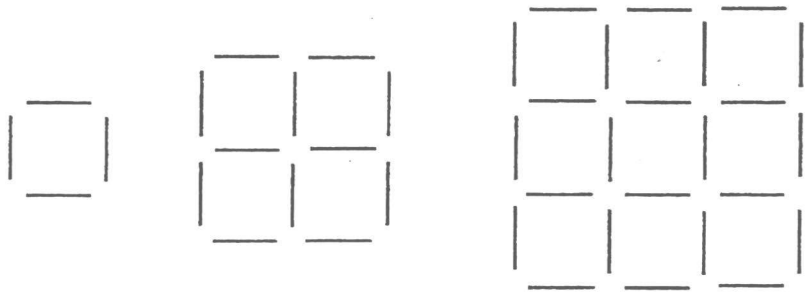
ACTIVITY 2
TOOTHPICK SQUARES

Instructions
Work on the following math activity, either individually or with one or two others.

The Problem



#1 #2 #3

Examine the pictures above, which show three squares constructed out of toothpicks. Each large square is made up of some number of small squares, and each small square is one toothpick long on each side.

1. **Square #3 has 12 toothpicks in its perimeter.**
   - If the sequence of squares was continued, how many toothpicks would be in the perimeter of square #4?

- Write a rule that lets you predict how many are in the perimeter of any large square in the sequence.

2. Square #3 is made up of 9 small squares.

- How many small squares would be needed for large squares #4, #5, and #6?

- Find and write a rule that lets you predict how many small squares would be in any square in the sequence, say square #*n*.

- Is there any way to make a toothpick square that contains exactly 40 small squares? Explain your answer.

- Is there any way to make a toothpick square that contains exactly 144 small squares? Explain your answer.

3. **The picture shows that there are 4 toothpicks in square #1 and 12 toothpicks in square #2.**
   - How many toothpicks are there in square #3?

   - In square #4?

   - Can you predict the number of toothpicks needed for squares #6, #10, and #15?

   - Find and write a rule that lets you predict the number of toothpicks in square #*n*?