# Four Tower Totals

## Lesson Overview

Students roll a die four times and build four corresponding towers with single blocks. They predict and count the total number of single blocks in their towers. They also pack to see how this total number is represented in groups of tens and ones, and then compare this total to their partners' total.

## Objectives

Thinking Skills:    Students predict and then determine the outcome of combining small sets of single blocks. They also use observation and reasoning skills to compare the number of single blocks with the number of packed blocks of each size. They use estimation skills to approximate more and less comparisons with a partner.

Mastery Skills:    Students learn to predict, count, and name a quantity of single blocks. They also learn to pack the blocks to make the equivalent representation in blocks-of-10 and single blocks.

## Materials

Each pair of students needs:
- Die (#1-6)
- Several "Four Tower Totals" Activity Sheets

- About 40 single blocks and 8 small holders
- More/Less spinner*

*To make a more/less spinner, give pairs of students a square of paper, a paper clip, and a pencil. Have them:
- Draw a circle on the paper and draw a line through it, dividing it in halves.
- Write "more" on one half, and "less" on the second half.
- Place the pencil point through the paperclip and hold it in the center of the circle with one hand.
- With a second hand, spin the clip to determine if having more blocks or having less blocks wins the round.


## Class Demonstration                                    (8 - 10 minutes)

Play a round of the game with a student volunteer to clarify directions and answer questions. Take turns with the following steps:
- Roll the die and build a tower with the indicated number of single blocks. Record the number in the first box on the activity sheet. This shows the first addend.
- Repeat 3 more times to make 4 towers. Record the 3 additional addends.
- Combine the blocks in all 4 towers.
- Count the blocks by ones. Name the number.
- Pack the blocks, name, and record the number as blocks-of-ten and single blocks.
- Predict who has more/less blocks and then compare.
- Spin the More/Less spinner to determine the winner of the round. If the clip lands on "more," the winner of a round is the student with more blocks in the towers. If the clip lands on "less," the winner of the rounds is the student with less blocks in the towers. The round winner draws a ☆ next to his or her sum. In case of a tie, both players draw a star!

**For Discussion:**
During the game demonstration, have students:
- Predict who has more and who has fewer blocks after each roll is made and each corresponding tower is built.

- Discuss strategies for estimating more and less. It is not necessary to speak in terms of exact numbers while students are building towers. Encourage students to think about compensating; for example, 2 medium-sized towers (3 and 3) are about the same altogether as a tall (5) and a short (1) tower.
- Model counting by ones, predicting how the blocks will look when packed, and then packing and naming tens and ones.
- Model ways to compare who has more and less.

## Student Activity                                                      (15 minutes)

Provide pairs of students with blocks, a die, and several "Four Tower Totals" activity sheets.
- Allow them to play several rounds.
- The game winner is the player who wins the most rounds.

Have additional activity sheets available for those more eager players to continue, perhaps with different partners.

## Closure                                                              (5-10 minutes)

Discuss game results.
- Generalize that the smaller the towers, the smaller the sum total of the towers. (The same is true with larger towers and larger totals.)

Ask if any pairs had a round in which they tied (had the same total). If so, discuss:
- Have players name the tower heights and discuss why they came out "even."
- For example, four towers of 3, 5, 4, and 2 would be the same as 4, 4, 4, and 2.
- Again, this will reinforce the idea of compensation (above), or "taking from one tower and giving to another."

## Assessment

As students work in pairs, observe and note the following. Do they:

- Mentally combine the blocks to find the total? Or do they need to count all the blocks one at a time?
- Use compensation or other techniques to estimate which student has more or less as they play?
- Accurately predict what their total number of single blocks will look like when packed?
- Pack the blocks correctly?
- Compare quantities (identify who has more or less) accurately?

## Extension

- Have students make 4 Tower Total TOTALS, where they combine their totals to create an even larger sum.
- Use a 0-9 die or spinner to create larger numbers, towers, and totals.
- Play a 5 or 6 Tower Total game, where students count, predict, and pack more towers to create greater totals.
- Play 4 Tower Totals stacking blocks-of-10 instead of singles. Students then pack to make and name quantities over 100.