MULTIPLICATION

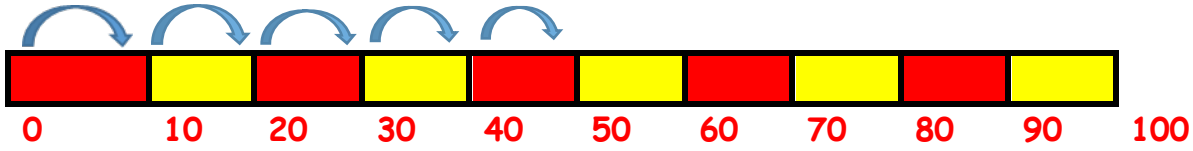
At the beginning of Primary School, children will focus mainly on doubling numbers up to 10 and some children will begin to double numbers up to 20.

Objects can be presented in groups of 10. For example, collecting 10 of any treasured object in each bag, such as fir cones or smooth pebbles.
The children will practice counting in 5s. This forms the basis for the 5x table.
They will also begin to count in 2s.

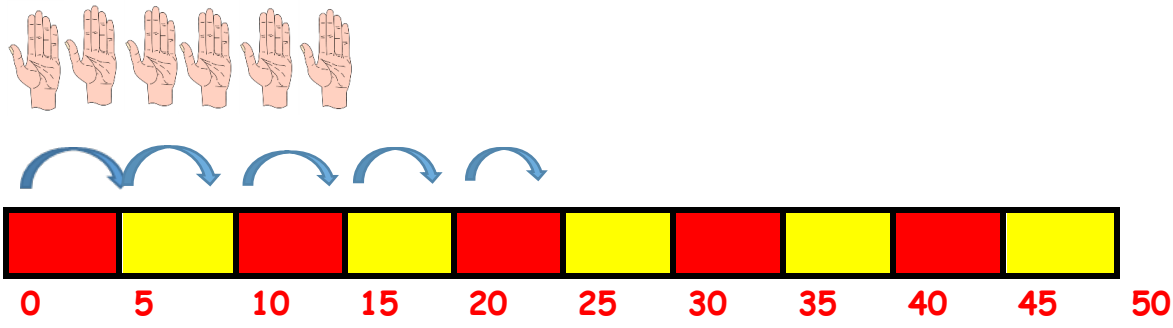
Children will then experience equal groups of objects and will count in 10s, 5s and 2s.
They will work on practical problem solving activities involving equal sets or groups.

e.g. There are 10 crayons in each box.

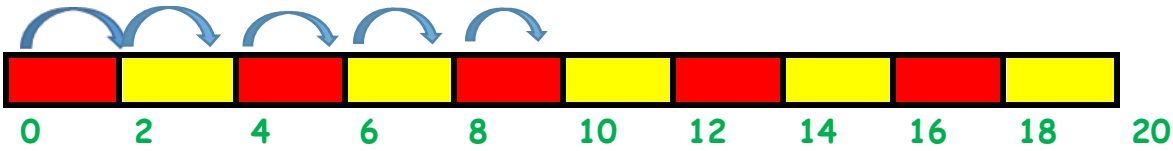
How many crayons are there altogether?



e.g. How many fingers are there altogether on six hands?



e.g. Count five hops of 2 along this counting stick. What number will you reach?

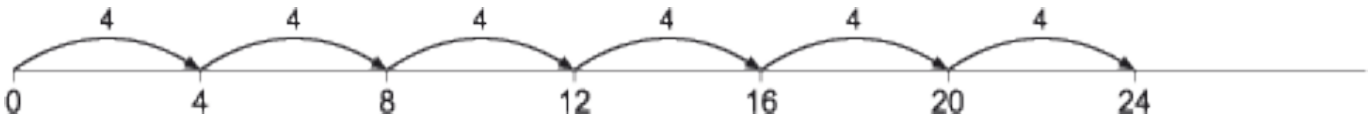


Children use repeated addition to work out their calculations.

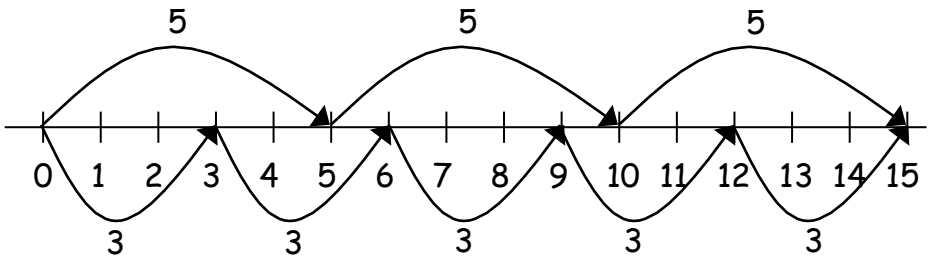
4 +4 +4 +4 +4 =20

Write this addition fact as a multiplication fact.

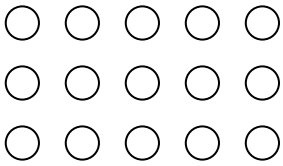
□ x □ = □



Children should know that 3 x 5 has the same answer as 5 x 3 but describes a different situation. This can also be shown on the number line. The Learn Its and switchers are key to embedding this understanding and quick recall.

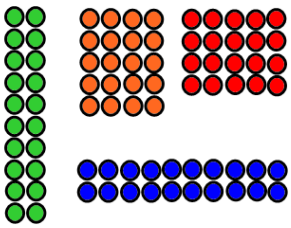


Children should be able to model a multiplication calculation using an array. This knowledge makes links to division.



5 x 3 = 15

3 x 5 = 15

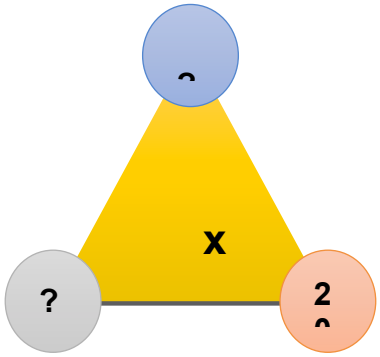


Here are 20 counters. How could you arrange them in equal rows? How could you use a number sentence to show your arrangement?

The above activity can be linked to missing box questions like the ones below.

What could the missing numbers be?

□ x □ = 20



Hundred squares

Hundred squares are used to identify multiples and the patterns they make. Children are encouraged to work beyond the 10th multiple on a hundred square, reinforcing the idea that the 2 times table doesn't stop at 20 and the 3 times table doesn't stop at 30.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Multiples of 3

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Multiples of 2

Questions and tasks are posed such as;

- Which is the highest multiple of 2 before 51? How many are left over? (This supports division and remainders later on).
- What can you tell me about the patterns made on the square by the 3 times table?

Multiplying by 10 and 100

When multiplying by 10, children are encouraged to move their digits 1 place to the left **then** add a zero. When multiplying by 100, we move the digits 2 places to the left then add 2 zeros and so on.

H T U
2 5 x 1 0
2 5 0

T H T U
2 5 x 1 0 0
2 5 0 0

It is very important to show that the **digits move first** and then the zeros are added.

Partitioning

Children apply their knowledge of multiplying by 10 or 100 and place value to work out more complex multiplications. Partitioning develops mental agility and is a very powerful tool for development of mental mathematical strategies.

e.g. *26 x 2 = 52*

20 x 2 = 40

6 x 2 = 12

40 + 12 = 52

34 x 5 = 170

30 x 5 = 150

4 x 5 = 20

150 + 20 = 170

Multiplying by 10 and 100

When multiplying by 10, children are encouraged to move their digits 1 place to the left **then** add a zero. When multiplying by 100, we move the digits 2 places to the left then add 2 zeros. When multiplying by 100, we move the digits 3 places to the left then add 3 zeros.

H T U	T H T U	T_{th} T H T U
2 5 x 1 0	2 5 x 1 0 0	2 5 x 1 0 0 0
2 5 0	2 5 0 0	2 5 0 0 0

It is very important that the **digits move first**, then the zeros are added, as is shown in the decimals example below.

✓

H T U . t h

2 . 5 x 1 0

2 5 . 0

In this example the digits move first then a zero is added, giving the correct answer of 25.

✗

H T U . t h

2 . 5 x 10

2 . 5 0

In this example a zero is added without moving the digits first, giving the incorrect answer of 25.

Partitioning

Children apply their knowledge of multiplying by 10 or 100 and place value to work out more complex multiplications. Partitioning develops mental agility and is a very powerful tool for development of mental mathematical strategies. It is further developed to include calculations up to 3 decimal places.

26 x 2 = 52	*34 x 5 = 170*	*2.37 x 6*
20 x 2 = 40	30 x 5 = 150	2 x 6 = 12
6 x 2 = 12	4 x 5 = 20	0.3 x 6 = 1.8
40 + 12 = 52	**150 + 20 = 170**	0.07 x 6 = 0.4
		12 + 1.8 + 0.42 = 14.22

Column method

The children then move onto a standard column method which involves carrying tens, hundreds etc into the next column.

Example 1	Example 2	Example 3
3 6	3 4	2 . 6
X 2	x 5	x 4
7 2	1 7 0	1 0 . 4
1	2	2

Example 1

Step 1

Multiply the 6 units by 2 units. The answer is 12 so record the units digit (the 2) in the units column and place the 1 ten underneath the tens column, to be added later.

Step 2

Now multiply the 3 tens by the 2 units. The answer is 6 tens but remember to add the 1 extra ten that was left over from the units column. 6 tens add 1 ten is 7 tens, so record 7 in the tens column. The answer is 71.

Example 2

Step 1

Multiply the 4 units by 5 units. The answer is 20 so record the units digit (the 0) in the units column and place the 2 tens underneath the tens column, to be added later.

Step 2

Now multiply the 3 tens by the 5 units. The answer is 15 tens but remember to add the 2 extra tens that were left over from the units column.

15 tens add 2 ten is 17 tens, so record 7 in the tens column and the 1 (which represents 1 hundred) in the hundreds column. The answer is 170.

Example 3

Step 1
Multiply the 6 tenths by 4 units. The answer is 2.4 so record the tenths digit (the 4) in the tenths column and place the 2 units underneath the units column, to be added later.
Step 2
Now multiply the 2 units by the 4 units. The answer is 8 but remember to add the 2 extra units that were left over from the tenths column.
8 add 2 is 10, so record 0 in the units column and the 1 (which represents 1 ten) in the tens column. The answer is 10.4.
Step 3
Drop the decimal point directly underneath in the answer space. This will hold the place accurately.

Long Multiplication

The children will then extend to **long multiplication**. This is where a number is multiplied by a number greater than a single digit.

For example, 34 x 52

```
      3  4
   x  5  2
   ------
      6  8
+  1  7  0  0
   ------
     2
   ------
   1  7  6  8
   ------
```

Step 1
Multiply the 2 units by the 4 units. The answer is 8. Record this in the units column.
Multiply the 2 units by the 3 tens. The answer is 6 tens. Record 6 in the tens column.

Step 2
Now place a zero in the units column of the answer line below. Now we can just multiply the number 34 by 5, instead of 50.
5 times the 4 units is 20, so record the 0 in the tens column and carry the 2 into the hundreds column.
Multiply the 3 tens by 5. The answer is 15, but also add the 2 hundreds left over in the hundreds column. 15 hundreds add 2 hundreds is 17 hundreds, so record 7 in the hundreds column and 1 in the thousands column.

Step 3
Now add up the 2 answer lines using the addition column method to give an answer of 1768.