

Modeling Linear Relationships

MATERIALS • 8.5 inch by 11 inch piece of paper • 1-inch ruler



Reason abstractly and quantitatively.

QUESTION How can you model a linear relationship?

You know that the perimeter of a rectangle is given by the formula $P = 2\ell + 2w$. In this activity, you will find a linear relationship using that formula.

EXPLORE Find perimeters of rectangles

STEP 1 Find perimeter

Find the perimeter of a piece of paper that is 8.5 inches wide and 11 inches long. Record the result in a table like the one shown.

STEP 2 Change paper size

Measure 1 inch from a short edge of the paper. Fold over 1 inch of the paper. You now have a rectangle with the same width and a different length than the original piece of paper. Find the perimeter of this new rectangle and record it in your table.

STEP 3 Find additional perimeters

Unfold the paper and repeat Step 2, this time folding the paper 2 inches from a short edge. Find the perimeter of this rectangle and record the result in your table. Repeat with a fold of 3 inches and a fold of 4 inches.

Width of fold (inches)	Perimeter of rectangle (inches)
0	39
1	?
2	?
3	?
4	?



DRAW CONCLUSIONS Use your observations to complete these exercises

1. What were the length and the width of the piece of paper before it was folded? By how much did these dimensions change with each fold?
2. What was the perimeter of the piece of paper before it was folded? By how much did the perimeter change with each fold?
3. Use the values from your table to predict the perimeter of the piece of paper after a fold of 5 inches. *Explain* your reasoning.
4. Write a rule you could use to find the perimeter of the piece of paper after a fold of n inches. Use the data in the table to show that this rule gives accurate results.