Measures

Thinking about Area and Perimeter

Grading Rubric

What learners can typically do.

f The Learner	g The learner	h The learner	i The learner	j The learner	k The learner
Verifies the relationship between area and perimeter from the given examples and states the relationship without considering any other cases.	Makes a prediction about whether or not the relationship will hold, and suggests how this might be tested (e.g. trying out other rectangles)	May notice that using squared paper, e.g. mathematics copies, will give you smaller shapes, but that the relationship between these shapes using the new unit will be the same	Draws on the use of squares in the diagram and makes use of squared paper or mathematics copies to try out.	May use number sense approaches (counting in rows or columns, or doubling of known areas/ perimeters to help estimate values for new shapes).	May notice (in response to teacher questioning, or examination of multiple examples) that the area of a rectangle can be calculated by multiplying the units up by the units across (length x breadth).

To investigate Max's idea, we can analyse various rectangles and examine the relationship between their areas and perimeters. Let's start by exploring different rectangles and recording their area and perimeter values. We'll then analyse the data to determine if Max's observation holds true.

Here is a table representing the areas and perimeters of different rectangles:

Rectangle	Length	Width	Area	Perimeter
Rectangle 1	2 units	3 units	6 square units	10 units
Rectangle 2	4 units	5 units	20 square units	18 units
Rectangle 3	1 unit	6 units	6 square units	14 units
Rectangle 4	3 units	3 units	9 square units	12 units
Rectangle 5	5 units	2 units	10 square units	14 units
Rectangle 6	6 units	1 unit	6 square units	14 units

Based on this sample data, we can observe the following:

Rectangle 1: The area (6 square units) is smaller than the perimeter (10 units).
Rectangle 2: The area (20 square units) is larger than the perimeter (18 units).
Rectangle 3: The area (6 square units) is smaller than the perimeter (14 units).
Rectangle 4: The area (9 square units) is smaller than the perimeter (12 units).
Rectangle 5: The area (10 square units) is larger than the perimeter (14 units).
Rectangle 6: The area (6 square units) is the same as the perimeter (14 units).

From this sample data, we can conclude the following:

Max's observation that "the area is always a smaller number than the perimeter number in these rectangles" is sometimes true. We have examples like Rectangle 1, Rectangle 3, and Rectangle 4 where the area is smaller than the perimeter.

Max's observation that "as the area value increases, the perimeter number increases as well" is sometimes true. We can see this in Rectangle 1, Rectangle 3, and Rectangle 4, where the area and perimeter values increase together.

To convince someone who is not sure, we can provide additional examples or perform further calculations to reinforce our findings. The data presented above already demonstrates that Max's idea is sometimes true.

Regarding rectangles with the same area but different perimeters, we can see an example in Rectangle 6. It has an area of 6 square units and a perimeter of 14 units. The dimensions of this rectangle are 6 units (length) and 1 unit (width).

For rectangles with the same perimeter but different areas, the data provided doesn't include an example. However, we can easily find such rectangles. For instance, consider two rectangles with a perimeter of 12 units: Rectangle A with dimensions 3 units (length) and 3 units (width) has an area of 9 square units, while Rectangle B with dimensions 4 units (length) and 2 units (width) has an area of 8 square units. Therefore, the areas of these rectangles are different despite having the same perimeter.

In summary, Max's idea about the relationship between the area and perimeter of rectangles is sometimes true but not always true.