

Chapter 1

Toothpick Storybooks

Grades K–3

- ☒ Total group activity
- ☒ Cooperative activity
- ☒ Independent activity
- ☒ Concrete/manipulative activity
- ☒ Visual/pictorial activity
- ☒ Abstract procedure

Why Do It:

Students will discover the concepts of 1-to-1 counting and number conservation, and will study basic computation relationships.

You Will Need:

This activity requires several boxes of flat toothpicks, white and colored paper (pages approximately 6 by 9 inches work well), glue, and marking pens or crayons.

How To Do It:

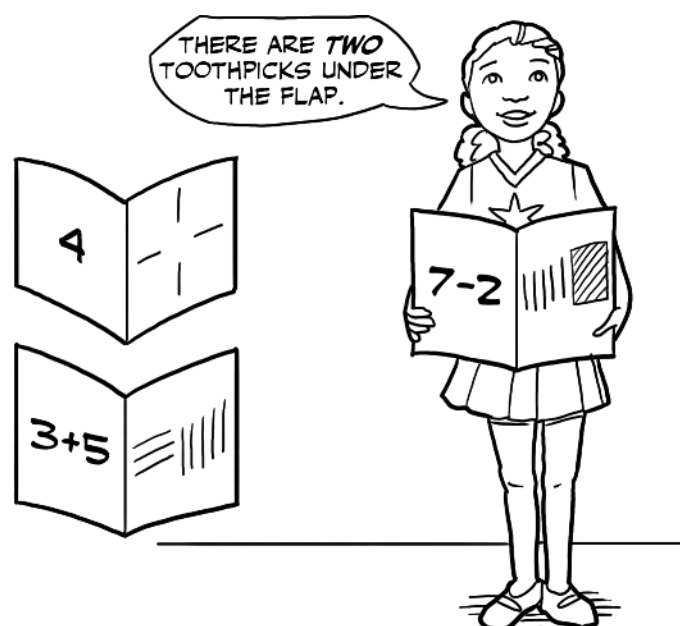
1. Have younger students explore and share the different arrangements they can make with a given number of toothpicks. For example, students could arrange 4 toothpicks in a wide variety of different configurations, all of which would still yield 4 toothpicks.
2. After exploring for a while, students should begin making Toothpick Storybooks, starting by creating number pages. Students can write, for instance, the number 6 on a sheet of white paper and glue 6 toothpicks onto a piece of colored paper. (To avoid a sticky mess, students should dip only the ends of the toothpicks in the glue.)

When they are ready, the learners follow the same procedure for equations and the corresponding toothpick pictures. (*Note:* Students sometimes portray subtraction by pasting a small flap on the colored page that covers the number of toothpicks to be "taken away." Furthermore, they enjoy lifting the flap to rediscover the missing portion.)

3. When a number of toothpick diagrams have been finished, the pages can be stapled together into either individual or group Toothpick Storybooks. Ask each student to tell a number story about one of the diagrams in which he or she makes reference to both the toothpick figure and the written equation or number.

Example:

Shown here are possible toothpick diagrams for 4, $3 + 5 = \underline{\quad}$, and $7 - 2 = \underline{\quad}$.



Extensions:

1. Simple multiplication facts, and even longer problems, can be portrayed with toothpick diagrams. For $6 \times 3 = \underline{\quad}$, the player might show $||| ||| ||| ||| ||| ||| = 18$. Similarly, for $4 \times 23 = \underline{\quad}$, it is necessary to show 4 groups of 23 toothpicks to yield 92.
2. Division can also be shown with toothpick diagrams. If the problem calls for the division of 110 into sets of 12, the player would need to form as many groups of 12 as possible, also taking into account any remainder. (*Note:* The student might also complete such a problem using partitive division. See *Paper Clip Division*, p. 179.)