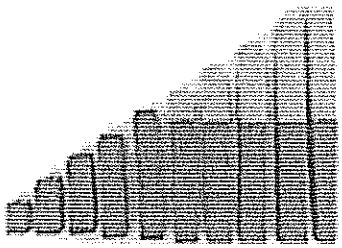
Number Towers

Grade Level PK –3



Description

Number towers, also known as number stairs, are representations of quantity constructed by joining together interlocking cubes such as Unifix ©. In the beginning of the Story, they are used to help younger children quite literally build their knowledge of cardinality by erecting towers of various numbers. Number towers are then used to teach concepts of "more/less" globally and the patterns of "1 more/less" and "2 more/less" specifically. This model leads to an understanding of comparison and the word "than," not only in the context of "more than" and "less than," but also in the context of "taller than," "shorter than," heavier than," "longer than," etc.

Children are encouraged to build towers for quantities 1 through 5 in one color. Quantities beyond 5 are added on in a second color. This color change provides support for several important developmental milestones. First, it facilitates children's understanding of 5 as a benchmark, which provides an important beginning to their ability to subitize. Second, it allows students to see relationships such as "5 needs 2 more to be 7;" "5 is 1 less than 6;" and "5 and 4 is 9, which is 1 less than 10." Finally, it encourages students to count on from 5 rather than starting at 1 to count quantities of 6, 7, 8, 9, and 10.

Such comparisons lead to looking at the parts that make up a number. ("3 is less than 7. 3 and 4 make 7.") These concepts are foundational to students' understanding of part/whole models (see Number Bonds). This, in turn, leads naturally to discussions of addition and subtraction, fact fluencies (+1, +2, +3, -1, -2, -3), and even the commutative property (flip the tower; 3 + 4 or 4 + 3—does the whole change?), which are explored in Kindergarten and Grade 1.

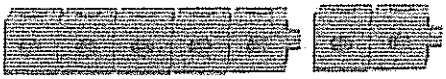
In Grades 2 and 3, as students prepare for and study multiplication and division, each unit in the number stair can be ascribed a value other than 1. For example: "Each of our cubes is equal to three. What is the value of the stair with five cubes?"

3 3 3 3 3

Further, the use of number stairs can be extended to help children understand more complex properties like the distributive property. "Each of our cubes is equal to three. Make a stair with five cubes. Now add two more cubes. The stair with 7 cubes is 2 more threes. So, 5 threes is 15, 2 threes is 6, and together 7 threes is 15 + 6 or 21.

5 threes + 2 threes = (5 + 2) threes

3 3 3 3 3 3 3



Instructional Strategies

- Sort, classify, and count up to 5 with meaning and then begin extending How Many questions up to 10.
- Build a series of towers from 1 to 10, and then use the towers to relate quantities, e.g., "5 is before 6." "6 is after 5." "5 + 1 more is 6." "6 is more than 5." "6 is 1 more than 5." "5 is 1 less than 6." "5 and 2 make 7." "5 + 2 = 7."
- Build a tower that shows 6.
- Build a specific tower and count the cubes. (Cardinality)
- Partners roll dice, each build a different tower and state which has more (less).
- Build a tower while stating the "one more" relationship (e.g., 4, 1 more is 5).
- Deconstruct the tower while stating the "one less" relationship (e.g., 7, one less is 6).
- Count on from 5 (e.g., to count 7, students use the color change to say "5, 6, 7"instead of starting from 1). The color change at 5 may be presented to students as a shortcut by having students slide their finger over a group of 5 as they count. (Subitizing)
- Count up from numbers other than 0 and 1.
- Count down from numbers other than 10 to numbers other than 0 and 1.
- Compare numbers within 1 and 10.