeter = ______ cm

   c. 9 m
      
      Perimeter = ______ m

   d. 6 in
      
      Perimeter = ______ in

2. Label the missing side lengths of the rectangle below. Then find the perimeter of the rectangle.

   4 cm

   9 cm

   Perimeter = ______ cm
3. Roxanne draws a regular pentagon and labels a side length as shown below. Find the perimeter of Roxanne’s pentagon.

![Pentagon Diagram]

4. Each side of a square field measures 24 meters. What is the perimeter of the field?

5. What is the perimeter of a rectangular sheet of paper that measures 8 inches by 11 inches?
Name _____________________________  Date ________________

1. Mrs. Kozlow put a border around a 5-foot by 6-foot rectangular bulletin board. How many feet of border did Mrs. Kozlow use?

2. Jason built a model of the Pentagon for a social studies project. He made each outside wall 33 centimeters long. What is the perimeter of Jason’s model Pentagon?

3. The Holmes family plants a rectangular 8-yard by 9-yard vegetable garden. How many yards of fencing do they need to put a fence around the garden?
4. Marion paints a 5-pointed star on her bedroom wall. Each side of the star is 18 inches long. What is the perimeter of the star?

5. The soccer team jogs around the outside of the soccer field twice to warm up. The rectangular field measures 60 yards by 100 yards. What is the total number of yards the team jogs?

6. Troop 516 makes 3 triangular flags to carry at a parade. They sew ribbon around the outside edges of the flags. The flags’ side lengths each measure 24 inches. How many inches of ribbon does the troop use?
Marlene ropes off a square section of her yard where she plants grass. One side length of the square measures 9 yards. What is the total length of rope Marlene uses?
Lesson 15 Homework

Name _____________________________ Date ________________

1. Miguel glues a ribbon border around the edges of a 5-inch by 8-inch picture to create a frame. What is the total length of ribbon Miguel uses?

2. A building at Elmira College has a room shaped like an octagon. The length of each side of the room is 35 feet. What is the perimeter of this room?

3. Manny fences in a rectangular area for his dog to play in the backyard. The area measures 35 yards by 45 yards. What is the total length of fence that Manny uses?
4. Tyler uses 6 craft sticks to make a hexagon. Each craft stick is 6 inches long. What is the perimeter of Tyler’s hexagon?

5. Francis made a rectangular path from her driveway to the porch. The width of the path is 2 feet. The length is 28 feet longer than the width. What is the perimeter of the path?

6. The gym teacher uses tape to mark a 4-square court on the gym floor, as shown. The outer square has side lengths of 16 feet. What is the total length of tape the teacher uses to mark Square A?
1. Find the perimeter of 10 circular objects to the nearest quarter inch using string. Record the name and perimeter of each object in the chart below.

<table>
<thead>
<tr>
<th>Object</th>
<th>Perimeter (to the nearest quarter inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

a. Explain the steps you used to find the perimeter of the circular objects in the chart above.

b. Could the same process be used to find the perimeter of the shape below? Why or why not?
Lesson 16 Problem Set

2. Can you find the perimeter of the shape below using just your ruler? Explain your answer.

3. Molly says the perimeter of the shape below is $6\frac{1}{4}$ inches. Use your string to check her work. Do you agree with her? Why or why not?

4. Is the process you used to find the perimeter of a circular object an efficient method to find the perimeter of a rectangle? Why or why not?
Use your ruler and string to find the perimeter of the shape below to the nearest quarter inch.
1. Find the perimeter of 5 circular objects from home to the nearest quarter inch using string. Record the name and perimeter of each object in the chart below.

<table>
<thead>
<tr>
<th>Object</th>
<th>Perimeter (to the nearest quarter inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Peanut Butter Jar Cap</td>
<td>9 1/2 inches</td>
</tr>
</tbody>
</table>

a. Explain the steps you used to find the perimeter of the circular objects in the chart above.
2. Use your string and ruler to find the perimeter of the two shapes below to the nearest quarter inch.

   ![Shapes A and B](shapes.png)

   a. Which shape has a longer perimeter?

   b. Find the difference between the two perimeters. Show your work.

3. Describe the steps you took to find the perimeter of the objects in Problem 2. Would you use this method to find the perimeter of a square? Explain why or why not.
Lesson 16: Use string to measure the perimeter of various circles to the nearest quarter inch.

Date: 1/29/14
Lesson 17: Use all four operations to solve problems involving perimeter and missing measurements.

Date: 1/29/14

1. The shapes below are made up of rectangles. Label the missing side lengths. Then write and solve an equation to find the perimeter of each shape.

a. \[ P = \]

\[ \begin{array}{c}
2 \text{ cm} \\
\hline
3 \text{ cm} \\
\hline
4 \text{ cm} \\
\hline
2 \text{ cm} \\
\end{array} \]

b. \[ P = \]

\[ \begin{array}{c}
5 \text{ ft} \\
\hline
2 \text{ ft} \\
\hline
1 \text{ ft} \\
\hline
2 \text{ ft} \\
\end{array} \]

c. \[ P = \]

\[ \begin{array}{c}
6 \text{ m} \\
\hline
4 \text{ m} \\
\hline
2 \text{ m} \\
\end{array} \]

d. \[ P = \]

\[ \begin{array}{c}
2 \text{ yd} \\
\hline
2 \text{ yd} \\
\hline
2 \text{ yd} \\
\hline
7 \text{ yd} \\
\end{array} \]
2. Nathan draws and labels the square and rectangle below. Find the perimeter of the new shape.

![Diagram of a square and rectangle with labeled sides: 6 cm, 6 cm, 12 cm, and 8 in.]

3. Label the missing side lengths. Then find the perimeter of the shaded rectangle.

![Diagram of a rectangle with labeled sides: 7 in, 2 in, 8 in, and a in. The shaded rectangle has sides b in and 16 in.]

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Label the missing side lengths. Then find the perimeter of the shaded rectangle.

Name ________________________________ Date ____________________

a m

5 m

b m

101

14 m

6 m

12 m

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1. The shapes below are made up of rectangles. Label the missing side lengths. Then write and solve an equation to find the perimeter of each shape.

a. \( P = \) \[\begin{array}{c}
7 \text{ m} \\
2 \text{ m} \\
4 \text{ m} \\
9 \text{ m} \\
\end{array}\]

b. \( P = \) \[\begin{array}{c}
8 \text{ cm} \\
6 \text{ cm} \\
5 \text{ cm} \\
2 \text{ cm} \\
2 \text{ cm} \\
\end{array}\]

c. \( P = \) \[\begin{array}{c}
6 \text{ in} \\
4 \text{ in} \\
4 \text{ in} \\
12 \text{ in} \\
\end{array}\]

d. \( P = \) \[\begin{array}{c}
2 \text{ ft} \\
3 \text{ ft} \\
3 \text{ ft} \\
1 \text{ ft} \\
8 \text{ ft} \\
7 \text{ ft} \\
\end{array}\]
2. Sari draws and labels the square and rectangle below. Find the perimeter of the new shape.

![Diagram of a square and rectangle combined with labeled sides]

3. Label the missing side lengths. Then find the perimeter of the shaded rectangle.

![Diagram of a rectangle with labeled sides]
Lesson 18: Construct rectangles from given number of unit squares and determine the perimeters.

Date: 1/29/14

1. Use unit squares to build as many rectangles as you can with an area of 24 square units. Shade in squares on your grid paper to represent each rectangle that you made with an area of 24 square units.

   a. Estimate to draw and label the side lengths of each rectangle you built in Problem 1. Then, find the perimeter of each rectangle. One rectangle is done for you.

   \[ P = 24 \text{ units} + 1 \text{ unit} + 24 \text{ units} + 1 \text{ unit} = 50 \text{ units} \]

   b. The areas of the rectangles in Part(a) above are all the same. What do you notice about the perimeters?
2. Use unit square tiles to build as many rectangles as you can with an area of 16 square units. Estimate to draw each rectangle below. Label the side lengths.

a. Find the perimeters of the rectangles you built.

b. What is the perimeter of the square? Explain how you found your answer.

3. Doug uses square unit tiles to build rectangles with an area of 15 square units. He draws the rectangles as shown below, but forgets to label the side lengths. Doug says that Rectangle A has a greater perimeter than Rectangle B. Do you agree? Why or why not?

Rectangle A

Rectangle B
Lesson 18 Exit Ticket

Lesson 18: Construct rectangles from given number of unit squares and determine the perimeters.

Tessa uses square-centimeter tiles to build rectangles with an area of 12 square centimeters. She draws the rectangles as shown below. Label the missing side lengths of each rectangle. Then, find the perimeter of each rectangle.

1. \[ \text{12 cm} \]
   \[ \underline{\text{cm}} \]
   \[ \underline{\text{cm}} \]
   \[ \text{P} = \]  

2. \[ \underline{\text{cm}} \]
   \[ \text{3 cm} \]
   \[ \underline{\text{cm}} \]
   \[ \text{P} = \]  

3. \[ \underline{\text{cm}} \]
   \[ \text{6 cm} \]
   \[ \underline{\text{cm}} \]
   \[ \text{P} = \]
1. Shade in squares on the grid below to create as many rectangles as you can with an area of 18 square centimeters.

2. Find the perimeter of each rectangle in Problem 1 above.
3. Estimate to draw as many rectangles as you can with an area of 20 square centimeters. Label the side lengths of each rectangle.

   a. Which rectangle above has the greatest perimeter? How do you know?

   b. Which rectangle above has the smallest perimeter? How do you know?
Lesson 18:

Construct rectangles from given number of unit squares and determine the perimeters.

Date:
1/29/14
Lesson 19: Use a line plot to record the number of rectangles constructed from a given number of unit squares.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

1. Use unit square tiles to make rectangles for each given number of unit squares. Complete the charts to show how many rectangles you can make for each given number of unit squares. The first one is done for you. You might not use all the spaces in each chart.

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<td>6</td>
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<td>3</td>
<td>4</td>
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<th>Number of rectangles I made</th>
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<tbody>
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<table>
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<th>Number of unit squares</th>
<th>Number of rectangles I made</th>
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<table>
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<tr>
<th>Number of unit squares</th>
<th>Number of rectangles I made</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Number of unit squares</th>
<th>Number of rectangles I made</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of unit squares</th>
<th>Number of rectangles I made</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of unit squares</th>
<th>Number of rectangles I made</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Create a line plot with the data you collected in Problem 1.

   Number of Rectangles Made With Unit Squares

<table>
<thead>
<tr>
<th>Number of Unit Squares Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

   **X = 1 Rectangle**

3. Which numbers of unit squares produce three rectangles?

4. Why do some numbers of unit squares, such as 13, only produce one rectangle?
Lesson 19 Exit Ticket

Use unit square tiles to make rectangles for the given number of unit squares. Complete the chart to show how many rectangles you made for the given number of unit squares. You might not use all the spaces in the chart.

Name ___________________________ Date __________________

Number of unit squares = 20

Number of rectangles I made: _____

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 19:
Use a line plot to record the number of rectangles constructed from a given number of unit squares.

Date: 1/29/14

<table>
<thead>
<tr>
<th>Number of unit squares</th>
<th>Number of rectangles I made:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Width | Length
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------
------|--------

1. Cut out the unit squares above. Then, use them to make rectangles for each given number of unit squares. Complete the charts to show how many rectangles you can make for each given number of unit squares. You might not use all the spaces in each chart.
2. Create a line plot with the data you collected in Problem 1.

Number of Rectangles Made With Unit Squares

<table>
<thead>
<tr>
<th>Number of Unit Squares Used</th>
<th>Number of Rectangles Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>X = 1 Rectangle</td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

2. Create a line plot with the data you collected in Problem 1.

Number of Rectangles Made With Unit Squares

<table>
<thead>
<tr>
<th>Number of Unit Squares Used</th>
<th>Number of Rectangles Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>X = 1 Rectangle</td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

a. Luke looks at the line plot and says that all odd numbers of unit squares produce only 1 rectangle. Do you agree? Why or why not?

b. How many X’s would you plot for 4 unit squares? Explain how you know.
Lesson 20 Problem Set

1. Use your square unit tiles to build as many rectangles as you can with a perimeter of 12 units.
   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.

   b. Explain your strategy for finding rectangles with a perimeter of 12 units.

   c. Find the areas of all the rectangles in Part (a) above.

   d. The perimeters of all the rectangles are the same. What do you notice about their areas?
2. Use your square unit tiles to build as many rectangles as you can with a perimeter of 14 units.
   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.

b. Find the areas of all the rectangles in Part (a) above.

c. Given a rectangle’s perimeter, what other information do you need to know about the rectangle to find its area?
Name ____________________________ Date ____________

1. Use your square unit tiles to build as many rectangles as you can with a perimeter of 8 units.
   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.

   b. Find the areas of the rectangles in Part (a) above.
Lesson 20: Construct rectangles with a given perimeter using unit squares and determine their areas.

Date: 1/29/14

1. Cut out the unit squares above. Then, use them to make as many rectangles as you can with a perimeter of 10 centimeters.
   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.
   b. Find the areas of the rectangles in Part (a) above.
2. Gino uses unit square tiles to make rectangles with a perimeter of 14 units. He draws his rectangles as shown below. Using square unit tiles, can Gino make another rectangle that has a perimeter of 14 units? Explain your answer.

![Rectangles](image)

3. Katie draws a square that has a perimeter of 20 centimeters.
   a. Estimate to draw Katie’s square below. Label the length and width of the square.

![Square](image)

   b. Find the area of Katie’s square.

   c. Estimate to draw a different rectangle that has the same perimeter as Katie’s square.

   d. Which shape has a greater area, Katie’s square or your rectangle?
Use the data you gathered from Problem Sets 20 and 21 to complete the charts to show how many rectangles you can create with a given perimeter. You might not use all the spaces in the charts.

<table>
<thead>
<tr>
<th>Perimeter = 10 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>1 unit</td>
<td>4 units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 12 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 14 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 16 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 18 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 20 units</th>
<th>Number of rectangles you made: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
</tbody>
</table>
Lesson 21: Construct rectangles with a given perimeter using unite square and determine their areas.

Date: 1/29/14

1. On your centimeter grid paper, shade and label as many rectangles as you can with a perimeter of 16 centimeters.
   a. Sketch the rectangles below and label the side lengths.

   b. Find the area of each rectangle you drew above.

2. On your centimeter grid paper, shade and label as many rectangles as you can with a perimeter of 18 centimeters.
   a. Sketch the rectangles below and label the side lengths.

   b. Find the area of each rectangle you drew above.
3. Use centimeter grid paper to shade in as many rectangles as you can with the given perimeters.
   a. Use the charts below to show how many rectangles you shaded for each given perimeter. You might not use all the spaces in the charts.

<table>
<thead>
<tr>
<th>Perimeter = 10 cm</th>
<th>Number of rectangles I made: ____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>1 cm</td>
<td>4 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 20 cm</th>
<th>Number of rectangles I made: ____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>1 cm</td>
<td>9 cm</td>
</tr>
</tbody>
</table>

b. Did you make a square with either of the given perimeters? How do you know?

4. Macy and Gavin both draw rectangles with perimeters of 16 centimeters. Use words and pictures to explain how it is possible for Macy’s and Gavin’s rectangles to have the same perimeters, but different areas.
Name ________________________________ Date ________________

On the grid below, shade and label at least two different rectangles with a perimeter of 20 centimeters.
1. Margo finds as many rectangles as she can with a perimeter of 14 centimeters.
   a. Shade Margo’s rectangles on the grid below. Label the length and width of each rectangle.
   b. Find the areas of the rectangles in Part (a) above.
   c. The perimeters of the rectangles are the same. What do you notice about the areas?
2. Tanner uses unit squares to build rectangles that have a perimeter of 18 units. He creates the chart below to record his findings.
   a. Complete Tanner’s chart. You might not use all the spaces in the chart.

<table>
<thead>
<tr>
<th>Perimeter = 18 units</th>
<th>Number of rectangles I made = _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>1 unit</td>
<td>8 units</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. Explain how you found the widths and lengths in the chart above.

3. Jason and Dina both draw rectangles with perimeters of 12 centimeters, but their rectangles have different areas. Explain with words, pictures, and numbers how this is possible.
Lesson 21: Construct rectangles with a given perimeter using unit squares and determine their areas.

Date: 1/29/14
Name ___________________________  Date ________________

Use the data you gathered from Problem Sets 20 and 21 to complete the charts to show how many rectangles you can create with a given perimeter. You might not use all the spaces in the charts.

<table>
<thead>
<tr>
<th>Perimeter = 10 units</th>
<th>Perimeter = 12 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rectangles you made: _____</td>
<td>Number of rectangles you made: _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit</td>
<td>4 units</td>
<td>4 square units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 14 units</th>
<th>Perimeter = 16 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rectangles you made: _____</td>
<td>Number of rectangles you made: _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Area</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Perimeter = 18 units</th>
<th>Perimeter = 20 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rectangles you made: _____</td>
<td>Number of rectangles you made: _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Area</th>
</tr>
</thead>
</table>
1. Use the data you gathered from your Problem Sets to create a line plot for the number of rectangles you created with each given perimeter.

**Number of Rectangles Made with a Given Perimeter**

---

2. Why are all of the perimeter measurements even? Do all rectangles have an even perimeter?
3. Compare the two line plots we created. Is there any reason to think that knowing only the area of a rectangle would help you to figure out its perimeter, or knowing only the perimeter of a rectangle would help you figure out its area?

4. Sumi uses unit square tiles to build 3 rectangles that have an area of 32 square units. Does knowing this help her find the number of rectangles she can build for a perimeter of 32 units? Why or why not?

5. George draws 3 rectangles that have a perimeter of 14 centimeters. Alicia tells George that there are more than 3 rectangles that have a perimeter of 14 centimeters. Explain why Alicia is correct.
Lesson 22 Exit Ticket

Suppose you have a rectangle with a perimeter of 2 cm. What can you conclude about the side lengths? Can all 4 sides of the rectangle measure a whole number of centimeters?
1. The following line plot shows the number of rectangles a student made using square unit tiles. Use the line plot to answer the questions below.

<table>
<thead>
<tr>
<th>Perimeter Measurements</th>
<th>X = 1 Rectangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

a. Why are all of the perimeter measurements even? Do all rectangles have even perimeters?

b. Explain the pattern in the line plot. What types of side lengths make this pattern possible?

c. How many X’s would you draw for a perimeter of 32? Explain your answer.
2. Luis uses unit square tiles to build a rectangle with a perimeter of 24 inches. Does knowing this help him find the number of rectangles he can build with an area of 24 square inches? Why or why not?

3. Esperanza makes a rectangle with a piece of string. She says the perimeter of her rectangle is 33 centimeters. Explain how it’s possible for her rectangle to have an odd perimeter.
Lesson 22: Use a line plot to record the number of rectangles constructed in Lessons 20 and 21.

Date: 1/29/14

Rectangle A

Rectangle B

Rectangle C

Rectangle D
Use a line plot to record the number of rectangles constructed in Lessons 20 and 21.

Date: 1/29/14

Number of Rectangles

Perimeter Measurements

X = 1 Rectangle
Name ____________________________ Date ______________

1. Gale makes a miniature stop sign, a regular octagon, with a perimeter of 48 centimeters for the town he built with blocks. What is the length of each side of the stop sign?

2. Travis bends wire to make rectangles. Each rectangle measures 34 inches by 12 inches. What is the total length of the wire needed for two rectangles?

3. The perimeter of a rectangular bathroom is 32 feet. The width of the room is 8 feet. What is the length of the room?
4. Raj uses 6-inch square tiles to make a rectangle, as shown below. What is the perimeter of the rectangle in inches?

5. Mischa makes a 4 foot by 6 foot rectangular banner. She puts ribbon around the outside edges. The ribbon costs $2 per foot. What is the total cost of the ribbon?

6. Colton buys a roll of wire fencing that is 120 yards long. He uses it to fence in his 18 yard by 24 yard rectangular garden. Will Colton have enough wire fencing left over to fence in a 6 yard by 8 yard rectangular play space for his pet rabbit?
Adriana traces a regular triangle to create the shape below. The perimeter of her shape is 72 centimeters. What are the side lengths of the triangle?
1. Rosie draws a square with a perimeter of 36 inches. What are the side lengths of the square?

2. Judith uses craft sticks to make two 24-inch by 12-inch rectangles. What is the total perimeter of the two rectangles?

3. An architect draws a square and a rectangle as shown below to represent a house that has a garage. What is the total perimeter of the house with its attached garage?
4. Manny draws three regular pentagons to create the shape shown below. The perimeter of one of the pentagons is 45 inches. What is the perimeter of Manny’s new shape?

![Pentagons](image)

5. Johnny uses 2-inch square tiles to make a square, as shown below. What is the perimeter of Johnny’s square?

![Square](image)

6. Lisa tapes three 7-inch by 9-inch pieces of construction paper together to make a happy birthday sign for her mom. She uses a piece of ribbon that is 144 inches long to make a border around the outside edges of the sign. How much ribbon is left over?

![Construction paper](image)
Use the given perimeters in the chart below to choose the widths and lengths of your robot’s rectangular body parts. Write the widths and lengths in the chart below. Use the blank rows if you want to add extra rectangular body parts to your robot.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Body Part</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>arm</td>
<td>14 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>B</td>
<td>arm</td>
<td>14 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>C</td>
<td>leg</td>
<td>18 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>D</td>
<td>leg</td>
<td>18 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>E</td>
<td>body</td>
<td>Double the perimeter of one arm = _______ cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>F</td>
<td>head</td>
<td>16 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>G</td>
<td>neck</td>
<td>Half the perimeter of the head = _______ cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td>__________ cm by __________ cm</td>
</tr>
</tbody>
</table>

My robot has 7 to 9 rectangular body parts. Number of body parts: ________
Use the information in the chart below to plan an environment for your robot. Write the width and length for each rectangular item. Use the blank rows if you want to add extra circular or rectangular items to your robot’s environment.

<table>
<thead>
<tr>
<th>Letter</th>
<th>Item</th>
<th>Shape</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>sun</td>
<td>circle</td>
<td>about 25 cm</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>house</td>
<td>rectangle</td>
<td>82 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>L</td>
<td>tree top</td>
<td>circle</td>
<td>about 30 cm</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>tree trunk</td>
<td>rectangle</td>
<td>30 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>N</td>
<td>tree top</td>
<td>circle</td>
<td>about 20 cm</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>tree trunk</td>
<td>rectangle</td>
<td>20 cm</td>
<td>__________ cm by __________ cm</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

My robot’s environment has 6 to 8 items. Number of items: ____
Lesson 24 Exit Ticket

Name ____________________________________________ Date _____________________

Estimate to draw three different rectangles with a perimeter of 16 centimeters. Label the width and length of each rectangle.
Lesson 24 Homework

Name ___________________________ Date ________________

1. Brian draws a square with a perimeter of 24 inches. What is the width and length of the square?

2. A rectangle has a perimeter of 18 centimeters.
   a. Estimate to draw as many different rectangles as you can that have a perimeter of 18 centimeters. Label the width and length of each rectangle.
   b. How many different rectangles did you find?
   c. Explain the strategy you used to find the rectangles.
3. The chart below shows the perimeters of three rectangles.
   a. Write possible widths and lengths for each given perimeter.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 cm</td>
<td>_______ cm by _______ cm</td>
</tr>
<tr>
<td>B</td>
<td>10 cm</td>
<td>_______ cm by _______ cm</td>
</tr>
<tr>
<td>C</td>
<td>14 cm</td>
<td>_______ cm by _______ cm</td>
</tr>
</tbody>
</table>

   b. Double the perimeters of the rectangles in Part (a). Then find possible widths and lengths.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12 cm</td>
<td>_______ cm by _______ cm</td>
</tr>
<tr>
<td>B</td>
<td>_______ cm</td>
<td>_______ cm by _______ cm</td>
</tr>
<tr>
<td>C</td>
<td>_______ cm</td>
<td>_______ cm by _______ cm</td>
</tr>
</tbody>
</table>
Lesson 25: Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.

Date: 1/29/14

Draw a picture of your robot in its environment in the space below. Label the widths, lengths, and perimeters of all rectangles. Label the perimeters of all circular shapes.
Name ___________________________ Date _________________

1. Sketch rectangles with the following perimeters. Label the side lengths.
   
   a. 22 cm
   
   b. 30 cm

2. Explain the steps you took to create the rectangles with the given perimeters.
Lesson 25 Homework

Name ____________________________ Date ____________________

1. The robot below is made of rectangles. The side lengths of each rectangle are labeled. Find the perimeter of each rectangle and record it in the table on the next page.

```
<table>
<thead>
<tr>
<th>Rectangles</th>
<th>Side Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4 cm</td>
</tr>
<tr>
<td>B</td>
<td>2 cm, 2 cm</td>
</tr>
<tr>
<td>C</td>
<td>8 cm, 6 cm, 2 cm</td>
</tr>
<tr>
<td>D</td>
<td>5 cm, 2 cm</td>
</tr>
<tr>
<td>E</td>
<td>5 cm, 2 cm, 2 cm</td>
</tr>
<tr>
<td>F</td>
<td>7 cm, 2 cm</td>
</tr>
<tr>
<td>G</td>
<td>7 cm, 2 cm, 2 cm</td>
</tr>
</tbody>
</table>
```

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Lesson 25 Homework

Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.

Date: 1/29/14

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
</tr>
</thead>
</table>
| A         | P = 4 \times 4 \text{ cm}  
           | P = 16 \text{ cm}        |
| B         |                   |
| C         |                   |
| D         |                   |
| E         |                   |
| F         |                   |
| G         |                   |

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Lesson 25 Evaluation Rubric

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Perimeter calculations for all shapes are correct, and both evaluations of a classmate's project have been completed.</td>
<td>Perimeter calculations include 1 to 2 errors, and both evaluations of a classmate's project have been completed.</td>
<td>Perimeter calculations include 3 to 4 errors, and at least 1 evaluation of a classmate's project has been completed.</td>
<td>Perimeter calculations include 5 or more errors, and at least 1 evaluation of a classmate's project has been completed.</td>
<td>____/4</td>
</tr>
</tbody>
</table>

Name ___________________________ Date ___________________________

Evaluation Rubric

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Perimeter calculations for all shapes are correct, and both evaluations of a classmate's project have been completed.</td>
<td>Perimeter calculations include 1 to 2 errors, and both evaluations of a classmate's project have been completed.</td>
<td>Perimeter calculations include 3 to 4 errors, and at least 1 evaluation of a classmate's project has been completed.</td>
<td>Perimeter calculations include 5 or more errors, and at least 1 evaluation of a classmate's project has been completed.</td>
<td>____/4</td>
</tr>
</tbody>
</table>

Name ___________________________ Date ___________________________
Lesson 26 Problem Set

Name _____________________________ Date ____________________

1. Collect the area measurements of your classmates’ robot bodies. Make a line plot using everyone’s area measurements.

Areas of Robot Bodies

<table>
<thead>
<tr>
<th>Area Measurements of the Robot’s Body in Square Centimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>X = 1 Robot Body</td>
</tr>
</tbody>
</table>

a. How many different measurements are on the line plot? Why are the measurements different?

b. What does this tell you about the relationship between area and perimeter?
2. Measure and calculate the perimeter of your construction paper in inches. Show your work below.

3. Sketch and label two shapes with the same perimeter from the robot’s environment. What do you notice about the way they look?

4. Write two or three sentences describing your robot and the environment in which it lives.
Lesson 26 Exit Ticket

Name ________________________________ Date __________________

1. Use string to help you sketch a circle with a perimeter of about 15 centimeters.

2. Estimate to draw a rectangle with a perimeter of 15 centimeters. Label the width and length.
1. Use Rectangles A and B to answer the questions below.

   ![Rectangle A](4 cm x 4 cm)
   ![Rectangle B](5 cm x 3 cm)

   a. What is the perimeter of Rectangle A?

   b. What is the perimeter of Rectangle B?

   c. What is the area of Rectangle A?

   d. What is the area of Rectangle B?

   e. Use your answers to Parts (a) through (d) to help you explain the relationship between area and perimeter.
Lesson 26 Homework

2. Each student in Mrs. Dutra’s class draws a rectangle with whole number side lengths and a perimeter of 28 centimeters. Then they find the area of each rectangle and create the table below.

<table>
<thead>
<tr>
<th>Area in Square Centimeters</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>45</td>
<td>4</td>
</tr>
<tr>
<td>48</td>
<td>2</td>
</tr>
<tr>
<td>49</td>
<td>2</td>
</tr>
</tbody>
</table>

a. Give two examples to show how it is possible to have different areas for rectangles that have the same perimeter.

b. Did any students in Mrs. Dutra’s class draw a square? Explain how you know.

c. What are the side lengths of the rectangle that most students in Mrs. Dutra’s class made with a perimeter of 28 centimeters?
Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.
Lesson 27 Problem Set

Name _______________________________ Date ________________________

Part A: I reviewed _______________’s robot.

1. Use the chart below to evaluate your friend’s robot. Measure the lengths and widths of each rectangle. Then calculate the perimeter. Record that information in the table below. If your measurements differ from those listed on the project, put a star by the letter of the rectangle.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Width and Length</th>
<th>Student’s Perimeter</th>
<th>Required Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>__________ cm by __________ cm</td>
<td>14 cm</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>__________ cm by __________ cm</td>
<td>14 cm</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>__________ cm by __________ cm</td>
<td>18 cm</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>__________ cm by __________ cm</td>
<td>18 cm</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>__________ cm by __________ cm</td>
<td>28 cm</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>__________ cm by __________ cm</td>
<td>16 cm</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>__________ cm by __________ cm</td>
<td>8 cm</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Is the perimeter of the robot’s body double that of the arm? Show calculations below.

3. Is the perimeter of the robot’s neck half the perimeter of the head? Show calculations below.
Part B: I reviewed ______________ ‘s robot environment.

Use the chart below to evaluate your friend’s robot environment. Measure the lengths and widths of each rectangle. Then calculate the perimeter. Use your string to measure the perimeters of non-rectangular items. Record that information in the table below. If your measurements differ from those listed on the project, put a star by the letter of the shape.

<table>
<thead>
<tr>
<th>Item</th>
<th>Width and Length</th>
<th>Student’s Perimeter</th>
<th>Required Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td></td>
<td></td>
<td>About 25 cm</td>
</tr>
<tr>
<td>K</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td>82 cm</td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td>About 30 cm</td>
</tr>
<tr>
<td>M</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td>30 cm</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td>About 20 cm</td>
</tr>
<tr>
<td>O</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td>20 cm</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Name ___________________________________________ Date ______________________

1. a. Record the perimeters and areas of Rectangles A and B in the chart below.

   ![Rectangle A and B](5 cm x 5 cm and 2 cm x 8 cm)

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Width and Length</th>
<th>Perimeter</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>__________ cm by __________ cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. What is the same about Rectangles A and B? What is different?
Name _______________________________ Date ____________________

1. Record the perimeters and areas of the rectangles in the chart on the next page.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 cm x 6 cm</td>
<td>6 cm x 6 cm</td>
</tr>
<tr>
<td>B</td>
<td>8 cm x 4 cm</td>
<td>4 cm x 8 cm</td>
</tr>
<tr>
<td>C</td>
<td>11 cm x 1 cm</td>
<td>1 cm x 11 cm</td>
</tr>
<tr>
<td>D</td>
<td>5 cm x 5 cm</td>
<td>5 cm x 5 cm</td>
</tr>
<tr>
<td>E</td>
<td>8 cm x 2 cm</td>
<td>2 cm x 8 cm</td>
</tr>
<tr>
<td>F</td>
<td>6 cm x 4 cm</td>
<td>4 cm x 6 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perimeter</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 cm</td>
<td>36 sq cm</td>
</tr>
<tr>
<td>32 cm</td>
<td>32 sq cm</td>
</tr>
<tr>
<td>11 cm</td>
<td>11 sq cm</td>
</tr>
<tr>
<td>20 sq cm</td>
<td>25 sq cm</td>
</tr>
<tr>
<td>20 sq cm</td>
<td>20 sq cm</td>
</tr>
<tr>
<td>24 sq cm</td>
<td>24 sq cm</td>
</tr>
</tbody>
</table>
Lesson 27: Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.

Date: 1/29/14

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Width and Length</th>
<th>Perimeter</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>_______ cm by _______ cm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Find the area and perimeter of each rectangle.

b. What do you notice about the perimeters of Rectangles A, B, and C?

c. What do you notice about the perimeters of Rectangles D, E, and F?

d. Which two rectangles are squares? Which square has the greatest perimeter?
Lesson 27: Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.

Date: 1/29/14

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### Lesson 27 Evaluation Rubric

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter calculations for all shapes are correct, and both evaluations of a classmate’s project have been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 1 to 2 errors, and both evaluations of a classmate’s project have been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 3 to 4 errors, and at least 1 evaluation of a classmate’s project has been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 5 or more errors, and at least 1 evaluation of a classmate’s project has been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
</tbody>
</table>

Name ______________________ Date ______________________

### Lesson 27 Evaluation Rubric

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimeter calculations for all shapes are correct, and both evaluations of a classmate’s project have been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 1 to 2 errors, and both evaluations of a classmate’s project have been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 3 to 4 errors, and at least 1 evaluation of a classmate’s project has been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
<tr>
<td>Perimeter calculations include 5 or more errors, and at least 1 evaluation of a classmate’s project has been completed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____/4</td>
</tr>
</tbody>
</table>

Name ______________________ Date ______________________
Lesson 27: Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.

Date: 1/29/14

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Width and Length</th>
<th>Student’s Perimeter</th>
<th>Required Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 cm by 5 cm</td>
<td>2cm + 2cm + 5cm + 5cm = 14cm</td>
<td>14 cm</td>
</tr>
<tr>
<td>B</td>
<td>2 cm by 5 cm</td>
<td></td>
<td>14 cm</td>
</tr>
<tr>
<td>C</td>
<td>2 cm by 7 cm</td>
<td></td>
<td>18 cm</td>
</tr>
<tr>
<td>D</td>
<td>2 cm by 7 cm</td>
<td></td>
<td>18 cm</td>
</tr>
<tr>
<td>E</td>
<td>6 cm by 8 cm</td>
<td></td>
<td>28 cm</td>
</tr>
<tr>
<td>F</td>
<td>4 cm by 4 cm</td>
<td></td>
<td>16 cm</td>
</tr>
<tr>
<td>G</td>
<td>2 cm by 2 cm</td>
<td></td>
<td>8 cm</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 28 Problem Set

1. Gia measures her rectangular garden and finds the width is 9 yards and the length is 7 yards.
   a. Estimate to draw Gia’s garden, and label the side lengths.
   b. What is the area of Gia’s garden?
   c. What is the perimeter of Gia’s garden?

2. Elijah draws a square that has side lengths of 8 centimeters.
   a. Estimate to draw Elijah’s square, and label the side lengths.
   b. What is the area of Elijah’s square?
   c. What is the perimeter of Elijah’s square?
d. Elijah connects three of these squares to make one long rectangle. What is the perimeter of this rectangle?

3. The area of Mason’s rectangular painting is 72 square inches. The width of the painting is 8 inches.
   a. Estimate to draw Mason’s painting, and label the side lengths.
   b. What is the length of the painting?
   c. What is the perimeter of Mason’s painting?
   d. Mason’s mom hangs the painting on a wall that already has two of Mason’s other paintings. The areas of the other paintings are 64 square inches and 81 square inches. What is the total area of the wall that is covered with Mason’s paintings?
Lesson 28: Solve a variety of word problems involving area and perimeter using all four operations.

4. The perimeter of Jillian’s rectangular bedroom is 34 feet. The length of her bedroom is 9 feet.
   a. Estimate to draw Jillian’s bedroom, and label the side lengths.
   b. What is the width of Jillian’s bedroom?
   c. What is the area of Jillian’s bedroom?
   d. Jillian has a 4-foot by 6-foot rug in her room. What is the area of the floor that is not covered by the rug?
Jennifer measures her rectangular sandbox and finds the width is 8 feet and the length is 6 feet.

a. Estimate to draw Jennifer’s sandbox, and label the side lengths.

b. What is the area of Jennifer’s sandbox?

c. What is the perimeter of Jennifer’s sandbox?
1. Carl draws a square that has side lengths of 7 centimeters.
   a. Estimate to draw Carl’s square, and label the side lengths.

   b. What is the area of Carl’s square?

   c. What is the perimeter of Carl’s square?

   d. Carl draws two of these squares to make one long rectangle. What is the perimeter of this rectangle?
2. Mr. Briggs puts food for the class party on a rectangular table. The table has a perimeter of 18 feet and a width of 3 feet.
   a. Estimate to draw the table, and label the side lengths.

   b. What is the length of the table?

   c. What is the area of the table?

   d. Mr. Briggs puts three of these tables together side by side. What is the area?
1. Kyle puts two rectangles together to make the L-shaped figure below. He measures some of the side lengths and records them as shown.

   12 in
   8 in
   6 in
   16 in

   a. Find the perimeter of Kyle’s shape.

   b. Find the area of Kyle’s shape.

   c. Kyle makes two copies of the L-shaped figure to create the rectangle shown below. Find the perimeter of the rectangle.

   12 in
   16 in
2. Jeremiah and Hayley use a piece of rope to mark a square space for their booth at the science fair. The area of their space is 49 square feet. What is the length of the rope that Jeremiah and Hayley use, if they leave a 3-foot opening so they can get in and out of the space?

3. Vivienne draws four identical rectangles as shown below to make a new, larger rectangle. The perimeter of one of the small rectangles is 18 centimeters and the width is 6 centimeters. What is the perimeter of the new, larger rectangle?

4. A jogging path around the outside edges of a rectangular playground measures 48 yards by 52 yards. Maya runs \(3 \frac{1}{2}\) laps on the jogging path. What is the total number of yards Maya runs?
Name _________________________________  Date __________________

Jeannette draws four identical squares as shown below to make a new, larger square. The length of one of the small square sides is 8 centimeters. What is the perimeter of the new, larger square?
1. Katherine puts two squares together to make the rectangle below. The side lengths of the squares measure 8 inches.

   a. What is the perimeter of Katherine’s rectangle?

   b. What is the area of Katherine’s rectangle?

   c. Katherine decides to draw another rectangle of the same size. What is the area of the new rectangle?
2. Daryl draws 6 equal size rectangles as shown below to make a new, larger rectangle. The area of one of the small rectangles is 12 square centimeters, and the length of the small rectangle is 4 centimeters.

![Diagram of 6 equal size rectangles]

a. What is the perimeter of Daryl’s new rectangle?

b. What is the area of Daryl’s new rectangle?

3. The recreation center soccer field measures 35 yards by 65 yards. Chris dribbles the soccer ball around the perimeter of the field 4 times. What is the total number of yards Chris dribbles the ball?
Use this form to critique your classmate’s problem-solving work.

<table>
<thead>
<tr>
<th>Classmate:</th>
<th>Problem number:</th>
</tr>
</thead>
</table>

Strategies my classmate used:

Things my classmate did well:

Suggestions for improvement:

Strategies I would like to try based on my classmate’s work:
Jayden solves the problem as shown below.

1. The recreation center soccer field measures 35 yards by 65 yards. Chris dribbles the soccer ball around the field 4 times. What is the total number of yards Chris dribbles the ball?

\[
\begin{align*}
P &= 35\text{yd} + 65\text{yd} + 35\text{yd} + 65\text{yd} \\
P &= 100\text{yd} + 100\text{yd} \\
P &= 200\text{yd}
\end{align*}
\]

\[
y = 200 + 200 + 200 + 200
\]

\[
y = 800
\]

Chris dribbles the ball a total of 800 yards.

a. What strategies did Jayden use to solve this problem?

b. What did Jayden do well?
Lesson 30 Homework

Name ___________________________________________ Date ______________________

Use this form to critique Student A’s problem solving work on the next page.

<table>
<thead>
<tr>
<th>Student:</th>
<th>Student A</th>
<th>Problem number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategies Student A used:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Things Student A did well:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggestions for improvement:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies I would like to try based on Student A’s work:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Lesson 30:** Share and critique peer strategies for problem solving.

**Date:** 1/29/14

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Lesson 30 Student A Work

Name ___________________  Date __________________

1. Katherine puts 2 squares together to make the rectangle below. The side lengths of the squares measure 8 inches.

   ![Diagram of a rectangle made by two squares]

   a. What is the perimeter of Katherine’s rectangle?  
   b. What is the area of Katherine’s rectangle?

   - a. Calculation:
     \[ p = 6 \times 8 \text{ in} \]
     \[ p = 48 \text{ in} \]
     The perimeter is 48 in.
   
   - b. Calculation:
     \[ A = (8 \times 10) + (8 \times 6) \]
     \[ A = 80 + 48 \]
     \[ A = 128 \text{ sq in} \]
     The area is 128 sq in.

   c. Katherine decides to draw another rectangle of the same size. What is the area of the new rectangle?

   ![Diagram of a new rectangle]

   - Calculation:
     \[ A_{\text{new}} = 128 \text{ sq in} + 128 \text{ sq in} \]
     \[ A_{\text{new}} = 256 \text{ sq in} \]
     The area of the new rectangle is 256 sq in.

Student A
- Area = 49 sq ft
- Perimeter (P) = 7 ft + 7 ft + 7 ft + 7 ft
- P = 4 x 7 ft
- P = 28 ft

Student B
- Area = 49 sq ft
- Perimeter (P) = 7 ft + 7 ft + 7 ft + 4 ft
- P = 3 sevens + 4 ft
- P = 21 ft + 4 ft
- P = 25 ft

Student C
- Area = 49 sq ft
- Possible rectangles:
  - 49 ft²
  - 7 ft x 7 ft
- Perimeter (P) = 4 x 7 ft
- P = 28 ft

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1. Three shapes are shown below.
   a. Circle the shape(s) with only one pair of parallel sides.
   b. Cross out the shape(s) with two pairs of parallel sides.

   c. Which of the three shapes are quadrilaterals? Explain how you know.
2. Use your ruler and right angle tool to draw the following shapes.
   a. Draw and name a shape with four right angles.
   b. Draw a four-sided shape with no right angles and no equal sides. Label the side lengths.
   c. Draw triangles to create a rhombus. Label the side lengths.
3. Mr. Cooper builds a fence to make a rectangular horse stall. The stall is 5 meters long and 7 meters wide. How many meters of fence does Mr. Cooper use? Draw a picture and write an equation to show your thinking.

4. Jamal wants to put wood trim around his rectangular bedroom and square closet. His bedroom is 10 feet wide and 8 feet long. His closet is 3 feet wide and 3 feet long.

   a. Wood trim is sold by the foot. How many feet of wood trim does Jamal need to go around his bedroom and closet? Show your work.

   b. How much more wood trim does Jamal need for his bedroom than his closet? Write and solve an equation. Use a letter to represent the unknown.
5. The figure below is composed of rectangles. Use the picture and the descriptions to find the perimeter of the shape. Show your work.

- Each side labeled with A is 6 inches.
- Each side labeled with B is 3 inches.
- Each side labeled with C is 8 inches.
6. Mrs. Gomez builds a fence around her backyard. Her plan shows the fence as a dotted line below.

Together, the garage and backyard make a rectangle. The fence goes only where there is a dotted line. How many feet of fence does Mrs. Gomez need to build? Show your work.
1. Katy and Jane construct a four-sided wall to surround their castle. The wall has a perimeter of 100 feet. One side measures 16 feet. A different side measures 16 feet. A third side measures 34 feet.

   a. Draw and label a diagram of the wall. Use a letter to represent the unknown side length.

   b. What is the unknown side length? Show your work, or explain how you know.

   c. Katy and Jane build a square fence around the castle’s pool. It has a perimeter of 36 feet. What is the area that the fence encloses? Use a letter to represent the unknown. Show your work.
2. Each shape has a missing side length labeled with a letter. The perimeter of the shape is labeled inside. Find the unknown side length for each shape.

- **Square**:
  - Sides: 6 cm, P: 24 cm
  - Missing side: \(a\) cm

- **Rectangle**:
  - Sides: 9 cm, P: 30 cm
  - Missing side: \(b\) cm

- **Parallelogram**:
  - Sides: 7 cm, P: 22 cm
  - Missing side: \(c\) cm

- **Square**:
  - Sides: 6 cm, P: 24 cm
  - Missing side: \(d\) cm

- **Parallelogram**:
  - Sides: 4 cm, P: 20 cm
  - Missing side: \(e\) cm

- **Isosceles Trapezoid**:
  - Sides: 2 cm, P: 22 cm
  - Missing side: \(c\) cm

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3. Suppose each square is 1 square centimeter.

a. Find the area and perimeter of each shape.

b. John says, “If two shapes have the same area, they must also have the same perimeter.” Is John correct? Use your answer from Part (a) above to explain why or why not.
4. Mr. Jackson’s class finds all possible perimeters for a rectangle composed of 36 centimeter tiles. The chart below shows how many students found each rectangle.

<table>
<thead>
<tr>
<th>Perimeter</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 cm</td>
<td>6</td>
</tr>
<tr>
<td>26 cm</td>
<td>9</td>
</tr>
<tr>
<td>30 cm</td>
<td>5</td>
</tr>
<tr>
<td>40 cm</td>
<td>7</td>
</tr>
<tr>
<td>74 cm</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Check the students’ work. Did they find all the possible perimeters? How do you know?

b. Use the chart. Estimate to construct a line plot of how many students found each perimeter.
5. The square to the right has an area of 16 square centimeters.
   a. What is the length of each side? Explain how you know.

   ![Square with area 16 sq cm]

   A = 16 sq cm

   b. Draw copies of the square to make a figure with a perimeter of 32 centimeters.

   c. Write a number sentence to show that your figure has the correct perimeter of 32 centimeters.
Use this form to analyze your classmate’s representations of one-half shaded.

<table>
<thead>
<tr>
<th>Square (letter)</th>
<th>Does this square show one-half shaded?</th>
<th>Explain why or why not.</th>
<th>Describe changes to make so the square shows one-half shaded.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Marty shades the square as shown below and says one-half of the big square is shaded. Do you agree? Why or why not?
1. Use the rectangle below to answer Problems 1(a) through 1(d).

   ![Rectangle Diagram]

   a. What is the area of the rectangle in square units?

   b. What is the area of half of the rectangle in square units?

   c. Shade in half of the rectangle above. Be creative with your shading!

   d. Explain how you know you shaded in half of the rectangle.
2. During math class, Arthur, Emily, and Gia draw a shape and then shade one-half of it. Analyze each student’s work. Tell if each student was correct or not, and explain your thinking.

<table>
<thead>
<tr>
<th>Student</th>
<th>Drawing</th>
<th>Your Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthur</td>
<td><img src="image" alt="Arthur's Drawing" /></td>
<td></td>
</tr>
<tr>
<td>Emily</td>
<td><img src="image" alt="Emily's Drawing" /></td>
<td></td>
</tr>
<tr>
<td>Gia</td>
<td><img src="image" alt="Gia's Drawing" /></td>
<td></td>
</tr>
</tbody>
</table>

3. Shade the grid below to show two different ways of shading half of each shape.
Lesson 31: Explore and create unconventional representations of one-half.

Date: 1/29/14
1. Look at the circles you shaded today. Glue a circle that is about one-half shaded in the space below.

   a. Explain the strategy you used to shade in one-half of your circle.

   b. Is your circle exactly one-half shaded? Explain your answer.

2. Julian shades 4 circles as shown below.

   a. Write the letters of the circles that are about one-half shaded.

   Circle A  Circle B  Circle C  Circle D
b. Choose one circle from your answer to Part (a) and explain how you know it’s about one-half shaded.

Circle _______

c. Choose one circle that you did not list in Part (a) and explain how it could be changed so that it is about one-half shaded.

Circle _______

3. Read the clues to help you shade the circle below.

- Divide the circle into 4 equal parts.
- Shade in 2 parts.
- Erase a small circle from each shaded part.
- Estimate to draw and shade 2 circles in the unshaded parts that are the same size as the circles you erased in Part (c).

4. Did you shade in one-half of the circle in Problem 3? How do you know?
1. Riddian shades a circle as shown below.

   a. Is Riddian’s shape about one-half shaded? How do you know?

   b. Estimate to shade about one-half of the circle in an unusual way.
Name ________________________________ Date ____________________

1. Estimate to finish shading the circles below so that each circle is about one-half shaded.

   a. 
   b. 
   c. 

2. Choose one of the circles in Problem 1, and explain how you know it’s about one-half shaded.

   Circle _____

3. Can you say the circles in Problem 1 are exactly one-half shaded? Why or why not?
Lesson 32 Homework

4. Marissa and Jake shade in circles as shown below.

Marissa’s Circle

Jake’s Circle

a. Whose circle is about one-half shaded? How do you know?

b. Explain how the circle that is not one-half shaded can be changed so that it is one-half shaded.

5. Estimate to shade about one-half of each circle below in an unusual way.
Explore and create unconventional representations of one-half.
List some games we played today in the chart below. Place a check mark in the box that shows how you felt about your level of fluency as you played each activity. Check off the last column if you would like to practice this activity over the summer.

<table>
<thead>
<tr>
<th>Activity</th>
<th>I still need some practice with my facts.</th>
<th>I am fluent.</th>
<th>I would like to put this in my summer activity book.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What fluency activity helped you the most in becoming fluent with your multiplication and division facts this year? Write three or four sentences to explain what made it so useful.
Teach a family member your favorite fluency game from class. Record information about the game you taught below.

Name of the game: ______________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Materials used: __________________________________________________________________
______________________________________________________________________________

Name of the person you taught to play: _____________________________________________

Describe what it was like to teach the game. Was it easy? Hard? Why? _________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Will you play the game together again? Why or why not? _____________________________
______________________________________________________________________________
______________________________________________________________________________

Was the game as fun to play at home as in class? Why or why not? _________________
______________________________________________________________________________
______________________________________________________________________________
Complete a math activity every day. To track your progress, color the box after you finish.

### Summer Math Review: Weeks 1–5

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong></td>
<td>Do jumping jacks as you count by twos from 2 to 20 and back.</td>
<td>Play a game from your Summer Practice booklet.</td>
<td>Use your tangram pieces to make a picture of your summer break.</td>
<td>Time how long it takes you to do a specific chore, like making the bed. See if you can do it faster the next day.</td>
<td>Complete a Sprint.</td>
</tr>
<tr>
<td><strong>Week 2</strong></td>
<td>Do squats as you count by threes from 3 to 30 and back.</td>
<td>Play a game from your Summer Practice booklet.</td>
<td>Collect data about your family’s or friends’ favorite type of music. Show it on a bar graph. What did you discover from your graph?</td>
<td>Read a recipe. What fractions does the recipe use?</td>
<td>Complete a Multiply By Pattern Sheet.</td>
</tr>
<tr>
<td><strong>Week 3</strong></td>
<td>Hop on one foot as you count by fours from 4 to 40 and back.</td>
<td>Create a multiplication and/or division math game. Then play the game with a partner.</td>
<td>Measure the widths of different leaves from the same tree to the nearest quarter inch. Then draw a line plot of your data. Do you notice a pattern?</td>
<td>Read the weight in grams of different food items in your kitchen. Round the weights to the nearest 10 or 100 grams.</td>
<td>Complete a Sprint.</td>
</tr>
<tr>
<td><strong>Week 4</strong></td>
<td>Bounce a ball as you count by 5 minutes to 1 hour, and then to the half hour and quarter hours.</td>
<td>Find, draw, and/or create different objects to show one-fourth.</td>
<td>Go on a shape scavenger hunt. Find as many quadrilaterals in your neighborhood or house as you can.</td>
<td>Find the sum and difference of 453 mL and 379 mL.</td>
<td>Complete a Multiply By Pattern Sheet.</td>
</tr>
<tr>
<td><strong>Week 5</strong></td>
<td>Do arm swings as you count by sixes from 6 to 60 and back.</td>
<td>Draw and label a floor plan of your house.</td>
<td>Measure the perimeter of the room where you sleep in inches. Then calculate the area.</td>
<td>Use a stopwatch to measure how fast you can run 50 meters. Do it 3 times. What was your fastest time?</td>
<td>Complete a Sprint.</td>
</tr>
</tbody>
</table>
Complete a math activity each day. Color the box for each day you do the suggested activity.

### Summer Math Review: Weeks 6–10

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Alternate counting with a friend or family member by sevens from 7 to 70 and back.</td>
<td>Play a game from your Summer Practice booklet.</td>
<td>Write a story problem for $7 \times 6$.</td>
<td>Solve $15 \times 4$. Draw a model to show your thinking.</td>
<td>Complete a Multiply By Pattern Sheet.</td>
</tr>
<tr>
<td>7</td>
<td>Jump forward and back as you count by eights from 8 to 80 and back.</td>
<td>Play a game from your Summer Practice booklet.</td>
<td>Use string to measure the perimeter of circular items in your house to the nearest quarter inch.</td>
<td>Build a 4 by 6 array with objects from your house. Write 2 multiplication and 2 division sentences for your array.</td>
<td>Complete a Sprint.</td>
</tr>
<tr>
<td>8</td>
<td>Do arm crosses as you count by nines from 9 to 90 and back. Teach someone the nines finger trick.</td>
<td>Create a multiplication and/or division math game. Then play the game with a partner.</td>
<td>Write a story problem for $72 \div 8$.</td>
<td>Measure or find the capacity in milliliters of different liquids in your kitchen. Round each to the nearest 10 or 100 milliliters.</td>
<td>Complete a Multiply By Pattern Sheet.</td>
</tr>
<tr>
<td>9</td>
<td>Jump rope as you count up by tens from 280 to 370 and back down.</td>
<td>Find, draw, and/or create different objects to show one-third.</td>
<td>Go on a shape scavenger hunt. Find as many triangles and hexagons in your neighborhood as you can.</td>
<td>Measure the weight of different produce you buy at the grocery store. What unit did you measure in? What are the lightest and heaviest objects you weighed?</td>
<td>Complete a Sprint.</td>
</tr>
<tr>
<td>10</td>
<td>Count by sixes starting at 48. Count as high as you can in one minute.</td>
<td>Draw and label a floor plan of your dream tree house.</td>
<td>Find the perimeter of a different room in your house. How much smaller or larger is it compared to the perimeter of the room where you sleep?</td>
<td>Show someone your strategy to solve $8 \times 16$.</td>
<td>Complete a Multiply By Pattern Sheet.</td>
</tr>
</tbody>
</table>
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