Modeling Area and Perimeter

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Title: All Around Pattern Blocks

Purpose: To develop the concept of perimeter using pattern blocks.

Activity: Find the perimeter of the individual pieces and polygons constructed with pattern blocks.

1. Using the orange square with a side of one unit of length, find the perimeter of each pattern block:
   yellow hexagon: blue rhombus:
   orange square: tan rhombus:
   red trapezoid: green triangle:
2. Which pattern block has the greatest perimeter? Which block has the least perimeter? Which blocks have the same perimeter?
3. Using a blue rhombus, a tan rhombus and an orange square construct figures with different perimeters. What is the least perimeter found? What is the greatest? Can you find other perimeters? Why do some figures with the same blocks have different perimeters?
4. Place two orange squares side by side and find the perimeter using another square to measure the distance around the figure.
   Explain why the perimeter is not 8 units.
   Find the perimeter of three squares placed side by side.
   Complete the table to show the results:

Number of squares	Perimeter
1	
2	
3	

Predict the distance around five squares in a row.
Predict the distance around ten squares in a row.
What happens to the perimeter each time you add another square to the figure?
Describe a pattern for the length of the perimeter based on the number of squares placed side by side in the figure.

Title: Measuring Area with Pattern Blocks

Purpose: To develop the concept of area using pattern blocks.
To construct figures with specific areas areas and perimeters using pattern blocks.

Activity: Find area and perimeter of polygons constructed with pattern blocks.

1. Using the orange square with area equal to one square unit of area, find the perimeter and area of a rectangle that is a 4x3 array of pattern block squares.
2. Create other figures with area = 12 square units using only orange squares. Find the perimeter of these figures.
3. Arrange a 3x3 array of pattern block squares. Find the perimeter and area. Create figures by reducing the area by one square unit and maintain the perimeter of 12 units. Do this for areas of 8 square units and continue downward to 3 square units.

Title: Tangram Pieces and Area and Perimeter

Purpose: To use the tangram pieces to find area and perimeter.
To construct polygons with specific areas and perimeters using tangram pieces.

Activity: Find the area and perimeter of tangram pieces and polygons constructed with tangram pieces.

1. Using the tangram pieces discover the relationships between the tangram pieces:
   medium triangle =
   small triangle =
   square =
   parallelogram =
2. Arrange the five different tangram pieces on the inch grid paper and find the area of each piece in square inches.
   Areas:
   large triangle = _____ square inches
   medium triangle = _____ square inches
   small triangle = _____ square inches
   square = _____ square inches
   parallelogram = _____ square inches
3. Use three tangram pieces to make a trapezoid with an area of 4 square inches.
4. Use four tangram pieces to make a rectangle with an area of 6 square inches.
5. Use five tangram pieces to make a trapezoid with an area of 12 square inches.
6. Place the tangram pieces on the inch grid paper. Determine the lengths of the tangram pieces using the inch grid and an inch ruler. Find the length to the nearest 1/8 of an inch. Label the sides of each tangram piece in inches. Write an addition sentence to represent the perimeter of each tangram piece.

   large triangle =

   square =

small triangle =

medium triangle =

parallelogram =

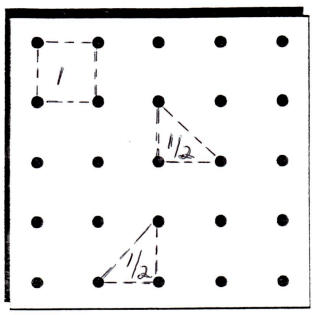
Title: Measuring Area and Perimeter on a Geoboard

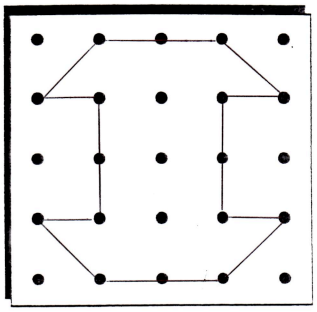
Purpose: To use a geoboard to find area and perimeter.
To construct polygons with specific areas and perimeters using a geoboard.

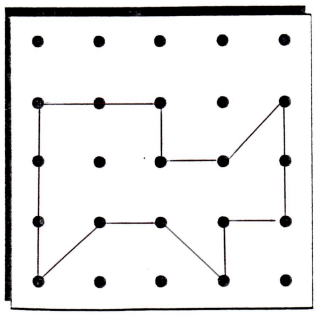
Activity: To find the areas and perimeter of lattice polygons and construct polygons on a geoboard with specific areas and perimeters.

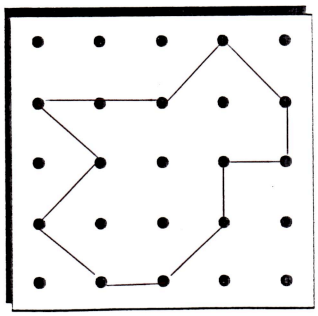
1. The distance between 2 adjacent pegs on a geoboard is defined as one unit of length. The smallest square that is possible on the geoboard is defined as an area of one square unit.
2. Make a figure that has a perimeter of 4 units. What is the area of this figure?
3. Make a figure that has a perimeter of 6 units. What is the area of this figure?
4. Make multiple figures that have a perimeter of 10 units.
5. Make multiple figures that have a perimeter of 8 units.
6. Make a figure that has a perimeter of 12 units and an area of 9 square units.
7. Make figures that have a perimeter of 12 units and an area of 8 square units.
8. Make figures that have a perimeter of 10 units and an area of 4 square units.
9. There are various methods to find the area of lattice polygons using geoboard paper:
   Whole squares and half-square method
   Half-rectangle method
   Wrap around method.
10. The whole square and half-square method for finding area involves subdividing the lattice polygons into whole squares and triangles that are half of squares and counting the amount of area on the geoboard. Find the area of the polygons on the attached page.
11. The half-rectangle for finding area involves subdividing the lattice polygons into triangles that are half of rectangles and counting the amount of area on the geoboard. Use all the methods for finding the area of the polygons on the attached page.
12. The wrap around method for finding area involves enclosing the original polygon in a square or rectangle. Find the area of the square or rectangle. Subdivide the region inside the square or rectangle but outside the original polygon. Find the area of this sub-divided region using whole squares, half-squares, and half-rectangles. To find the area inside the original polygon subtract the two areas:
    area of square/rectangle - area of outside region = area of the original polygon.
    Find the area of the polygons on the attached page.

Whole squares and Half-squares

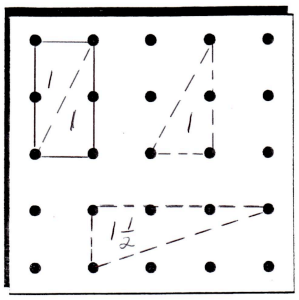


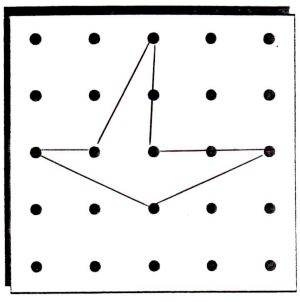


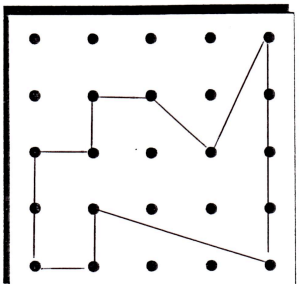


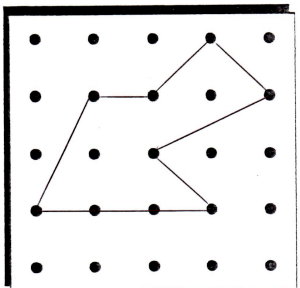


Half-rectangle









Wrap Around