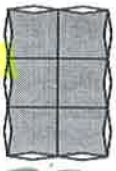
# 1.1.2 How does it change?

Perimeter and Area Relationships

trait or characteristic

**1-5.** TOOTHPICKS AND TILES: Cruz, Sophia, and Savanna are using toothpicks and tiles to describe the attributes of the shapes below. Cruz made a pattern and told the girls the number of tiles he used. Then Sophia and Savanna each tried to be the first to see who could call out how many toothpicks, or units of length, were on the outside.

a) Cruz made the tile pattern shown at right and said, "There are six tiles." Savanna quickly said, "There are ten toothpicks." Copy the tile pattern on your paper and show where Savanna counted the 10 toothpicks. **Justify** your answer with words, numbers, or pictures.



b) Cruz put down the pattern as shown at right. How would you describe this shape using toothpicks and tiles?


c) Get a set of tiles from your teacher and work with your team to:

- Make a pattern so that there are four more toothpicks than tiles.
- Draw your tile pattern on your paper
- Label the number of toothpicks and tiles on your drawing.

**1-10** TEAM CHALLENGE: TOOTHPICKS AND TILES: As a team, work together to solve her challenges below using exactly **four tiles**. Justify your answers with pictures and labels.

Your Task: Create a tile pattern where the number of toothpicks is exactly double the number of tiles. Then, create a pattern where the number of toothpicks is more than double the number of tiles.

**1-8.** Does changing the number of toothpicks always change the number of tiles? Does changing the number of tiles always change the number of toothpicks? Think about these two questions as you look at the following tile shape.

a) Write a fact statement that includes information about the number of tiles and toothpicks that would describe this tile shape.

b) How can you add a tile to the shape in part (a) but not change the number of toothpicks? **Justify** your response with a diagram.

**1-9** Recall that the **perimeter** of a design is the length of the boundary around the outside of the design (the toothpicks). The number of squares needed to fill the design (the tiles) is called the **area**.

or at home.

a) Use these words to write a fact statement with your team describing the perimeter and area in the tile pattern to the right.

b) For your fact statement in part (a), build and draw a different shape that could also be described by the fact. Label the figure with the area and perimeter.

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b) Complete on pg 11

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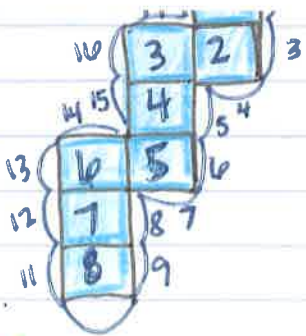
b)

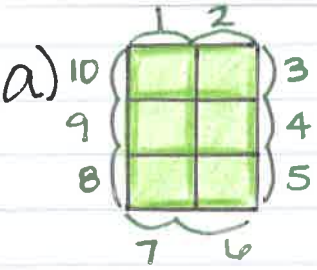
c)

Example




perimeter is 18.

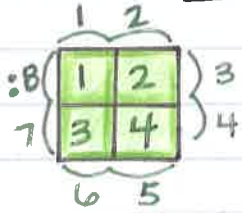
**1-5** a)




There are 10 toothpicks because there are 10 units of length on the outside.

b) The shape has 8 tiles and 18 toothpicks.

c) Example:

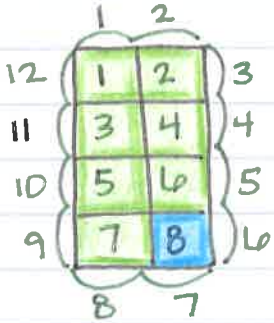



This pattern has 4 tiles and 8 toothpicks, which is a difference of 4.

**1-10** Completed on page 11.

**1-8** a) The shape has 7 tiles and 12 toothpicks.

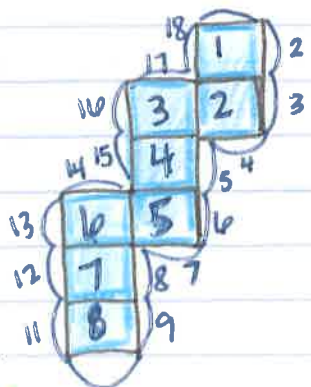
b) you could add a tile to the bottom right corner.




There are now 8 tiles, but still 12 toothpicks.

**1-9** a) The area is 8 and the perimeter is 18.

b)




Example

The area is 8 and the perimeter is 18.