1. Teaching Objectives
   MMF Al.4.a
   Solve real-world problems involving formulas for perimeter, area, distance, and rate.
   CC 7.G.6
   Solve real-world and mathematical problems involving area, volume and surface area of two- and three- dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.

   Classroom Objective
   Solve real-world problems involving area and perimeter of quadrilaterals.

2. Instructional Activities
   • (First 50 minute period) As students enter class, have the following video playing on the projector: http://teachertube.com/viewVideo.php?video_id=157 (Mrs. Burk's Area and Perimeter Rap).
   • Distribute the Manipulative Math Area and Perimeter worksheet. Guide students to use colored tiles to define “1 unit” and then model each question with colored tiles on the overhead for a basic review of perimeter and area.
   • Distribute the Multiplying Polynomials Notes page. Students will use this page as a note taking guide during the PowerPoint.
   • As their exit question, students must answer the following question. “Is there anything about perimeter and area that confuses you? Give me a specific example. If not, give me a basic summary of the meanings of perimeter and area.”
   • (Begin second 50 minute period.) If needed, address any issues students noted on the previous day's exit question.
• Divide students into groups of 4. Give each student a Floor Plan worksheet, and give each group 2 copies of the Mathiston, MS Floor Plan, yarn and a ruler.

• Review the 5 page floor plan with the students. Guide students to discuss the possible meanings for the symbols used throughout the plans (doors, stairs, closets, electrical wiring, etc). Call special attention to the roof markings on page 3 (slope). Finally, discuss the meaning of square footage of a home. Lead students to discover the connection between $ft^2$ and square footage. Briefly discuss the difference between “total square footage” and “heated/cooled square footage.”

• Direct students to read the introduction of the Floor Plans worksheet and begin cooperatively answering the questions of the worksheet. Students should use the yarn and ruler to answer the last questions on the worksheet. Observe the groups’ progress and answer any questions during this time.

3. Materials and Resources

Manipulative Math Area and Perimeter worksheet
Overhead projector
Square Color Tiles
Multiplying Polynomials PowerPoint
Multiplying Polynomials Notes page
Floor Plan worksheet
Mathiston, MS Floor Plans
Yarn & ruler

4. Assessment

Rubric for Grading Exit Questions
Checklist for observation of cooperative learning

References


List of Drawings:
1. Cover Page
2. First Floor Plan & Schedules
3. Front & Back Elevations
4. Side Elevations
5. Electrical Plans

Maltison, Mississippi
Manipulative Math Perimeter and Area

Model each shape with colored tiles. Find the area and perimeter of each shape.

1.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

2.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

3.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

4.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

5.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

6.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

7.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]

8.)  \[ \text{area} = \underline{\text{_______}} \]
    \[ \text{perimeter} = \underline{\text{_______}} \]
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<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>A = 1, P = 4</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>A = 6, P = 10</td>
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<td>3.</td>
<td>A = 4, P = 10</td>
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<tr>
<td>4.</td>
<td>A = 13, P = 20</td>
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<tr>
<td>5.</td>
<td>A = 4, P = 10</td>
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<td>6.</td>
<td>A = 2, P = 6</td>
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<td>7.</td>
<td>A = 6, P = 14</td>
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<tr>
<td>8.</td>
<td>A = 9, P = 20</td>
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</table>
1) A rectangle has a length $x + 9$ and width $x - 1$. Find the area. $A = lw$

2) Find the area:

\[
\begin{array}{c}
3x + 5 \\
4x - 3
\end{array}
\]

3) Find the area:

\[
\begin{array}{c}
x - 1 \\
3x + 9
\end{array}
\]
4) Find the difference in the areas of the two rectangles. \( A = lw \)

\[
\begin{align*}
\text{Area 1: } 3x \\
\text{Area 2: } 4x^2 - 3x + 7 \\
\text{Difference: } 9x^2 + 7x - 12
\end{align*}
\]

5) Find the difference in the areas of the two rectangles. \( A = lw \)

\[
\begin{align*}
\text{Area 1: } 2x \\
\text{Area 2: } 2x^2 - 4x + y \\
\text{Difference: } 5x^2 + 9x - 2
\end{align*}
\]
Multiplying Polynomials – Word Problems Involving Area Notes Answer Key

1. \( A = x^2 + 8x - 9 \)
2. \( A = 12x^2 + 11x - 15 \)
3. \( A = 3x^2 + 6x - 9 \)
4. \( 27x^3 + 5x^2 - 24x - 28 \)
5. \( 10x^3 + 12x^2 + 8x + 3y \)
Multiplying Polynomials PowerPoint Slides

1) A rectangle has a length \( x + 9 \) and width \( x - 1 \). Find the area.

\[
A = l \times w
\]

\[
(x + 9)(x - 1) = x^2 - 8x + 9
\]

2) Find the area:

\[
(3x + 5)(4x - 3) = 12x^2 - 9x + 20x - 15
\]

3) Find the area:

\[
(x - 1)(3x + 9) = 3x^2 + 9x + 3x - 9
\]

Find the difference in the area of the two rectangles. \((A = l \times w)\)

Find the area of each rectangle first.

\[
3x(9x^2 + 7x - 12) = 27x^3 + 21x^2 - 36x
\]

\[
4(4x^2 - 3x + 7) = 16x^2 - 12x + 28
\]

\[
27x^3 + 21x^2 - 36x + (16x^2 + 12x + 28)
\]

\[
27x^3 + 5x^2 - 24x - 28
\]
5) Find the difference in the areas of the two rectangles. \( A = l \times w \) 

Area of red rectangle 
\[ 2x(5x^2 + 9x - 2) \]
\[ = 10x^3 + 18x^2 - 4x \]

Area of blue rectangle 
\[ 3(2x^2 - 4x + y) \]
\[ = 6x^2 - 12x + 3y \]

Find the area of each rectangle first.

\[ 10x^3 + 18x^2 - 4x \]
\[ + \quad (6x^2 - 12x + 3y) \]
\[ 10x^3 + 12x^2 + 8x - 3y \]
Exit Question

Directions: Read the following questions. Answer one (1) of the questions.

Is there anything about PERIMETER or AREA that confuses you? Give me a specific example (draw a picture).

If not, give me a basic summary of the meanings of perimeter and area. Draw a model to help explain your meanings.
Floor Plans Worksheet

The Mathiston, MS floor plans were created by Jones Home Designers in Starkville, MS. Starkville is in Oktibbeha county. This home was built in Mathiston, MS. Mathiston is in Webster county (which is a neighboring county to Oktibbeha county).

Use your ruler and the yarn provided to help you model answer the following questions.

1. What is the perimeter of the house?

2. If the family who lives in this house wants to fence in the yard 30 feet away from the house (on all sides of the house), how many feet of fencing materials will they need?

3. Suppose the family decides to build a fence around the house adding 20 extra feet of fencing along the front (front porch) and back sides of the house. How many feet of fencing materials will they need?

4. What is the heated/cooled square footage of the house?

5. Suppose the family living in this home decides to finish the bonus room in the attic (above the garage). How many square feet would this add to the heated/cooled square footage of the house?

6. What would the new square footage of the house be after the bonus room is finished?

7. Suppose the family wanted to add an additional 500 ft² to their house. As their contractor, what would you suggest they do? Lay out your plan using the yarn. Describe your plan below. Include dimensions of the room(s) you plan to add.
Rubric for Grading Exit Questions

<table>
<thead>
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<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>0</td>
<td>No Response</td>
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<tr>
<td>1</td>
<td>Student made an effort to complete the question 1 or 2 but did not answer the question thoroughly.</td>
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<tr>
<td>2</td>
<td>Student thoroughly answered question 1 or 2 but did not provide a supportive drawing.</td>
</tr>
<tr>
<td>3</td>
<td>Student thoroughly answered question 1 or 2 and provided a drawing to support his/her answer.</td>
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Checklist for Observation of Cooperative Learning Activity

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Student participates in group discussion and group work.</th>
<th>Student uses correct language when referring to perimeter/area.</th>
<th>Student exhibits (through work/verbal explanation) an understanding of how to calculate area of a quadrilateral.</th>
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