

Paths and Ponds

2-6

MATERIALS

50-60 cubes or construction paper
squares of two colors
crayons
paper
pencils
grid paper, 1" or 2 cm, pages 178-179

REAL-WORLD CONNECTION

The Moors in Spain loved water. Their garden environment reflected this in the many ponds and pools in their homes and gardens. The Alhambra in Granada, Spain is a wonderful example of how water was used to create serene environments that also had practical applications. For example, the Moors' water-wheel technology was adapted for use as ancient air conditioning.



The sight and sound of murmuring water is considered a critical element in designing gardens today. Let's explore the designs for a series of ponds. The following are ideas for building square and rectangular ponds.

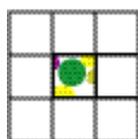
How

Square Ponds

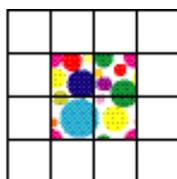
- Let's begin with cubes (or 1" paper squares) that represent 1-foot-square tiles. Use them to figure out how many tiles you need to make a border or path around the edge of a pond. Try using one color for the pond and a different color for the border. Don't forget the corners.

This is about
connecting patterns and
functions through the investi-
gation of area and perimeter.

- Make some models for ponds that are 1' by 1', 2' by 2', 3' by 3', and 4' by 4'.



1' BY 1' POND



2' BY 2' POND

- Figure out how many square tiles you will need for the border of each pond.
- To record your work, use the grid paper and color in the squares. Use one color for the pond and a different color for the border.
- Make a table. See if you can figure out a pattern that will tell you how many tiles you need for the border of any size square pond. Talk about how to use the table to figure out the border for your ponds.

LENGTH OF POND SIDE	POND SQUARE FEET	# OF BORDER TILES
1	1	8
2	4	12
3	?	?
.	.	.
.	.	.
.	.	.

- Before you move on to the rectangular ponds, ask your child what might happen next. Does your child see any patterns?

Paths and Ponds

How

Rectangular Ponds

- Ask your child to create some rectangular ponds in the following sizes: 1' by 2', 2' by 2', 3' by 2', 4' by 2'... Add a border for each pond using your paper squares or cubes.
- See if your child confidently moves the tiles into the new shapes. If not, let your child keep exploring square ponds until she is ready to move on.
- Make a table to record your results similar to the one for square ponds. Show the length (let the changing number be the length), the width, the area, and the border for each pond.
- Make another table for the 1' by 3', 2' by 3', 3' by 3' family of ponds. Work out the pattern for the number of tiles in the borders for these ponds. What patterns does your child see?
- Next try the 1' by 4', 2' by 4', 3' by 4' family.

Here's More

- Ask your child what would happen if you had 24 tiles for the border. Using all 24 tiles, what size ponds could you enclose? Don't forget the corners.
- Create a table for these ponds.