

Sharing Cell Walls Investigation

Let's explore how shared cell walls affect the amount of wax a bee would need to build its honeycomb.

- 1) Outline the first cell using a colored marker.
- 2) Count the number of walls a bee would have to build. Place that number inside the cell.
- 3) Using a different colored marker, outline the next cell in the row. Count the number of walls the bee would have to make for this cell, and put that number inside the cell.
- 4) Continue outlining cell walls in different colors until the first row is complete. Outline partial shapes as well; if part of the cell is cut off, you should count those walls in the total.
- 5) Count the number of cell walls that a bee would need to make to complete the first row. Record the total at the end of the row in the designated space.
- 6) Continue outlining and counting cell walls in each row until the entire honeycomb is completely outlined. Add up the numbers from each row to find the grand total number of cell walls.

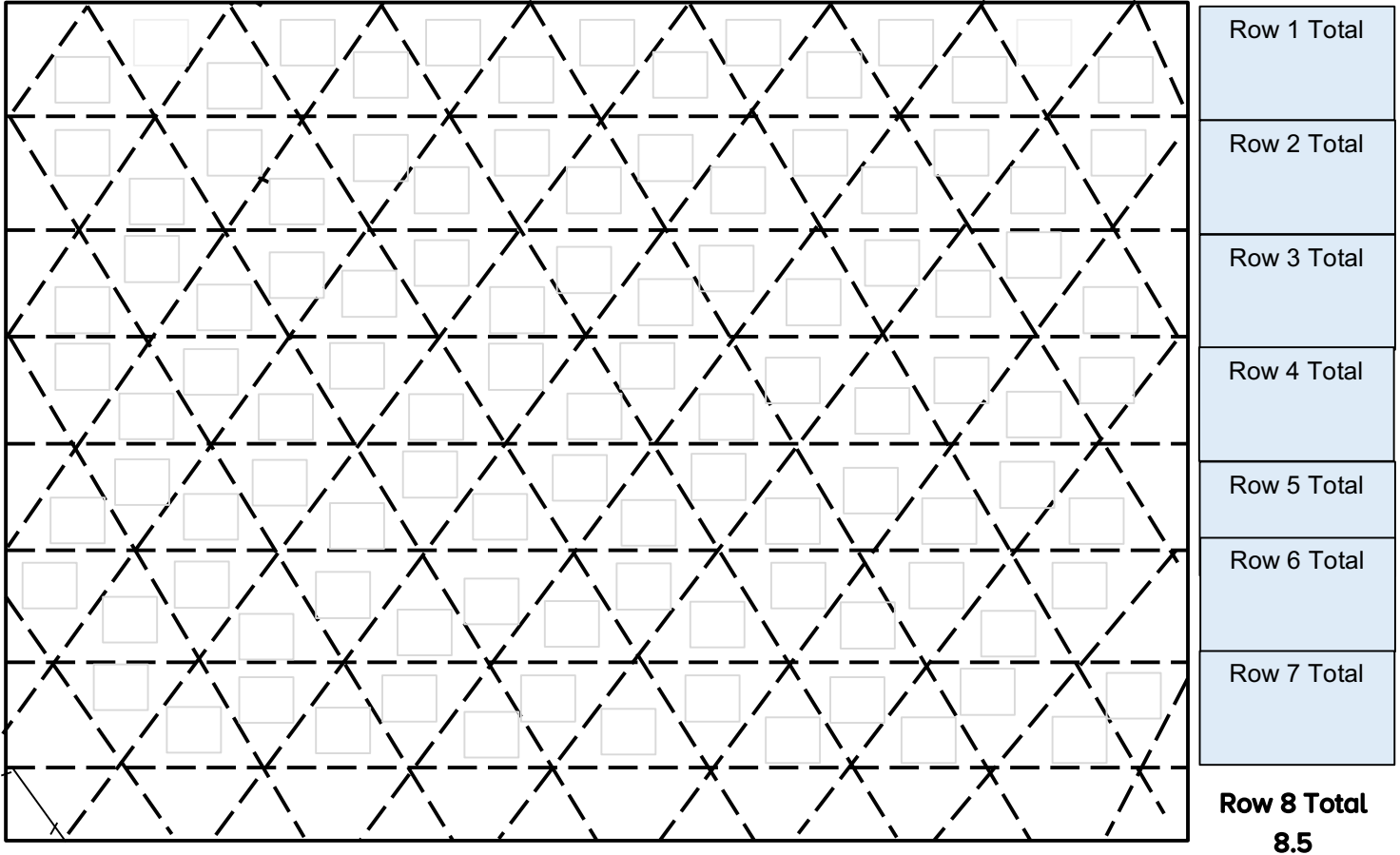
Note: All honeycombs on this worksheet cover the same area (15 in²), and each cell wall is approximately $\frac{3}{4}$ of an inch in length.

Honeycomb With Square-Shaped Cells

<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 1 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 2 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 3 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 4 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 5 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 6 Total
<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	<u> </u> # of wax walls	Row 7 Total

Add up the row totals. The total number of wax walls a bee would have to make to complete this honeycomb is _____.

Honeycomb With Triangle-Shaped Cells

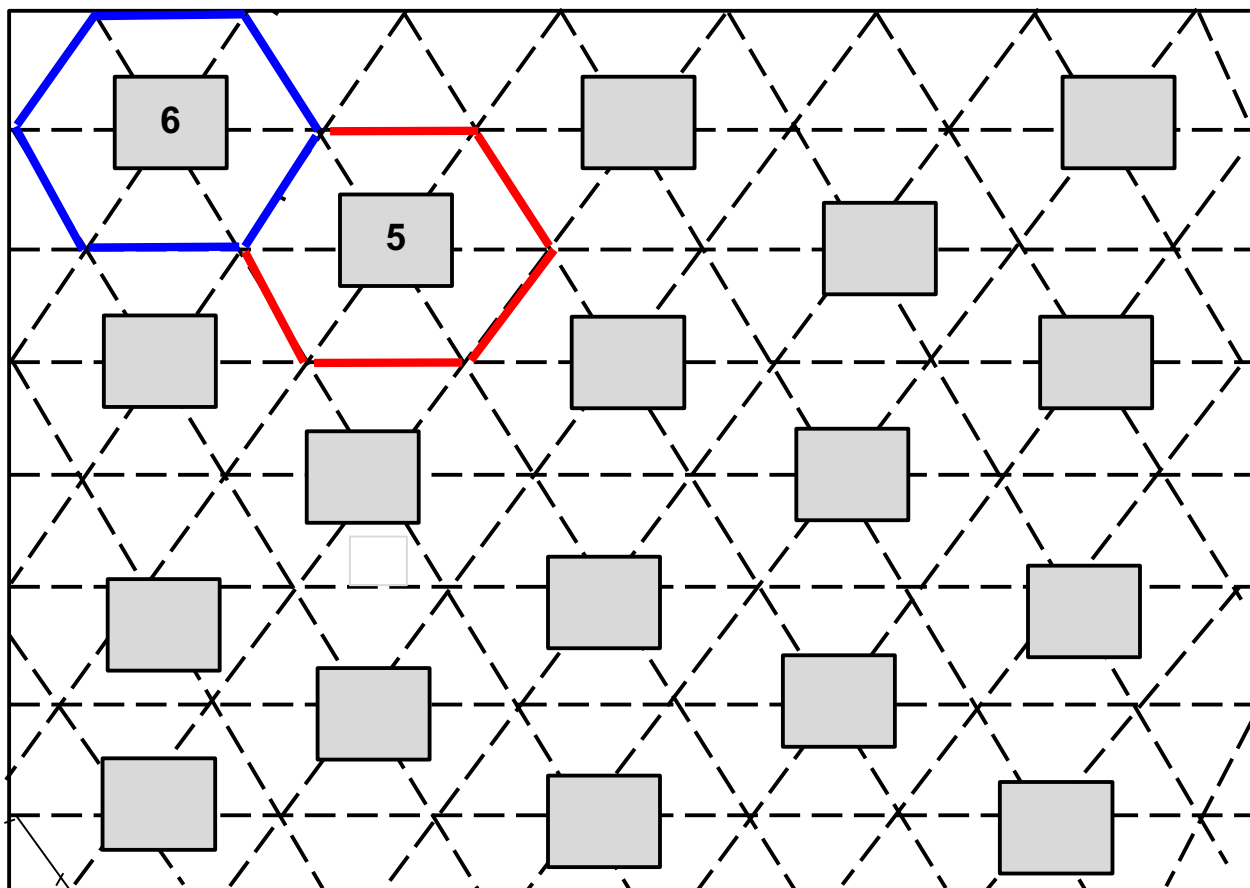


Add up the row totals. Make sure you add the total for the partial walls in Row 8.

The total number of wax walls a bee would have to make to complete this honeycomb is _____.

Honeycomb With Hexagon-Shaped Cells

- Two cells are outlined to get you started. Outline another hexagon-shaped cell using a colored marker.
- Count the number of walls a bee would have to build from wax. Place that number inside the cell.
- Using a different colored marker, outline the next cell in the row or column. Count the number of wax walls the bee would have to make for this cell, and put that number inside the cell.
- Continue outlining cells in different colors until you complete the entire sheet.
- Count up the numbers from the first column of cells, and record the total at the bottom of the column in the designated space.
- Add the totals from the columns to find the grand total number of cell walls.



Column 1 Total	Column 2 Total	Column 3 Total	Column 4 Total	Column 5 Total
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Add the totals from the columns. Make sure you add the total for the partial walls, if there are any.

The total number of wax walls a bee would have to make to complete this honeycomb is _____.

Collect and Analyze Your Data

How many wax walls must a bee make for an area of ~15 square inches? Fill in the table below:

Shape	Square	Triangle	Hexagon
Total Number of Cell Walls			

Which shape required building the most wax walls? _____

Which shape required building the fewest wax walls? _____

What can you conclude about the relationship between the number of sides a shape has and the total number of walls a bee would have to build if it used that shape for its honeycomb?

How would shared cell walls affect the amount of wax a bee would need to construct a honeycomb? Explain your answer using evidence from your data table.
