



Mathsticks



January 2023, Issue 5

Monthly Newsletter dedicated to Primary and Elementary teachers
Mathematics Education Department, SCERT, Haryana

Special Feature of the Newsletter –

• Learnings from the Research

New aspects of the research will be shared to deepen your understanding of Mathematics learning.

• To do in the Classroom

In each issue, you will get suggestions to improve the maths learning process based on research.

• Take the challenge

Each issue will provide a challenging and exploratory task/ problem and puzzles that can be attempted by teachers or learners of any level. You can share your solution with us at

mathsedu.scert@gmail.com.

• Learning from the classroom experiences

In each issue, classroom experiences shared by teachers will be published.

You can share your comments/experiences with us at

<https://forms.gle/Xdq7zP4UYz2kFBgV7>

or mathsedu.scert@gmail.com

In this Issue

- What kind of feedback should teachers give to students to encourage growth mindset?
- **Challenge - for all levels of teachers and students**
- Harbans Puzzles - For Teachers and Students of all levels
- **Classroom experiences - what have I learned from my students?**
- **Research based- Facts about Multiplication- Part- III**

!!IMPORTANT!!

Every week, post at least one challenge/puzzle on your school notice board. Encourage children to do these. Let them struggle on their own. Don't stop their brain growth by telling them the solution.

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When you or your students work on these tasks

Don't forget to share with BRP/ ABRC/ DIET Mentor of your block.

The correct answer doesn't matter here, what matters is how you did, how was your problem solving journey, what strategies you used?



Mindset Works !!

Growth Mindset Messages # part 1

As students start learning new things, their growth mindset affects them constantly. Eventually they become flexible and focused towards learning. Monitoring and providing feedback of efforts of students and results of their efforts is essential because feedback from teachers enable students to assess their efforts.

What to Say : When student is working hard but unable to fetch positive outcomes-



* It seems difficult but your progress is clearly visible !

*No doubt it is tough, but you can do it.
Let's split the problem into parts and start over.

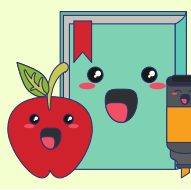
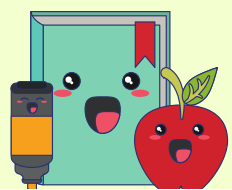
*If it is easy then how will you learn new things

Lets wind up today. Will start tomorrow with a different approach

Your hard-work and dedication is awesome. You will definitely get your ways with such dedication

Never be afraid of mistakes.
Your mistakes will indicate the point where you need my support.

Such messages motivate students. In next issue, we will discuss the circumstances when students are struggling and need your support.



Harbans Puzzle

You all must have heard about Harbans Puzzle. If not, then click on the link and learn to play this puzzle.



[Click here to watch how Harbans Puzzle is played](#)



Use 3 consecutive even numbers from 1 to 15

26+		2HCF
(70) LCM	22+	
		14

Use 3 numbers to solve this puzzle

		0.1+
0.2+	0.1+	
		0.2

1. How many steps were involved in solving the puzzle ?

2. What could be the minimum number of steps that can solve the puzzle ?

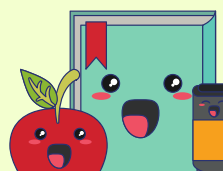
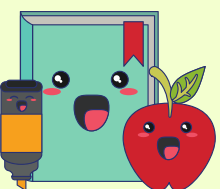
3. Can there be more than one solution to this puzzle?

4. could you think of more than one ways for a solution ?



Such mathematical puzzles are not only interesting for students but also help in growth of mathematical investigation and logical reasoning.

[Click here to read the article on Harbans Puzzle.](#)





Take The Challenge

Let us imagine that we are tiling a floor or terrace area.
Let us assume that the area is square and measures 3×3 .

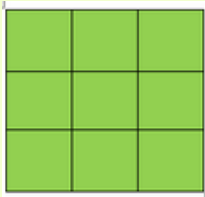
We have tiles in three sizes: 1×1 , 2×2 , and 3×3 .

These tiles can be laid in any arrangement, to cover the space completely.

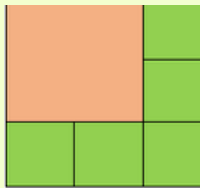
However, none of the tiles can be cut.

For your challenge, find out - what is the total number of tiles being made by the way you place the tiles ?

For example, for a 3×3 square, you can do this by using-



9 tiles of 1×1



1 tile of 2×2 , and 5 tiles of 1×1 ,
or



1 tile of 3×3

The smallest number of tiles is one and the largest is nine.
Now if you have tiles of measures 1×1 , 2×2 , 3×3 and 4×4 .

How Many Tiles Can You Use for a 4×4 Square Yard?

If you also have tiles of size 5×5 , how many tiles can you use for a 5×5 square yard?

The last part of this challenge requires you to carefully check the answers you got for each of the three parts – 3×3 , 4×4 and 5×5 .

Now discuss with your friends about what you observe.
What do you think would happen if one were to use tiles of size 6×6 and 7×7 ?

Suggested method: This problem can be shown on the board or digital board. Explain the task and ask the children- How can they tile the 3×3 square floor? They can also draw on a paper. Share your ideas on the board, so that students are fully familiar with the context.



Note: Why to do this challenge?

This task is a good starting point for students to investigate and develop problem solving skills. It stimulates children to work systematically, look for patterns, logical reasoning, and creatively apply the knowledge of the area and related concepts.

Let children focus -why some number of tiles are impossible ? Now ask them to focus on guessing about 6×6 and 7×7 .

Give students time to think and talk to each other, then bring the full discussion into the classroom, letting the children have their thoughts

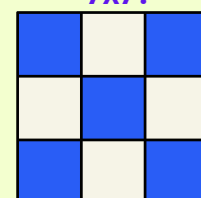
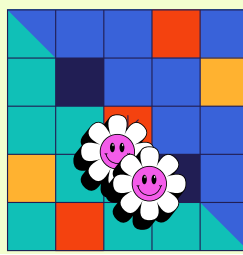
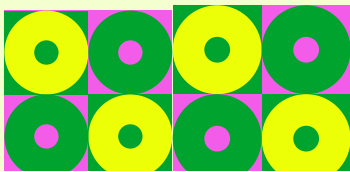
Main questions

Are you taking a different number of tiles each time?

What will be the maximum and minimum number of tiles for 6×6 and 7×7 respectively?

What is common in the tiling of 3×3 , 4×4 and 5×5 ? Can you apply this to 6×6 and

7×7 ?



Troubling Tables - Part3

Fluency with Numbers Using Flexibility

The multiplication facts in 9's table are the easiest to learn even though they are the largest because there are many patterns and reasoning strategies hidden in 9's table.



First of all, children usually use a table of 10 to find multiples of 9, for example I asked a child what is 3 times 9? The child used $3 \times 10 = 30$ to say that since $3 \times 10 = 30$ and 3×9 is only 3 less than that, $30 - 3 = 27$. If the child answers using this type of reasoning strategy, then definitely their number sense is developing.

If you feel that children are not yet using these strategies, they can be given opportunities to do this with the help of concrete objects. Interlocking cubes can be of great help or contextual situations such as 10 three-wheelers. Children's attention can be attracted to these strategies by including questions like how many wheels of 10 three-wheelers (auto) – 30, then how many wheels of 9 three-wheelers.



Second, the multiplication facts by nine include some interesting patterns that lead to finding multiplication facts. Encourage children to explore and discover these.

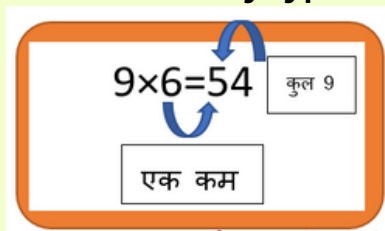
For example-

Ask children to find patterns by recording each fact in sequence.

$(9 \times 1 = 9, 9 \times 2 = 18, \dots, 9 \times 9 = 81)$



Children can find many types of patterns – such as –



×	0	1	2	3	4	5	6	7	8	9
0										0
1										9
2										18
3										27
4										36
5										45
6										54
8										72
9	0	9	18	27	36	45	54	63	72	81

The tens digit of the product is always one less than the one factor (except 9). The sum of the two digits in the product is always 9, so this pattern can be used to find the product, 9×8 . The product will be - 8 less than one i.e. 7 which will be the ten's digit and 2 will have to be added to 7 to make 9. So $9 \times 8 = 72$.

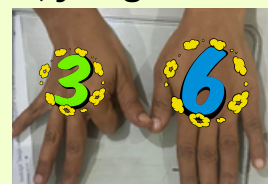


Based on the pattern, some children found a way using their fingers - Raise both hands up.

Start counting from the little finger from your left hand, for example, for 9×4 , you go to the fourth finger and bend it down.

look at your fingers- you have-

Three on the left side of the bent finger and six on the right side—36.



After discussing the pattern, it is also important

to find out how this pattern works because it is not easy to see the conceptual relation.

Challenge the kids to think about why these pattern works.

If you or your students discover more new patterns or find out why the above patterns or the patterns they discovered are working, then do share with us.

In the next issue, we will discuss how children can find out new (unknown) facts using known (already known) facts.



Learnings from the classroom experiences



What did I learn from my students?

I want to share some of my classroom experiences with you. Since the number of teachers is less than the number of classes, then it becomes challenging to teach and keep all the children busy in learning. This is a matter of second class. They had learned counting but the understanding that should have been achieved at this stage was not satisfactory. The irony was that I was not able devote much time with them.

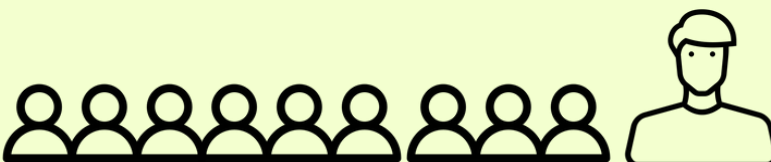


There is a picture of snakes and ladders in the second-class book. I was thinking why not to make it on a big board or buy it from somewhere because it is difficult to play on the book-page.

But my problems ended automatically when the government provided snakes and ladders and ludo game boards in the schools. So the beginning was like this. I gave those boards to the children. Without giving any instructions, without telling any rules and regulations, they and other children who were in the first grade were left free to play. They forgot everything and got immersed in playing. It went on like this for two to four days. I sometimes had to intervene in their arguments or settle some issues. But that interference was only like advice, not judgment. The effect of this was that within a few days, the children learned all that they should have learned in counting at that grade.

In the beginning, they used to count one step to move their counter forward, but soon after, they were able to place the counter at the required place in a single move without counting one by one. I was happy, the children were happier than me. By the way, I am not in favor of giving homework to small children, but sometimes it has to be done for the happiness of the parents. So the same type of work was given to the children that they were doing in the game, they could also do it in their notebooks. Amazingly, the younger children started reaching school before the older children. Yes, I also learned to be patient and also learned that children go on learning by not interrupting. .

Yes ! I learned to be patient and also learned that children go on learning even if they are not interrupting.



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