

# A Multisensory Approach to Maths

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This article highlights the importance of exploration during free play and demonstrates how storytelling and interactive games can be effectively integrated into teaching foundational mathematical concepts. Through hands-on experiences like building with wooden blocks and bundling sticks, children develop essential skills such as number sense, place value, and problem-solving, all while having fun.

One day, I saw two children from my UKG class playing and building a castle using wooden blocks. They were quite precise in the symmetry of the walls to make that castle stand. Their talk during that play was no less than that of skilled persons.

Child 1: *'Chal ab darwaza banate hain.'* (Let's make the door now.)

Child 1 put three blocks vertically on both sides in a ratio of 2:1. On seeing this, the other child observed:

Child 2: *'Ye toh achcha nahi lag raha, ek aur block laga issme.'* (This is not looking great, add one more block to it.)

So, they added one more block to make it equal. Later, they decided to make a roof over that and added one more block horizontally on top of those vertical blocks.

This play gave me an insight into my students' play with number bonds and drew my attention to using wooden blocks in mathematics. The most important factor at this age, when children are free to do a lot of things on their own, is children's engagement with the material that they see around them and its application in their play.

At the Foundational Stage, playing with mathematical concepts is more important than 'studying' them. All subject matter should be based on the play-way method, otherwise, children become victims of boring education and are never able to free themselves from it.

There are 20 students in the age group of 5 to 6 years in my class. Free play provides me with the opportunity to integrate their experiences because it allows them to independently choose their activities, playmates,

objects, and methods of play. Essentially, it enables children to select, create, and organise games based on their preferences and interests. As a result, they can pursue their ideas without specific goals, outcomes, or time constraints.

I often find that when children are given free play time, they count objects, separate them based on some criteria, form groups, create patterns from objects, etc. Similarly, with the help of different objects, they become familiar with different counting methods while playing. So, I used the following game with the children to help them visualise



Figure 1: Students make bundles and count numbers up to 20.

numbers beyond 10, build their understanding of place value, and do activities like counting in groups.

### Integrating stories and concrete manipulatives

Material used: Wooden blocks, video (story on bundle counting), and rubber bands

Objectives:

- Understanding place value
- Comparing numbers
- Representing numbers in concrete and abstract forms

I planned activities in several stages so that children could engage with various experiences as they progressed with an objective of the development of number sense and the concept of place value in the 10-base system. It is essential to implement various methods to facilitate the understanding of numbers beyond 10, as this foundational knowledge is crucial for grasping algorithms and future mathematical concepts.

The example given in the beginning depicts my students' free play talk about maths, so it gave me the idea to use the same resource in learning to count beyond 10. I decided to add some rubber bands along with the wooden blocks in their play section. As per my expectation, the children started playing and having fun; they played different types of games and made buildings, roads, bridges, etc. using wooden blocks. Some children also made bundles with the help of rubber bands. No instructions were given. Gradually, after this free play, we got back to our daily routine, and I asked them to bring whatever they had made with those wooden blocks. Children are always excited to show their work; I used this enthusiasm to draw their attention to the planned topic of the day.

**“ I often find that when children are given free play time, they count objects, separate them based on some criteria, form groups, create patterns from objects, etc. ”**

Next was storytelling. I narrated to them a story called *The Magical Rope*<sup>2</sup> Briefly, it is the story of a boy called Bhola, who knew how to count but forgot the number of counted items; he also did not know how to write them down. By the end of the story, he finds an easy way to count by making bundles of 10, which makes his work easier.



Figure 2: Students visualise numbers, which helps develop their ability to subitise.

During the story, there was a discussion with the children in which some of the questions were:

Q: *What should Bhola do if he forgets?*

Children: He can write it down.

Q: *Why do you think he did not write it down?*

Children: Maybe he doesn't know how to write or doesn't have a pencil; he lives in the forest and doesn't have a copy in which to write; maybe his teacher didn't tell him how to write numbers till 10.

Stories motivate and inspire children's imagination; they enable them to form connections with different subjects. Learners can understand meaning and context more easily when language is contextualised because it is familiar, and the story is supported by illustrations and drawings.

Next, I asked the children to make bundles, as Bhola did. During this activity, I observed that when children were counting and making groups, they were re-checking their count, and if they found some error, they restarted slowly till they arrived at a correct arrangement of blocks. While grouping blocks, they arranged them in different patterns, like 5+5 (5 blocks in each row), 3+3+3+1, etc.

This was not my plan at all, but their problem-solving skills added one more dimension to my teaching. This was related to the subitising of objects for counting just like when we roll the dice during play, we do not need to count the dots every time; the special arrangement of dots has made an impression in our minds and whenever we see items arranged in that pattern, we can quickly perceive the number. This was connected to the number line that was presented in the classroom on which children saw numbers represented in the form of objects, symbols, and special arrangement patterns.

We moved ahead, and I asked one child to act as Bhola and collect the wooden blocks from the classroom floor, and then she had to make a bundle of 10 and count forward. This was a fun activity for the children as everyone was eager to tell the girl that she was about to reach 10 and that she should make a bundle of it.

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Next, an activity was done with the children in which they were given 11, 13, and 14 open sticks in the group and asked to make bundles of 10. The children found this



Figure 3: Students count using concrete bundles and write numbers in pictorial form.

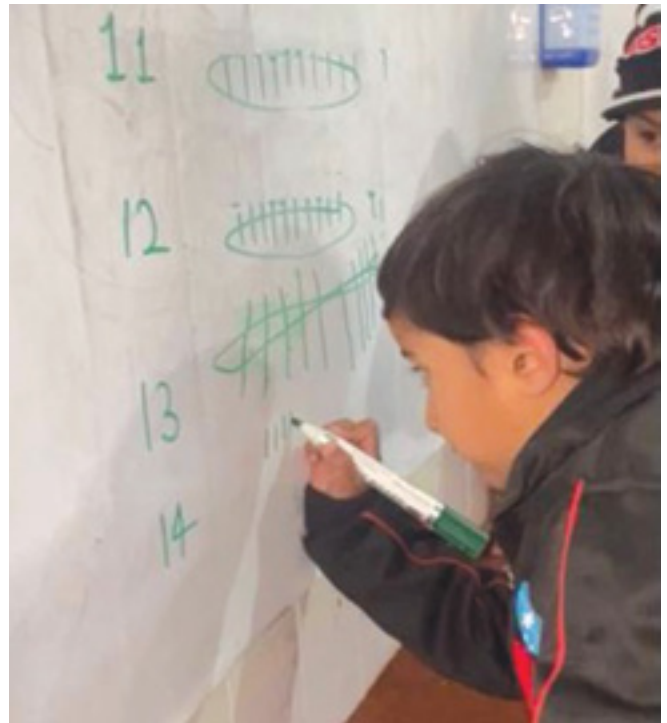


Figure 4: Students learn to write numbers using pictorial representation.

game very interesting, and even before I told them, they had started counting each other’s bundles of sticks and loose sticks.

Next, I thought of dealing with the representation of the bundles, as initially, children were asked to make bundles and then count. Later, I asked them to put the bundle on their left side and loose sticks on the right so that this would go with the abstract representation, i.e., numbers. It can also help avoid confusion about presenting the concept of tens and ones in symbols, i.e., numerals.

Such activities of counting and making bundles were done for a whole week till the children became familiar and competent enough to count the objects by grouping them. After this, I asked them if they could write how many sticks they had counted. ‘How can we write it?’ they asked. I replied, ‘Let us try to draw them.’ I gave them markers and asked them to write. They represented the numbers in pictorial forms (Figure 4). Some of them already knew numbers, and they eagerly wrote the

By integrating stories, concrete manipulatives, interactive play, drawing, and games, students can better understand and enjoy learning numbers. This multi-sensory approach caters to different learning styles and makes math concepts more accessible and fun.

numbers along with the pictorial form. And that came out as a whole new learning activity.

At this point, I was expecting that if asked to represent 11 (eleven) sticks on the board, children might write 101. But their pictorial representation was quite illustrative. Those who already knew the pattern of counting and could write numbers up to 50 easily, and some of them who could write up to 100, helped the other children to write numbers and quickly wrote 11 instead of 101. Here, it became easier for me to tell them that in place of the bundle, we write 1 as this is a single bundle, and then we write the number of loose sticks because they learned the nominal representation from their peers. In this way, my class of 20 children went through the experience of counting beyond 10, and out of those, 12 were able to group and count, represent in pictorial and written form, and read the number in abstract form.

The way forward: My children understood the concept, and now they can apply the concept ahead. The way forward with this concept is to develop the concept of number comparison, addition, and subtraction.

Challenge: Eight children in my class are still in the learning process as they have not reached the level of transition of symbolic representation, but they can count and make bundles to make numbers by following the patterns and arrangements. To scaffold them, I will regularly allow them to play with numbers until they become familiar with and grasp the concept.

## Conclusion

Around 80 percent of the brain of a child is developed by the age of 8 years. Keeping this in mind, I, as a teacher, try to familiarise them with new ideas, concepts, and experiences, which helps them learn about cause-and-effect relationships, problem-solving strategies, etc. That approach has worked well with students, but one must be careful while providing such ideas to build concepts at their age because these form the basis of their further learning. Also, since maths cannot be learnt in abstraction at this stage, the inclusion of story, enactment, and activities (such as bundle-making) by the students, and pictorial and nominal representation provide a wholesome experience to them.

<sup>1</sup> *The Magical Rope. BodhaGuru stories*

English: [https://www.youtube.com/watch?v=\\_CcGOt6q8m8](https://www.youtube.com/watch?v=_CcGOt6q8m8)

Hindi: <https://www.youtube.com/watch?v=r-Ta91qSa18>



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