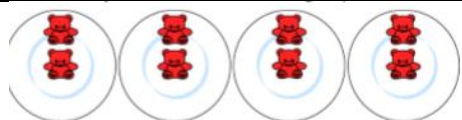


Multiplication structures: representing equal groups and repeated addition *Introduced at Year 2*



There are 4 equal groups. There are 2 in each group.
4 groups of 2.

2	2	2	2
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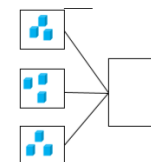
2 + 2 + 2 + 2

$$4 \times 2$$

$$4 \times 2 = 8$$

The 4 represents how many equal groups
X symbol means groups of / lots of
The 2 represents how many in each
group
The 8 represents how many there are
altogether

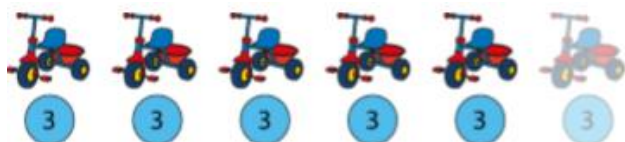
Other representations



Times tables: steps to learn and practise each times tables (order to learn times tables: 1, 5, 10, 2, 4, 8, 3, 6, 9, 11, 2) *Introdouced at Year 2* *Example using the 3 times table*

Step 1: learn the skip counting pattern and link to a concrete or visual representation

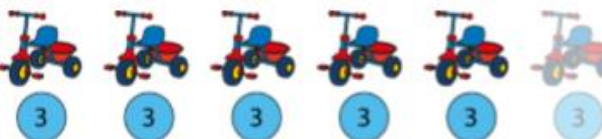
3 6 9 12 15...



Step 2: construct each times tables along side a visual representation

Start at zero groups of 3... recording the number of groups, how many in each group and product as a multiplication equation (Add on a representation of 3 each time as you build up to 12 x)

Say: 1 group of 3 is 3, write $1 \times 3 = 3$



$$0 \times 3 = 0$$

$$1 \times 3 = 3$$

$$2 \times 3 = 6$$

$$3 \times 3 = 9$$

$$4 \times 3 = 12$$

$$5 \times 3 = 15$$

$$6 \times 3 = 18$$

Step 3: Practice chanting the full times table with the written times table to support at first

- One group of three is equal to three, two groups of three is equal to six...
- One three is three, two threes are six,...

Step 4: writing an equation to match a representation (in words, repeated addition and multiplication equation)

5 groups of 3

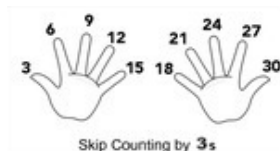
$$3 + 3 + 3 + 3 + 3$$

$$5 \times 3 = 15$$



Step 5: reciting the times tables up to the fact they need to answer.

- Using fingers on their hand to represent each group as they skip count up to the fact or saying the times table up to the fact needed.



Step 6: being able to spot patterns and generalisations for each times tables
For example: we are adding on a group of 3 each time, the digits in the product always add up to 3, 6 or 9

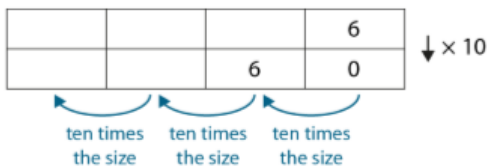
Step 7 : Recalling facts in isolation - this is the ultimate aim

Multiplying whole numbers by 10 and 100 Introduced at Year 3

X 10

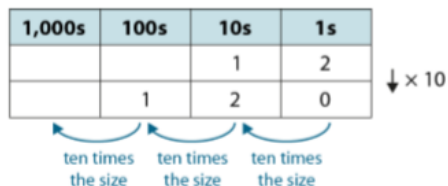
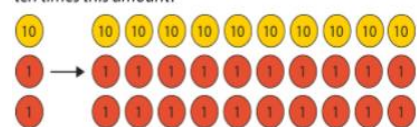
- When you multiply a whole number by 10, the product is always a multiple of 10.
- You make each digit 10 times greater.
- The digits always stay in the same order
- To multiply a whole number by 10, you place a zero after the final digit

$$6 \times 10 = 60$$



$$12 \times 10 = 120$$

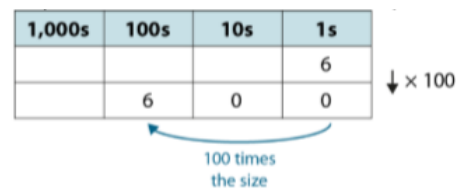
'I have twelve. This is one ten and two ones. How much is ten times this amount?'



X 100

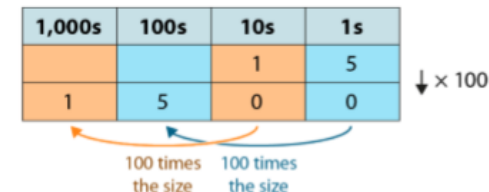
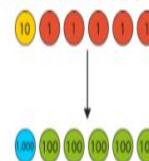
- When you multiply a whole number by 100, the product is always a multiple of 100.
- You make each digit 100 times greater.
- The digits always stay in the same order
- To multiply a whole number by 100, you place 2 zeros after the final digit

$$6 \times 100 = 600$$



$$15 \times 100 = 1500$$

'I have fifteen. This is one ten and five ones. How much is one hundred times this amount?'



Short multiplication: 2 digit multiplied by a single digit using partitioning and known facts

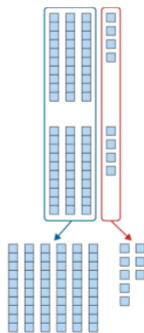
Concrete representations (Year 3)

No regrouping

$$34 \times 2 =$$

34 2 times

3 tens and 4 ones
multiplied by 2



Jottings (Year 4 onwards)

$$34 \times 2 =$$

$$30 \quad 4$$

$$30 \times 2 = 60$$

$$4 \times 2 = 8$$

$$60 + 8 = 68$$

Formal method (Year 4 onwards)

Expanded multiplication
algorithm:

10s	1s
3	4
\times	2
6	8
6	0
6	8

$2 \times 4 \text{ ones} = 8 \text{ ones}$

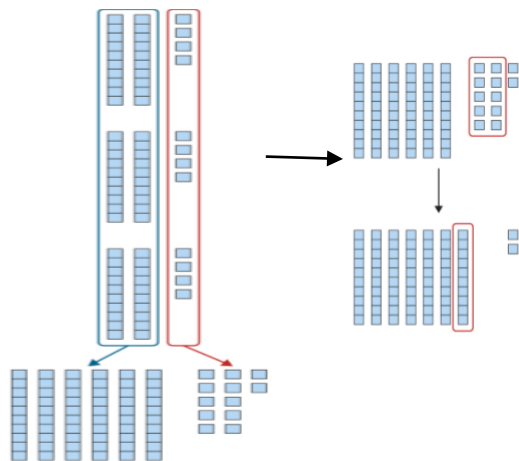
$2 \times 3 \text{ tens} = 6 \text{ tens}$

$$\begin{array}{r} 34 \\ \times 2 \\ \hline 68 \end{array}$$

Regrouping example

$$24 \times 3 =$$

24 3 times



Regrouping example

$$\begin{array}{r} 24 \times 3 = \\ 20 \quad 4 \end{array}$$

$$20 \times 3 = 60$$

$$4 \times 3 = 12$$

$$60 + 12 = 72$$

Regrouping example

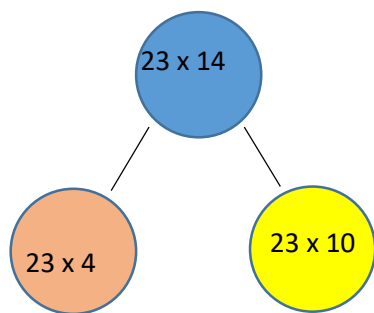
	10s	1s
	2	4
\times		3
	1	2
	6	0
	7	2

$3 \times 4 \text{ ones} = 12 \text{ ones} = 1 \text{ ten} + 2 \text{ ones}$

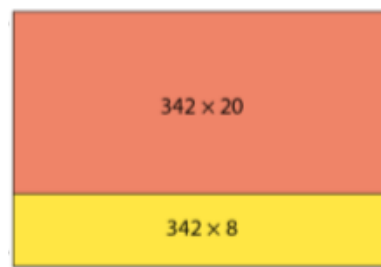
$3 \times 2 \text{ tens} = 6 \text{ tens}$

$$\begin{array}{r} 24 \\ \times 3 \\ \hline 72 \\ \hline 1 \end{array}$$

Long multiplication 3 or 2 digit multiplied by a 2 digit Year 6



		2	3	
\times		1	4	
		9	2	(23×4)
	2	3	0	(23×10)
	3	2	2	
	1			



Th	H	T	O
	3	4	2
		2	8
2	7	3	6
6	8	4	0
9	5	7	6
1			