Classroom Procedure:

1. Display two rectangles, each the same size but partitioned using different-sized squares. Ask students what is the same or different about the figures.
2. Allow for responses and discussion. Ask students: What is the difference between a row and a column.
3. Allow for responses and discussion. Ask students if the two figures can be partitioned into smaller squares. How?
4. Allow for responses and discussion. Introduce Rectangle Partition to the class.
5. Distribute Rectangle Partition content pages. Read and review the information with the students. Save the final question for the lesson closing. Use the additional resources to enhance understanding.
6. Distribute Activity page. Read and review the instructions. Pair students. Distribute 4 sheets of paper using paper shapes similar to the rectangles shown on the activity page. Students will try to fold each page into a square. Unfold and then determine the number of columns, rows, and squares. They must draw an image using the given rectangles on the activity page.
7. Once completed, conduct a discussion with students. Students may display the folded pages to the class, share the number of columns, rows, and squares. Discuss the experience with the students. What have they learned?
8. Distribute Practice page. Check and review the students’ responses.
9. Distribute the Homework page. The next day, check and review the students’ responses.
10. In closing, ask students: What is the greatest number of squares a rectangle can be partitioned? Why? What is the least number of squares a rectangle can be partitioned? Why?
11. Allow for responses and discussion. Explain why the greatest number is infinite and the least number is two.

Approximate Grade Level: 2

Objectives: The students will be able to partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

State Educational Standards*
LB.MATH.CONTENT.2.G.A.2

Class Sessions (45 minutes):
1 or 2 class sessions.

Teaching Materials/Worksheets:
Rectangle Partition content pages (2), Activity page, Practice page, Homework page

Student Supplies:
4 sheets of paper similar to activity rectangles, handouts

Prepare Ahead of Time:
Sheets of paper for activity, pair students for activity. Copy handouts.

Options for Lesson: Students may work alone or in groups for the activity. Demonstrate the activity with a single sheet of paper to help students get started. Students fold the pages for the activity and draw the rows and columns on the folded pages. Distribute giant pages or sheets of paper to each pair of students to divide into squares, identifying the number of columns, rows, and squares. Students use straws, pieces of string, or toothpicks to create rows and columns to divide 3 dimensional objects’ surfaces such as books, desk tops, etc.

*Lessons are aligned to meet the education objectives and goals of most states. For more information on your state objectives, contact your local Board of Education or Department of Education in your state.
Teacher Notes

The lesson introduces students to the partitioning of rectangles into equal-sized squares is a necessary step in the understanding of area. Most students understand the concept of a space or the area of a rectangle or another shape, but this lesson helps students see that a rectangle can be partitioned into an equal number of squares. It also helps students recognize the difference between rows and columns.
Partitioning Rectangles

There are some candy bars that are shaped like a rectangle. As you know a rectangle is a four-sided figure with two equal lengths and two equal widths. It is a plane figure meaning it has only the two dimensions, length and width, and is made of straight lines. Other plane figures may be made with curves such as a circle.

The candy bar represents a rectangle. Many people like to share their candy bar with a friend. Some candy bars can be broken apart into small pieces - they are partitioned or divided into parts.

There are rows and columns of candy pieces. A row can be made by using a horizontal line - a line drawn across a shape. A column can be made using a vertical line - a line that is drawn up and down a shape. The chart to the right shows some 3 columns and 4 rows.

Rectangles can also be partitioned or divided into squares by correctly using rows and columns. Remember, a square has four equal sides. Even though a rectangle does not have four equal sides, it can be divided into squares by drawing vertical and horizontal lines while creating rows and columns.

Review the rectangle to the left, which is about the same size as the candy bar. However, it is now divided or partitioned into 8 equal squares. Each square has the same length and width. There are 2 rows and 4 columns.
When you divide a rectangle using columns and rows, you can easily count the total number of squares. You can count the number in each row and add them together or count the number in each column and add them together. The total number will be equal.

The rectangle to the right has been divided into 3 rows and 7 columns. In each column, there are 3 squares: $3 + 3 + 3 + 3 + 3 + 3 + 3 = 21$. There are 21 total squares. You can count the squares in each row too: $7 + 7 + 7 = 21$. Again, 21 total squares.

Using columns and rows will help you partition or divide rectangles into the same-size squares.
Instructions

1. Work with your partner.
2. Use the 4 sheets of paper provided by your teacher.
3. Fold each sheet of rectangular sheets of paper in different ways to create rows and columns.
4. Try to make the squares equal in size.
5. Draw the rows and columns using the images of the rectangles below.
6. Tell how many columns, rows, and squares there are in each rectangle.

A. Number of columns: _____
   Number of rows: _____
   Total number of squares: _____

B. Number of columns: _____
   Number of rows: _____
   Total number of squares: _____

C. Number of columns: _____
   Number of rows: _____
   Total number of squares: _____

D. Number of columns: _____
   Number of rows: _____
   Total number of squares: _____
Use the word bank to fill in the blanks.

<table>
<thead>
<tr>
<th>divide</th>
<th>up and down</th>
<th>row</th>
<th>across</th>
<th>column</th>
</tr>
</thead>
</table>

1. When you draw a horizontal line, you draw it ____________ a sheet of paper.
2. The word partition has the same meaning as the word ____________.
3. A ____________ can be made up of a group of objects that are placed next to each other on a book shelf.
4. When you draw a vertical line, you draw it ____________ on a sheet of paper.
5. A ____________ can be created by stacking a group of objects on top of each other.

Tell how many rows and columns are in each rectangle.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</tbody>
</table>

Rows _____  Rows _____  Rows _____
Columns _____  Columns _____  Columns _____

Divide the rectangles into squares using the given number of columns and rows.

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
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</tbody>
</table>

A. 3 rows and 5 columns  B. 4 rows and 8 columns  C. 6 rows and 3 columns
D. 2 rows and 4 columns  E. 5 rows and 5 columns  F. 2 rows and 2 columns

Number of squares: A_____ B_____ C_____ D_____ E_____ F_____
Use the three rectangles and create a different number of squares using different numbers of columns and rows for each rectangle. Tell the number of squares for each rectangle.

1.

Total Number of Squares: ______________________

2.

Total Number of Squares: ______________________

3.

Total Number of Squares: ______________________
Use the word bank to fill in the blanks.

<table>
<thead>
<tr>
<th>divide</th>
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<th>row</th>
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</tr>
</thead>
</table>

1. When you draw a horizontal line, you draw it across a sheet of paper.
2. The word partition has the same meaning as the word divide.
3. A row can be made up of a group of objects that are placed next to each other on a bookshelf.
4. When you draw a vertical line, you draw it up and down on a sheet of paper.
5. A column can be created by stacking a group of objects on top of each other.

Tell how many rows and columns are in each rectangle.

<table>
<thead>
<tr>
<th>Rows 3</th>
<th>Rows 4</th>
<th>Rows 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columns 5</td>
<td>Columns 16</td>
<td>Columns 4</td>
</tr>
</tbody>
</table>

Divide the rectangles into squares using the given number of columns and rows.

<table>
<thead>
<tr>
<th>A. 3 rows and 5 columns</th>
<th>B. 4 rows and 8 columns</th>
<th>C. 6 rows and 3 columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. 2 rows and 4 columns</td>
<td>E. 5 rows and 5 columns</td>
<td>F. 2 rows and 2 columns</td>
</tr>
</tbody>
</table>

Number of squares: A 15  B 32  C 18  D 8  E 25  F 4
Use the three rectangles and create a different number of squares using different numbers of columns and rows for each rectangle. Tell the number of squares for each rectangle.

(Responses will vary)

1. 

Total Number of Squares: ______________________

2. 

Total Number of Squares: ______________________

3. 

Total Number of Squares: ______________________