

Toothpick Squares

Purpose

Students will solve problems by choosing strategies and tools, explaining their reasoning, making calculations, and checking results.

Materials

For the teacher: overhead projector, 10 toothpicks

For each student: 20-30 toothpicks, paper, pencil

Activity

A. Introducing the Problem

1. Tell students they will be working with toothpicks to discover patterns.
2. On an overhead projector, make a square using four toothpicks.

B. Solving the Problem

1. Have students make the four-toothpick square with the toothpicks on their desks.
2. Have students follow directions to make another square that has sides that are two toothpicks long.
3. Count the number of toothpicks.
4. Continue this process to make a third square, a fourth square, etc. At each stage, count the number of toothpicks and record the result.
5. Ask students to look for a pattern and predict the number of toothpicks before they build the next square [students should notice a pattern that increases by four].

C. Solving Related Problems

1. Have students make a square using four toothpicks.
2. Have students add on more toothpicks to make a second square joined on to the first.
3. Count the number of toothpicks.
4. Continue this process to make a third square, a fourth, etc.
5. At each stage, count the number of toothpicks and record the result.
6. Ask students to look for a pattern and predict the number of toothpicks before they build the next square [students should notice a pattern that increases by three].

(continued)

EXTENDING
THE



ACTIVITY

Have students make a square using four toothpicks. Make a rectangle the size of two squares. Continue this process as in this activity, looking for and recording patterns.

connecting
across the
curriculum



Visual Arts

Using toothpicks held together by gumdrops, have students make structures of connecting squares.

Standards Links
2.3.3, 2.3.4, 2.4.1, 2.4.3

Activity (continued) _____


D. Discussion


1. Discuss the patterns the students found.
2. Challenge the students to predict the number of toothpicks in the tenth square in each problem.

Questions for Review _____

Basic Concepts and Processes

During the activity, discuss the following questions with your students to gauge their understanding of the Standard Indicators:

 What is the next number in this pattern? 1, 5, 9, 13, 17, _____

 How did you figure out the next number in the pattern?
