Multiplication

To begin with, children learn about equal groups

Equal groups in circles; equal groups with markers eg teddy bears; equal groups without markers

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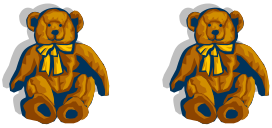

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Children also learn to count rhythmically or to skip count

Example ○○ ○○

1 **2** 3 **4**

When they do this, they add the same number all the time

Example 2 4 6 8

+2 +2 +2

When children are in year 3, they are ready to learn how to multiply numbers

Children begin by investigating multiplication by 2, 4, 3, 10 and 5 (not times tables)

Then, multiplication by 8, 6, 9 and 7 (not times tables)

Students are asked to imagine a number that is 2 times bigger (double); 4 times bigger (double and double again); 3 times bigger; 6 times bigger etc

Learning times tables isn't enough because

we want children to be able to multiply large numbers

Distributive property of multiplication

Distributing multiplication over addition

*(children can partition numbers they **can't** multiply, into numbers they **can** multiply and then add the products)*

Example (single digit)

$2 \times 7 = 14$

$2 + 5$

$2 \times 2 =$ **4** *(is the product)*

$2 \times 5 =$ **10** *(is the product)*

So, $4 + 10 = 14$

This can work with teen numbers and 2 digit numbers

Example (teen number)

$2 \times 14 = 28$

$10 + 4$

$2 \times 10 = 20$

$2 \times 4 = 8$

So, $20 + 8 = 28$

Example (2 digit number)

$2 \times 45 =$

$40 + 5$

$2 \times 40 = 80$

$2 \times 5 = 10$

So, $80 + 10 = 90$

Children can partition either number

Example

$4 \times 13 = 52$

$2 \quad 2$

$2 \times 13 = 26$

$2 \times 13 = 26$

So, $26 + 26 = 52$

OR

$4 \times 13 = 52$

$10 \quad 3$

$4 \times 10 = 40$

$4 \times 3 = 12$

So, $40 + 12 = 52$

Multiplicative place value

When a number is multiplied by 10, it moves one column to the left

thousands	hundreds	tens	ones
			1
		1	0
	1	0	0
1	0	0	0

x10 x10 x10

Using multiplicative place value

Example 4 x 56 =224

50 + 6

4 x 50 =

same as 4 x 5 x 10 =

same as 20 x 10 =

When a number is multiplied by 10, it moves one column to the left

hundreds	tens	ones
2	2	0
	0	0

x10 x10

So, 20 x 10 becomes 200

Back to multiplying 4 x 56 = 224

4 x 50 = 200

4 x 6 = 24

So, 200 + 24 = 224

Multiplying by 5

Example

5 x 8 = 40

Start with 10 x 8 (which we know) = 80

Then halve 80

$\frac{1}{2}$ of 80 = 40

So, 5 x 8 = 40

Multiplying by 9

Example

9 x 7 = 63

Start with 10 x 7 = (which we know) = 70

10 x 7 is 1 x 7 more than 9 x 7

So, 70 - 7 = 63