

Wonder of Sticks



Mona had understood that-



2 Rasgullas 2 Rasgullas 2 Rasgullas

2 , 3 times

or 3 times 2  = 6 

or 3 multiplied by 2 = 6

or $3 \times 2 = 6$

Mona told this to her friends Haneef and Jassi too.

She said that it is very easy to do multiplication. Repeated addition of any number is called multiplication.

All the friends began to test Mona's statement-

Jassi calculated $4 + 4 + 4$ or $3 \times 4 = 12$ lemons.

Haneef calculated $3 + 3 + 3 + 3$ or $4 \times 3 = 12$

Lemons



How did this happen? Mona was excited. All were trying to prove themselves right.

Mona explained, "All of you are correct. The difference is only how you see it."

You also understand-

There are total 20 trees in this garden. Seeing from here you will find there are 4 rows, 5 trees in each row.

That means, the number of trees in this garden is 4 times of 5.

$5 + 5 + 5 + 5 = 20$ trees

or $4 \times 5 = 20$ trees.



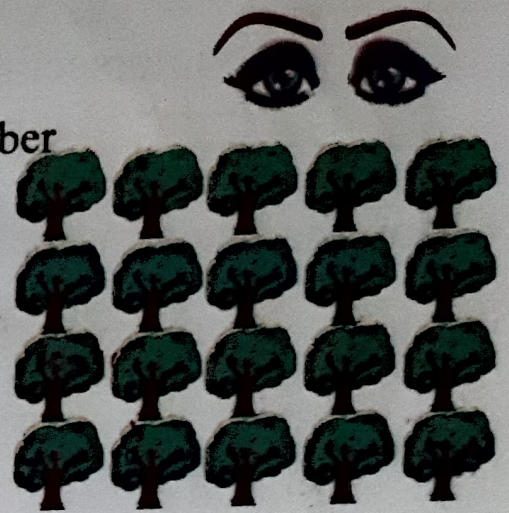
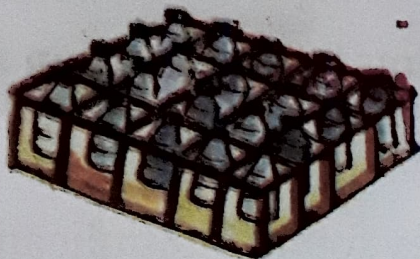
Let us see this garden from the other side.

Seeing from here, you will find there are 5 columns.

There are 4 trees in each column. That means, the number of trees in this garden is 5 times of 4.

$$4+4+4+4+4=20 \text{ trees}$$

$$\text{Or } 5 \times 4 = 20 \text{ trees}$$



Now tell, how many total bottles are there ?
..... $\times$=..... bottles.

The game of sticks-

Lalit was standing there and listening to the above conversation. He came closer and said- "Give me any question of multiplication. I will tell you its answer without adding or multiplying it".

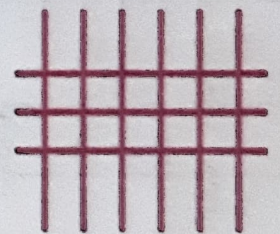
Jassi quickly said " 3×6 ."

Lalit took out a few sticks from his pocket and arranged them in this manner-

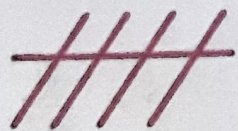
He said 3 times 6=18

How would Lalit have done this?

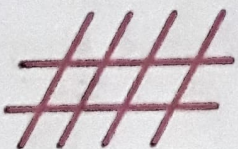
Let us understand-



1 time $4 = 1 \times 4 = 4$ (4 points of intersection)

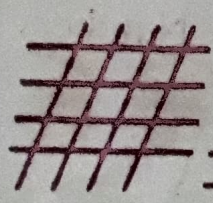
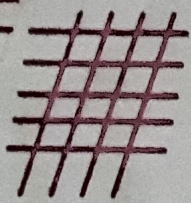


2 times $4 = 2 \times 4 = 8$ (8 points of intersection)



3 times $4 = 3 \times 4 = 12$ (12 points of intersection)



times.....=..... $\times$=..... (points of intersection)
times.....=..... $\times$=..... (points of intersection)

Similarly, arrange sticks for more numbers. Count the points of intersection for each and find the products.

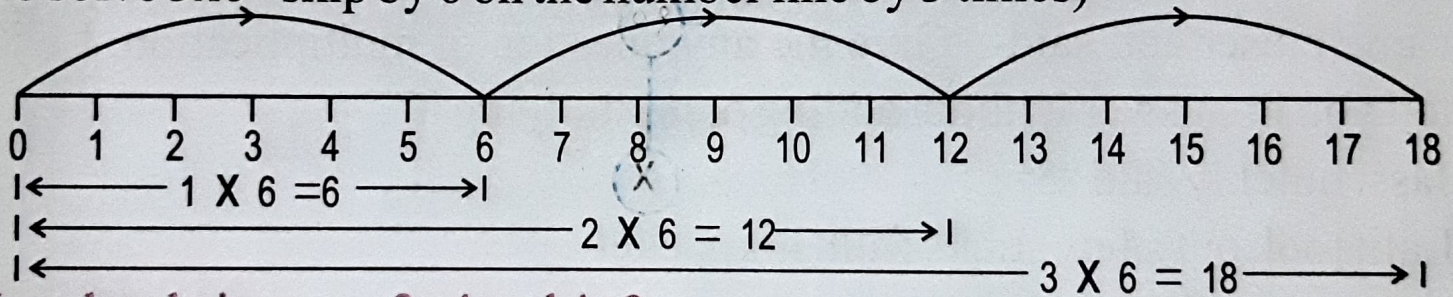
Arrange 0×4 and 4×0 sticks. How many points of intersection are there? Not even one (0).

Therefore, we can say that $0 \times 4 = 4 \times 0 = 0$

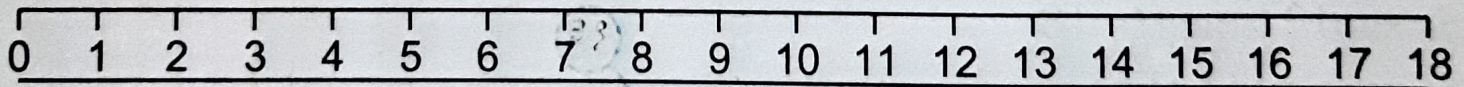
All the friends understood the game of sticks. They found multiplication to be very interesting.

You know that $3 \times 6 = 18$. Let us look at it in another way.

(To solve 3×6 - skip by 6 on the number line by 3 times)



You also do it - 2×4 and 4×2



Make tables, solve them-

5	4	7	9
$\times 8$	$\times 5$	$\times 0$	$\times 1$
<u>40</u>	<u> </u>	<u> </u>	<u> </u>

Think, to solve 9×12 , should we add 12, 9 times or is there any other easy method too?

We know that - $12 = 10 + 2$

So, $9 \times 12 = 9 \times 10 + 9 \times 2 = 90 + 18 = 108$

If 12 children have to be given 9 toffees each, how many toffees would be we needed? How would you find out?

Can we solve 12×9 in this way?

$$\begin{array}{r} 12 \\ \times 9 \\ \hline \textcircled{1}8 \end{array} \rightarrow \begin{array}{r} \textcircled{1} \\ 12 \\ \times 9 \\ \hline 108 \end{array}$$

Begin by multiplying 9 with 2. 2 times of 9 ones will be 18, write the ones digit of 18 i.e, 8 below ones column. The tens digit of 18, i.e, 1 should be written over tens place as carry over. Multiply 9 by 1 (at the tens place) and write by adding 1 carry to it.

Hanif, Mona and Jassi solved the following sum in this way-

$$24 \times 12 = ?$$

We know $12 \times 10 + 2$

$$\begin{aligned} \text{Therefore, } 24 \times 12 &= 24 \times 10 + 24 \times 2 \\ &= 240 + 48 \\ &= 288 \end{aligned}$$

(Mona and Haneef)

$$\begin{array}{r} 24 \\ \times 12 \\ \hline \textcircled{4}8 \end{array} \rightarrow \begin{array}{r} \textcircled{4} \\ 24 \\ \times 12 \\ \hline 288 \end{array}$$

(Jassi)

Which is the correct method of multiplying 24×12 ?

Which method do you like?

Now, what will you do to solve 123×14 ?

We know $14 = 10 + 4$

$$\text{Therefore, } 123 \times 14 = 123 \times 10 + 123 \times 4 = 1230 + 492 = 1722$$

Can we solve it in this way also?

$$\begin{array}{r} 123 \\ \times 14 \\ \hline \textcircled{1}2 \end{array} \rightarrow \begin{array}{r} \textcircled{1} \\ 123 \\ \times 14 \\ \hline 492 \end{array} \rightarrow \begin{array}{r} 123 \\ \times 14 \\ \hline 492 \\ + 1230 \\ \hline 1722 \end{array}$$

think, how?

Discuss in detail with children about all these methods of multiplication.

Solve these too-

$$64 \times 10 \quad 58 \times 20 \quad 26 \times 30$$

Can we say that, if any number is multiplied by 10, 20, 30..... we obtain 10 times the product of 1, 2, 3 and that number. For this we simply multiply the number by 1, 2, 3,..... and place a zero to the right most of the product obtained.

Think, if a number is multiplied by 100, 200, 300... what product will be obtained?

We have Learnt

- The product of multiplication remains the same even if the number to be multiplied are interchanged.
- If zero is multiplied by any number or any number is multiplied by zero, the product is always zero.
- If any number is multiplied by 1, the product will be that same number.
- If any number is to be multiplied by 10, 20, 30,..... simply multiply that number by 1, 2, 3,..... respectively and place a zero to the right side of the product.



Exercise

1. Complete it-

$3 \times 7 = \dots\dots\dots$

$2 \times 8 = \dots\dots\dots$

$5 \times 9 = \dots\dots\dots$

$3 \times 10 = \dots\dots\dots$

$10 \times 6 = \dots\dots\dots$

$0 \times 7 = \dots\dots\dots$

$4 \times 8 = \dots\dots\dots$

$9 \times 7 = \dots\dots\dots$

$8 \times 3 = \dots\dots\dots$

2. Complete according to the pattern-

- 3, 6, 9,,,
- 7, 14, 21,,,
- 10, 20, 30,,,
- 30, 60, 90,,,

3. If there are 5 buttons in one coat, how many buttons are there in 3 coats?

4. Solve these-

$$22 \times 3 = \dots\dots\dots \quad 30 \times 5 = \dots\dots\dots \quad 48 \times 7 = \dots\dots\dots$$

$$63 \times 9 = \dots\dots\dots \quad 74 \times 8 = \dots\dots\dots \quad 88 \times 4 = \dots\dots\dots$$

5. A child has 5 books. Each book has 18 pages. How many pages are there in all the 5 books?

6- There are 132 students in a school. On Monday, all the students were given 2 bananas each. How many bananas were distributed in all?

7- Solve these-

$$42 \times 23 = \dots\dots\dots \quad 54 \times 12 = \dots\dots\dots \quad 132 \times 12 = \dots\dots\dots$$

$$246 \times 18 = \dots\dots\dots \quad 105 \times 15 = \dots\dots\dots \quad 130 \times 28 = \dots\dots\dots$$

8- How many tyres will be there in 5 bicycles?

9- How many tyres will be there in 14 cars?

For developing conceptual understanding of multiplication among the students, the teacher should get the sums solved using more than one method. Later practice the related exercises in the workbook.