

Bring a Big, Bright Smile to Math with Plinko!

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Do your students really understand the meaning of “one’s place,” “ten’s place,” and “hundred’s place”? Could they explain in their own words the relationships between each digit in a number? Unfortunately, many students cannot. They know the mechanics needed to finish the worksheet or assignment, but they lack a true understanding of the task.

It was surprising to learn how little Grade 2 students understood about place value. They knew the terms, but when asked what each term meant in relation to the others, blank stares and a few wild guesses were received. It was then I realized that my students needed a solid understanding of “known” math concepts, because these concepts are the foundation for much of the mathematics students will encounter later on. They need these concepts so that they can function intelligently in an uncertain future world.

How can this understanding be fostered in students? One way is to provide concrete experiences that allow children to manipulate objects as they learn, and to have fun at the same time. This idea was the motivation for creating “Plinko,” a place-value teaching aid guaranteed to bring a smile to students’ faces and the gleam of comprehension to their eyes.

How to Play “Plinko”

In order to interest my students in learning about place value, I decided to create an activity that

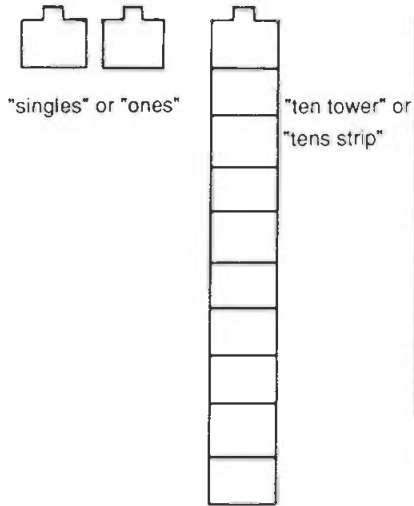
students could do by themselves. A student stands behind the panel, and drops three disks, labeled “ones,” “tens” or “hundreds” anywhere along the top row of pegs. The disks must be pressed flat against the panel and dropped one at a time. The disk works its way down the panel and drops into a numbered bin at the bottom (see photograph). The student then calls out the number of the bin in which the disk lands. Other students record that number in the correct place-value position. For example, if the disk labeled “tens” lands in the bin marked “8,” students should place an 8 in the “tens” column. The numbers may be written on paper or recorded by having students physically manipulate objects such as blocks, beads or popsicle sticks (see Sketch 1). This will help them get used to finding the “hundreds place,” and if manipulatives are used, they will help students see these place values as well.

The activity continues until all the disks have been played, called out and recorded. The disks are left in the bins until all three have been played. The students then orally calculate the number and check the disks to see if they have recorded the numbers correctly. If so, then another student may come to the panel and begin the process all over again. A running score may be kept for individuals and/or teams to incorporate the element of competition.

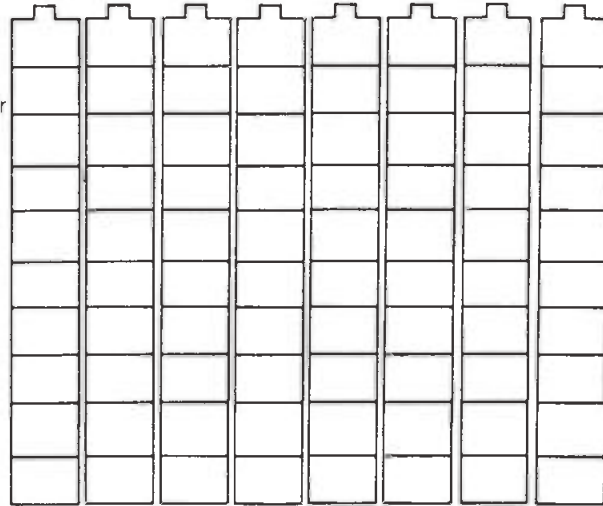
Some children, however, may inadvertently place a number in the incorrect column, or they may misunderstand the concept of place value. If a student sees no connection or relationship between the value positions, such as 10 “ones” equals 1 “ten,” or even that the hundred’s column is always to the left of the “tens” column, explanations should be made immediately. These corrections may be verbal explanations by yourself or by another student.

Sketch #1: Manipulatives: blocks, beads, popsicle sticks

BLOCKS

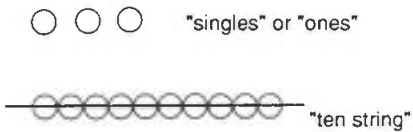


Example:

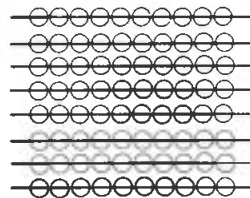


"8 in the tens place" or "80"

BEADS

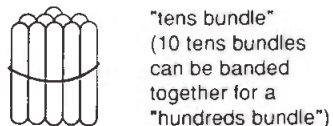


Example:

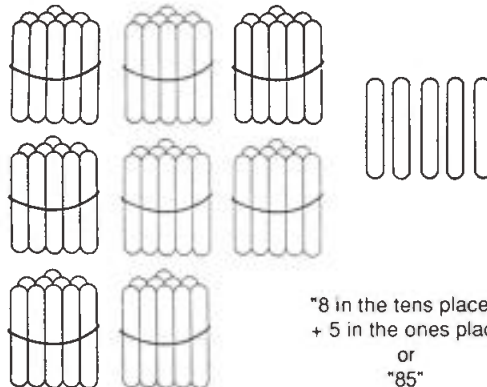


"8 in the tens place
+ 2 in the ones place"
or
"82"

POPSICLE STICKS

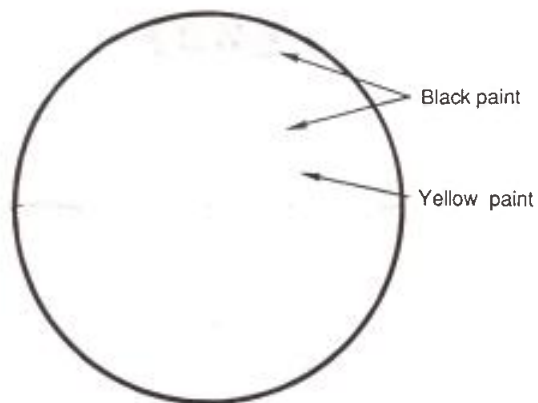
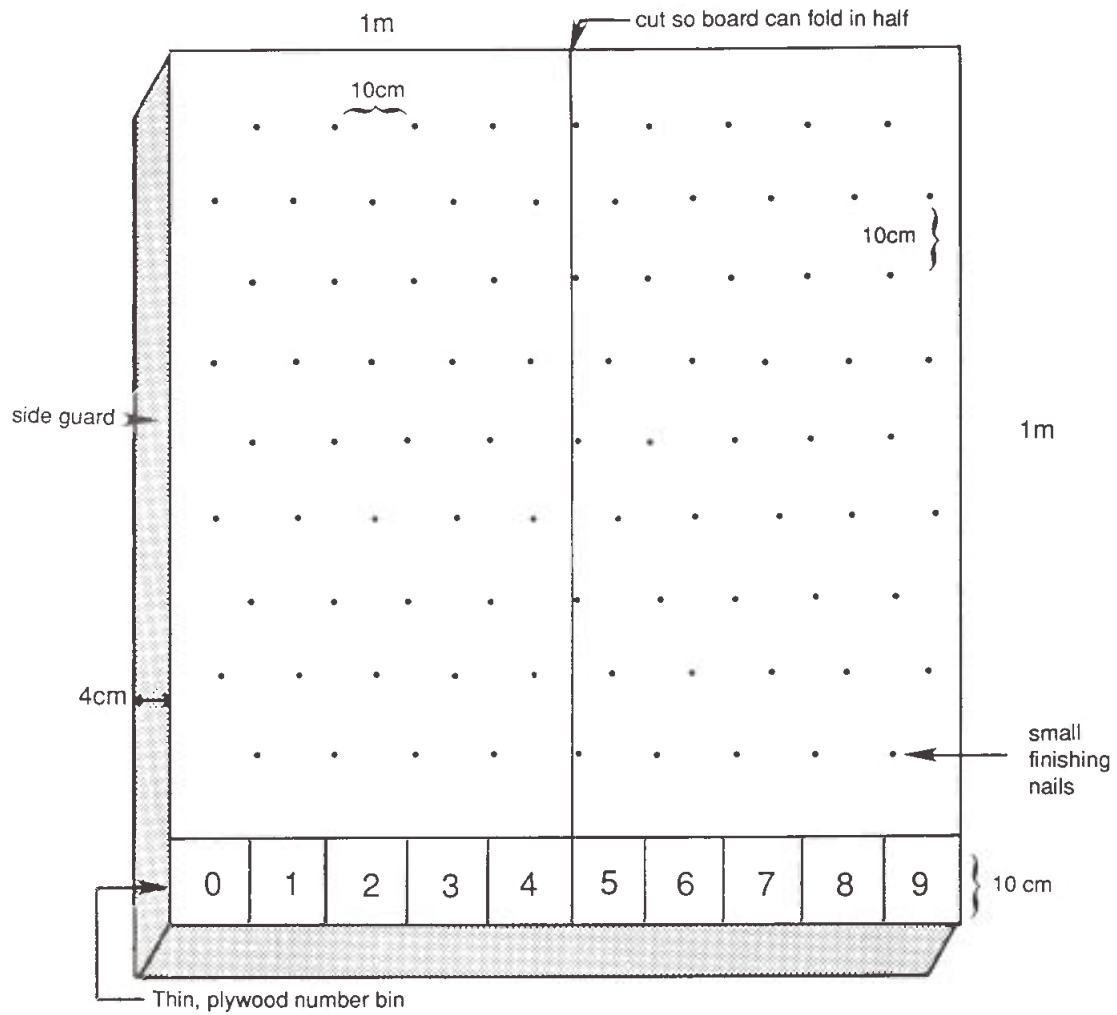


Example:



"8 in the tens place
+ 5 in the ones place"
or
"85"

Sketch #2: Gameboard Measurements



Manipulatives can also be used to further explain the concept and to reinforce place value in concrete terms. For example, the child could physically stack 10 individual blocks to see that they equal one "ten" block. Therefore, if some students do not have the correct number after checking with the disks, discuss what might have gone wrong and correct it at that time.

To expand on this activity, the concept of rounding numbers could be incorporated. Once the resulting number is agreed upon, students could round that number to the nearest 10, 100 or even 1,000, depending on their grasp of the concept.

Bingo is also a great way of using the numbers produced in "Plinko." Students can look for the "Plinko" number on their individual bingo cards. If the number is on their card, they place a marker on the number, just as in a bingo game. This "game" provides not only another method of practising place value, but it also adds a little extra fun to learning.

Materials

You will need

1. yellow and black paint;
2. approximately 90 small finishing nails;
3. a large plywood square, about 1 metre square, 2 to 3 cm thick;
4. thin plywood for the bins;
5. three hinges for centre cut; and
6. flat, circular wooden disks.

Benefits

Aside from place values, "Plinko" can also be beneficial in teaching addition, subtraction, multiplication, division, fractions, decimals and probability. It enables a wide range of students to make use of and enjoy the aid at several different levels. For addition and subtraction, students could ignore the labels on the disks and simply add or subtract the single-digit numbers as the disk lands on them. They can check the sums and differences for patterns of odd or even numbers, prime numbers and so on, or students could simply identify the number as an even, odd or prime and add and subtract it. As their abilities increase, they can work up to adding and subtracting the two- and three-digit numbers created by the original game procedure. Negative numbers could be incorporated simply by subtracting the larger number from the smaller or by adding disks with negative numbers marked on them.



Front view of game board

The same type of activity could be performed for developing multiplication and division skills. Rather than adding or subtracting the resulting numbers, simply multiply or divide them. Decimals and fractions can be produced and studied by using the same procedure.

The concepts of probability and statistics could be taught by using "Plinko" to record and/or predict the frequency with which numbers will occur when the disks are dropped.

Therefore, whether you are a kindergarten teacher or a Grade 6 teacher, this aid can be useful to you and to your students whatever your particular math curriculum may entail.

Students have enjoyed "Plinko" very much. They often ask if they can work with "Plinko" instead of having recess, and they often say math is fun. When I hear these comments, I realize just how helpful "Plinko" is in reaching children affectively and cognitively. It also helps students answer questions with more confidence and accuracy.

"Plinko" has strengthened not only my students' understanding of the foundations of math, but it has also given them something to smile about. A big, bright smile in a classroom really can make a difference. Don't you and your students deserve this refreshing change?