

Foundational Numeracy with my Mathematics Kit

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It is the objective of a mathematics teacher to simplify mathematical processes, give children experiences with these and, thereby, keep every child connected with the processes in the classroom. If every child gets the opportunity to go through the process of learning mathematical concepts, they will be able to work comfortably with abstract ideas. This article explores such efforts of a teacher.

In our efforts to achieve the goal of foundational literacy and numeracy (FLN) by 2026-27, I worked with children from my school using teaching-learning materials (TLM) focused on foundational numeracy. I have seen positive results through this approach.

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Students in the class and their characteristics

I teach maths in class III, which has 28 students. The students are at different learning levels and, therefore, I have grouped them based on their cognitive abilities and requirements. We know that every child is unique, and

their learning pace and behaviour are also different. I try to make efforts towards providing concrete mathematical experiences to children of this age, because at the primary level, children are highly inquisitive and curious. They are eager to learn, and they learn things by doing, touching and observing. Children understand tangible concepts better.



Figure 1. Each student has a different pace and process of learning.

For instance, when it comes to counting, they prefer actual physical counting to mere verbal recitation; they enjoy it. When it comes to measurement, they want to measure things around them, compare them, and discuss with their peers to verify their findings. They want their experiences to be included and look for opportunities to do this.

Children at the primary level learn independently. It is said that rules cannot bind children. Therefore, the importance of hands-on experience, like doing and touching things, increases. From my perspective, this natural behaviour of children is a strong cornerstone of primary mathematics.

Limitations of the mathematics kit

Institutions associated with education have provided our school with teaching materials, which include a 'Mathematics Kit'. This kit includes materials related to counting, time, spatial knowledge, patterns, and mathematical games. Considering the learning behaviours of children at the primary level that I mentioned earlier, I always felt that work should be done with children using tangible objects. I already had the idea of using a mathematics kit in mind, and then we received one. However, since there was only one kit available at our school, not all children were able to benefit from it.

In the classroom, the kit became merely a tool for demonstration. The question was, 'How do I provide the opportunity of using one kit to the 28 students in the class at the same time?' The more active children of the class were the ones to use the kit more frequently. Children who were relatively reserved or hesitant were reluctant to use it. The instructions that came with the kit said that it should not be lost or damaged. This became another reason for students to use it with extra care; therefore, they were unable to make good use of it or benefit from it. Moreover, the kit did not contain materials covering all types of concepts. For instance, if the class was to be taught the concept of measurement, area, perimeter, fraction, etc., the kit lacked relevant material.

Idea of our own kit

Looking at these shortcomings of the kit, I thought of creating a maths kit that every student could use without any hesitation, which would contain materials relevant to most of the maths concepts taught at the primary level, and which the students themselves would make using the resources available to them. This would provide them with an opportunity to create a TLM themselves. As a result, they would have an emotional connection with it. This connection would help them be responsible for the kit and develop values of handling and preserving it.

I believe that the materials in the kit should also be based on the games and activities found in the textbook so that there is a connection between the two, and the kit would become an extension of the textbook.

There were also certain other aspects that I have listed below:

1. Students would be able to use the supplementary material independently.
2. They would be able to experience numerous mathematical concepts physically.
3. Participation of each child in using the material would be ensured.
4. Students would care for the kit responsibly.
5. If any TLM is broken or lost, it can be recreated.
6. The more concepts the kit covers, the more it will help children understand those concepts clearly.
7. Children would enjoy learning mathematics.
8. Children would learn to create things by creatively using waste materials.
9. Children would be able to associate the resources available at their homes and school with mathematics.
10. This process would also provide students with the opportunity to engage in discussions.



Figure 2. Students discuss materials to use for their kits.



Figure 3. When play becomes learning, learning becomes play.

Building mathematics kits

These points helped me in understanding the need for a mathematics kit and determining its contents. I put forth the idea of a maths kit to the students in a planned manner and put together a list of the supplementary teaching materials that should be available in the kit. The list was as follows:

1. A big box to store the contents
2. Number cards from 1 to 100
3. *Ginmala/ganitmala* (number garland)
4. Place value cards
5. Base ten blocks for units, tens, and hundreds
6. Objects and cards for patterns
7. Two-dimensional and three-dimensional shapes
8. A clock
9. Play money
10. Collection of mathematical games
11. Collection of mathematical stories and poems
12. TLM related to fractions
13. Masks for poems, stories, and role play
14. Material for measurement

All the students started building their mathematical kits – each one their own.

The process of building the kit started with the box. Children brought big cardboard boxes from their homes. I provided coloured paper, charts, fevicol, scissors, etc. They created beautiful boxes and decorated them with mathematical symbols. They named the boxes 'My Mathematical Kit'. During the process, the students helped one another. Some

of them cut out pictures from old books and pasted them onto the boxes and decorated them with sketches and coloured paper. It was delightful to see children so engaged in the maths class. They were excited and curious about the contents that would go into the box!

First, I asked the children to collect bottle caps. They made *ginmala* of 50 and 100 bottle caps. These strings had alternating sets of five red bottle caps, five blue bottle caps, and so on for easier counting. Some students made number strings using beads. They even made hanging cards for the number strings. Plastic paper was wrapped around the hanging cards so that numbers could be written on them and erased later. In this manner, the children made number cards from 1 to 100, place value cards, and blocks for units, tens, and hundreds for place value using chart paper cut-outs.



Figure 4. A child cuts out a mask for their maths kit.

They drew circles on cardboard and cut them out to make clocks. The clock hands were made of cardboard and stitched at the centre with a button, so that the hands could be rotated, giving children a hands-on experience similar to a real clock. Food wrappers (biscuits, toffees, etc.) showing the manufacturing date, expiry date, and weight of the material were collected and included in the kit. Old 25 and 50 paise coins were also placed in the

box. Play money was made with cards. Three-dimensional shapes were made using small boxes, and marking the face, edge, and vertex. For two-dimensional shapes, paper cuttings were used. Masks were made using thick chart paper. Board games were made with numbers written on A4 sheets, and the rules for playing were written on them. Coloured paper was also used for making patterns. Even empty bottles of different measures, such as 10 ml, 100 ml, 250 ml, 500 ml, etc., were included in the kit. Cardboard cuttings demonstrating fractions, such as $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$, were added to the contents of the box. We also collected some mathematical songs, wrote them down on pieces of paper, and kept them in the Mathematics Kit.

“ In a big group, such activities provide every child with an opportunity to learn. I have also observed that children like maths when taught in such a manner and even consider it their favourite subject. ”

Mathematics kits in the classroom

Whenever I work on numbers with children, I ask them to form numbers using cards. If the number is formed incorrectly, I instruct them to refer to place value cards. By doing this, children are able to make as well as understand numbers. Besides this, I ask them to present different numbers using number cards. They do it as a game, for example, who will find the number first. Various other activities are also undertaken with the help of number cards in the class. These include arranging cards in descending or ascending order; removing certain cards and finding the missing numbers; laying out cards from 0 to 9 on the table to form numbers such as 4, 20, or 042 (based on my question); or using the base ten strips to form a given number.

Using the *ginmala*, I work with the children on counting, counting in tens, even and odd numbers, skip counting

in twos, and the processes of addition and subtraction, etc. For instance, solving $20 + 5$ or $7 + 5$ by moving along the *ginmala*, or similarly doing subtraction. Activities such as skip counting by 2s and 3s gradually helped children move towards understanding multiplication tables. Using the shape and number cards from their mathematics kits, we also created different patterns.

I learned that children had developed a quantitative understanding through these activities. By using the blocks of 10 and 100 for addition and remainder problems, they got help in understanding the principle of carrying over in addition. Play money aided in developing an understanding of numbers and addition and subtraction. When children engaged in actual exchanges, they understood what they were practically doing through addition or subtraction.

Sorting concrete two-dimensional and three-dimensional shapes is also a part of this process. For example, showing a triangle, identifying a square, or holding both a square and a rectangle to compare similarities and differences. Similarly, in three-dimensional shapes, holding a cube and identifying its base, apex and edges; counting them; and finding similar shapes in their surroundings. Children use the clock they made themselves to show the current time, or to demonstrate 5:00, 5:15, 5:30, and 5:45 on their clock.

Impact of using a mathematics kit

Through such activities, children learn by observing and asking each other questions. In a big group, such activities provide every child with an opportunity to learn. I have also observed that children like maths when taught in such a manner and even consider it their favourite subject. When given the chance to recite mathematical poems or roleplay by engaging in exchanges, their faces light up, and they participate in activities involving the mathematical kit with great enthusiasm. Going forward, I plan to further enrich this kit. I am also trying to incorporate the games and activities discussed in the mathematics textbook into the kit.

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