

Investigating Ways of Cutting “Vegetables”

1.5

When experienced cooks prepare dishes, they usually cut up a vegetable using different techniques. Often the cook cuts the vegetable in long thin strips. Then he or she stacks the pieces and then cuts in a perpendicular direction to the strips. Why does a cook do this?

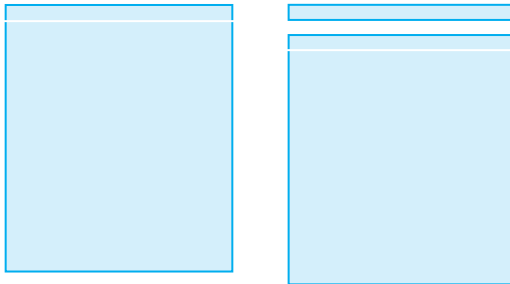


Think, Do, Discuss

Use two rectangular pieces of paper and a pair of scissors. The paper will act as your “vegetable.” You will cut each piece of paper in strips in two different ways.

Method 1

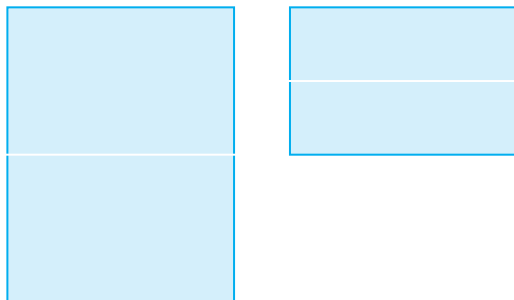
1. (a) Take one piece of paper and cut a thin strip (about 2 cm wide) along the width.



- (b) Repeat cutting the entire sheet into strips, all of which should be about the same size.

Method 2

2. (a) Take the other piece of paper and cut it in half along the width.



- (b) Stack the halves. Cut the pile in half, along the width.
 (c) Continue stacking and cutting, until you have created strips that are about the same width as the strips you created in method 1.
 (d) Copy and complete the table.

Number of Cuts	Number of Pieces Using Method 1	Number of Pieces Using Method 2
1		
2		
3		
$\vdots$	$\vdots$	$\vdots$

3. Compare the number of pieces created after each cut using both methods. How does the number of pieces change with each cut? Describe the pattern.
4. For each method, find the next three terms of the sequence of the number of pieces for each cut.
5. Suppose you had to cut over 1000 strips. What is the least number of cuts you would have to make?
6. Determine a recursive formula for each sequence in step 3.
7. Determine the general term of each sequence.
8. Discuss how the sequences are alike and how they are different.