

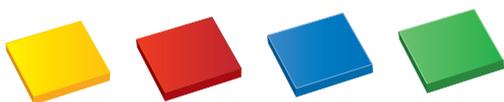
Ben's Garden Plot

OBJECTIVE

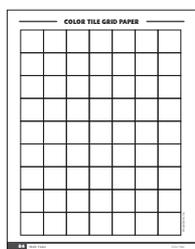
Children will determine the perimeter of irregular shapes by counting, and compare shapes with the same area.

WHAT YOU WILL NEED

Color Tiles, 30 per pair



Color Tile Grid Paper,
several sheets
per pair, page 84



OVERVIEW

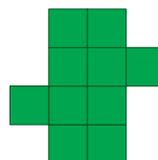
In this activity, children use Color Tiles to design plots for a garden.

THE BIG IDEA

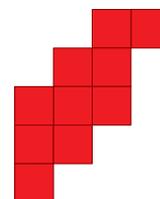
In addition to counting and comparing, this activity gives children the opportunity to make observations that relate to several important geometry and measurement ideas. One is that although all their garden plots have 10 tiles each, the plots do not all require the same amount of fencing. Noticing this lays the groundwork for understanding the concept that not all shapes with the same area have the same perimeter.



$P = 14$



$P = 16$



$P = 18$

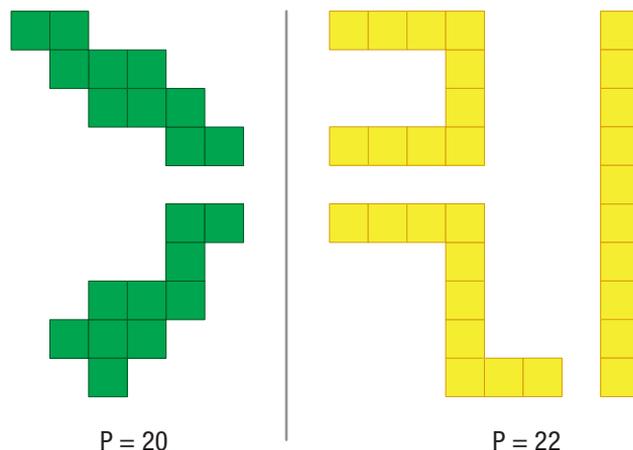
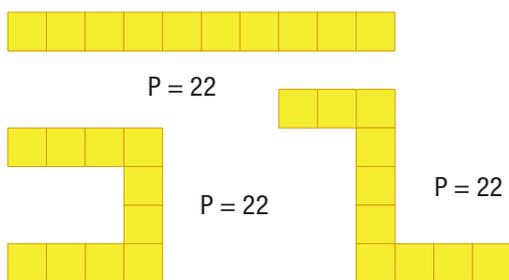
Number • Geometry Measurement

Counting | Comparing | Area | Perimeter

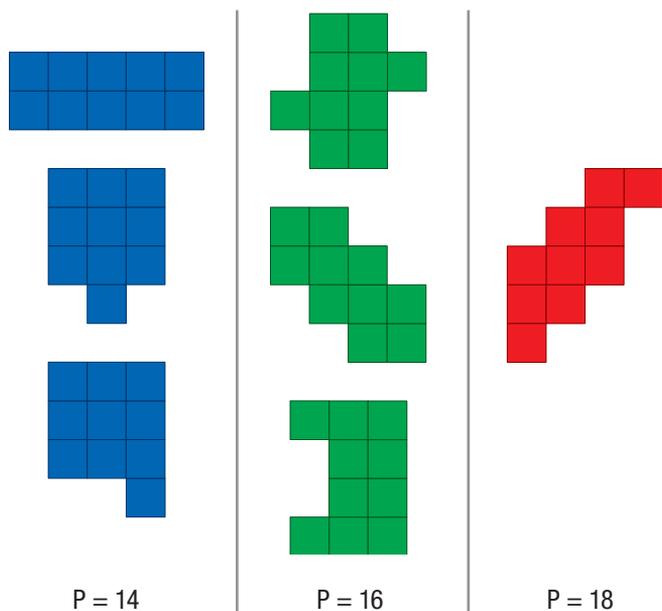


Ben's
Garden Plot,
page 92

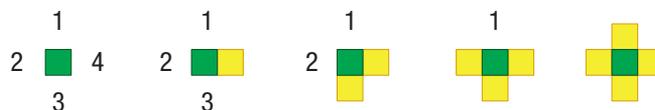
Another observation that children may make, especially as they study the postings, is that garden plots with the same number of tiles and the same distance around do not always look alike; that is, different shapes can have the same area and the same perimeter.



There are five possible perimeters for a 10-tile design: 14, 16, 18, 20, and 22. Some of the possible designs are shown in the following graph:



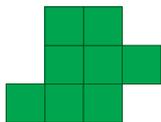
Children do not instinctively realize how placing tiles side by side affects the perimeter of a shape. It is a difficult idea for young children to understand that every time a side of a tile touches another, two sides are no longer part of the perimeter. With experience, children can discover that the number of exposed sides of a tile decreases from four to zero as new tiles are added.



Children will have different ideas about which plot Ben would choose for his garden. Some may like the ones that show symmetry or some sort of design. Others may point out that the more compact designs might fit better in a family's yard. Still others may recommend the long, skinny plots because with these, Ben would not have to step on other parts of the plot when he does chores such as weeding.

1 INTRODUCTION

- ▶ Display this design and ask children to build it with 8 Color Tiles.
- ▶ Tell children that you can find the distance around this design by using another Color Tile. Hold a tile on edge and demonstrate how to use it to measure part way around the design.
- ▶ Ask children to finish measuring on their own. Confirm that the distance around is 14 units.
- ▶ Point out that if this were a design for a fenced-in garden, the garden would need to have 14 units of fencing.



2 ON THEIR OWN

Children will complete the On Their Own. During this time, the teacher's role is to:

- ▶ ask probing questions to guide and extend
- ▶ record student thinking
- ▶ record student conversation that promotes collaboration

Use the information gathered to inform the Math Talk.

3 MATH TALK

Use prompts such as these to promote class discussion:

- ▶ Which column has the most designs? the fewest?
- ▶ How many more designs are there with a fencing of _____ than with a fencing of _____? Explain how you know.
- ▶ How many fewer designs are there with a fencing of _____ than with a fencing of _____? Explain how you know.
- ▶ What do you notice as you look at all the designs on the graph?
- ▶ What is the same about all the designs? What is different?
- ▶ Which design do you think Ben would pick for his garden? Why?

4 EXTENSION

- ▶ Have children repeat the activity, this time changing the number of tiles to design a garden for a different number of vegetables.
- ▶ Have children sort their designs in new ways: number of sides, symmetrical or not, long and skinny, or short and fat.

Ben's Garden Plot

ON THEIR OWN

How can you help Ben design a fenced-in garden in which he can plant 10 kinds of vegetables?

- 1 With a partner, make different designs for Ben's garden. Use 10 Color Tiles for each design.
- 2 In each design, every tile must touch one side of another tile completely.



- 3 Record your designs.
- 4 Find how much fencing Ben will need for each design. Measure around it with the edge of another Color Tile. Write that number next to the design.
- 5 Choose the design that you like best and cut it out.



- ⑤ Choose the design that you like best and cut it out.
- ④ Find how much fencing Ben will need for each design. Measure around it with the edge of another Color Tile. Write that number next to the design.
- ③ Record your designs.



- ② In each design, every tile must touch one side of another tile completely.
- ① Use 10 Color Tiles for each design.
- ① With a partner, make different designs for Ben's garden.

How can you help Ben design a fenced-in garden in which he can plant 10 kinds of vegetables?

BEN'S GARDEN PLOT

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How can you help Ben design a fenced-in garden in which he can plant 10 kinds of vegetables?

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- ③ Record your designs.
- ④ Find how much fencing Ben will need for each design. Measure around it with the edge of another Color Tile. Write that number next to the design.
- ⑤ Choose the design that you like best and cut it out.