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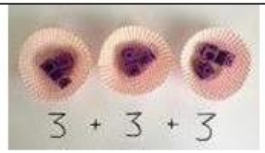
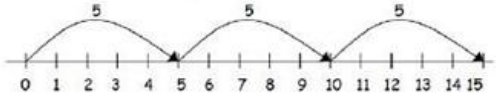
YEAR 1/2 — Calculating strand: MULTIPLICATION — 15/11/19

Y1 Vocabulary	Y2 Vocabulary	Y1 Key Questions	Y2 Key Questions
Ones, groups, lots of, doubling, repeated addition groups of, lots of, times, columns, rows, longer, bigger, higher etc, times as (big, long, wide …etc)	multiple, multiplication array, multiplication tables / facts groups of, lots of, times, columns, rows	Why is an even number an even number? What do you notice? What's the same? What's different? Can you convince me? How do you know?	What do you notice? What's the same? What's different? Can you convince me? How do you know?

Example Questions

Basic	Advancing	Deep
Use …and … in a number sentence. **Illustrate** the problem **Memorise** the multiplication facts for the … times table **Match** the answers to the number problems **Tell** a friend how you solved the problem	**Compare** which method you prefer to use **Identify** patterns in the number sentences **Modify** the numbers to change the answer **Organise** the numbers into a number sentence.	**Prove** how you know the answer is… **Investigate** how many different ways you can make …using multiplication. **Explain** your method **Create** two multiplication number sentences from the given numbers.

Objective	Concrete	Pictorial	Abstract
Repeated addition	   Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?  2 + 2 + 2 = 6  5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures.  2 + 2 + 2 = 6

Arrays- showing commutative multiplication	Create arrays using counters/cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.  4 × 2 = 8 2 × 4 = 8 4 multiplied twice  2 × 4 = 8 4 × 2 = 8 2 x 4 2 multiplied 4 times	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

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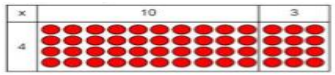
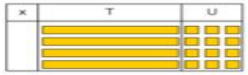
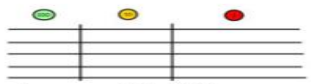
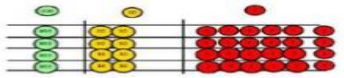
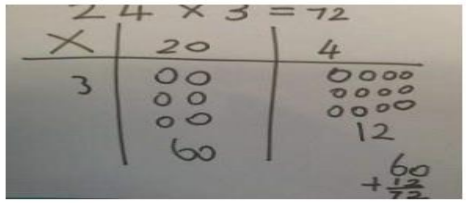
YEAR 3/4 — Calculating strand: MULTIPLICATION — 15/11/19

Y3 Vocabulary	Y4 Vocabulary	Y3 Key Questions	Y4 Key Questions
partition grid method inverse	Factor	What do you notice? What's the same? What's different? Can you convince me? How do you know?	What do you notice? What's the same? What's different? Can you convince me? How do you know?

Example Questions

Basic	Advancing	Deep
Arrange your multiplication calculation in a different order **Use** a different multiplication method to solve the calculation. **Describe** your method of multiplication to a partner. **Tell** a friend how you solved the problem	**Organise** your calculation as a written method. **Explain** your method **Estimate** the answer **Compare** two written methods and **explain** which one is your preferred method. **Apply** your written method to solve.	**Prove** you are correct **Create** a word problem **Create** a help sheet to explain the written method that you have used. **Investigate** the total journey time/distance if travelled each day for x amount of days.

Objective	Concrete	Pictorial	Abstract
Grid method	Show the link with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move on to using Base 10 to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.  Fill each row with 126.  Add up each column, starting with the ones making any exchanges needed.  4 × 126 = 504	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | 7 | 210 | 35 | 210 + 35 = 245 Moving forward, multiply by a 2 digit number showing the different rows within the grid method. | | 10 | 8 | | 10 | 100 | 80 | | 3 | 30 | 24 | | X | 1000 | 300 | 40 | 2 | | 10 | 10000 | 3000 | 400 | 20 | | 8 | 8000 | 2400 | 320 | 16 |

Expanded method			Start with long multiplication, reminding the children about lining up their numbers clearly in columns. 18 3 x . 24 (3 x 8) 30 (3 x 10) + 54

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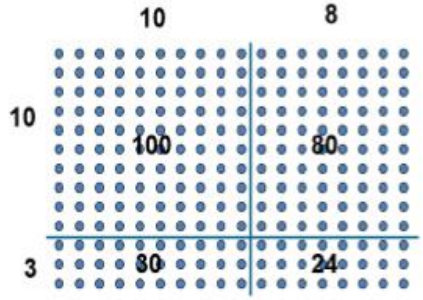
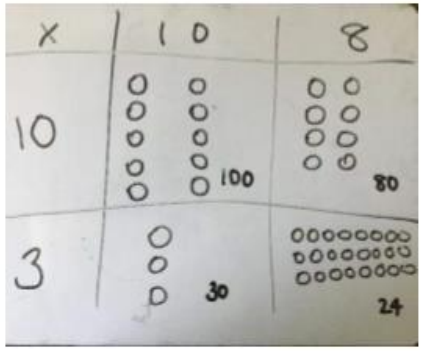
YEAR 5/6 — Calculating strand: MULTIPLICATION — 15/11/19

Y5 Vocabulary	Y6 Vocabulary	Y5 Key Questions	Y6 Key Questions
cube numbers, prime numbers square numbers, common factors prime number, prime factors, composite numbers	See previous years common factor	What do you notice? What's the same? What's different? Can you convince me? How do you know? How do you know this is a prime number?	What do you notice? What's the same? What's different? Can you convince me? How do you know?

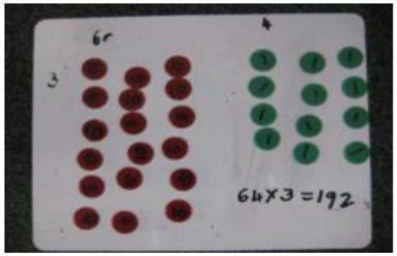
Example Questions

Basic	Advancing	Deep
Use column multiplication to multiply … and … **List** all the different vocabulary for multiplication. **Tell** me the method you have used to find the total	**Predict** if a x b would total an odd or an even number. **Estimate** the answer to ..., work out the answer to check your estimation. **Explain** your method. **Organise** your calculation	**Create** your own word problem. **Design** your own recipe for one meal then scale it up for 4 people. **Investigate** multiple distances travelled on a map.

Objective	Concrete	Pictorial	Abstract
Expanded method	Show the link with arrays to first introduce the expanded method. 		2 digit x 2 digit 18 x 13 24 (3 x 8) 30 (3 x 10)) 80 (10 x 8) 100 (10 x 10) 234

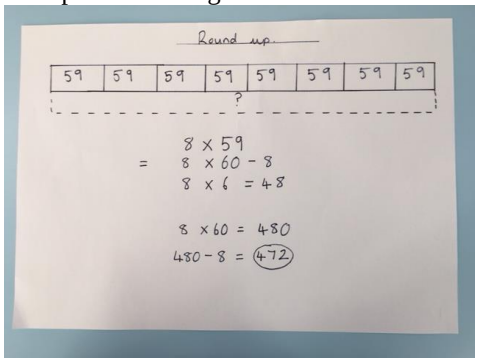
Compact Method

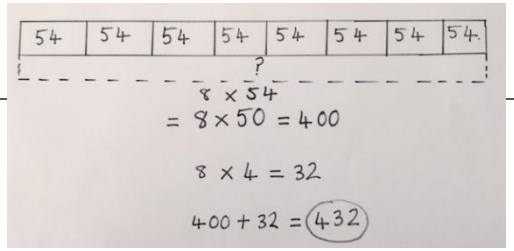
Children can continue to be supported by place value counters at the stage of multiplication.

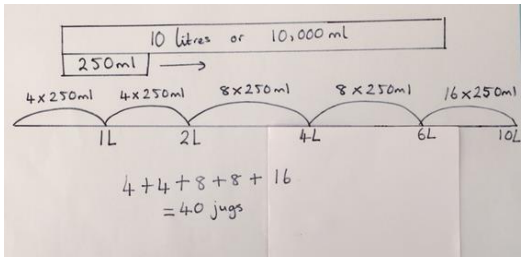


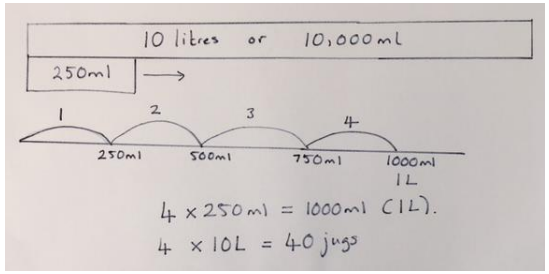
It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.

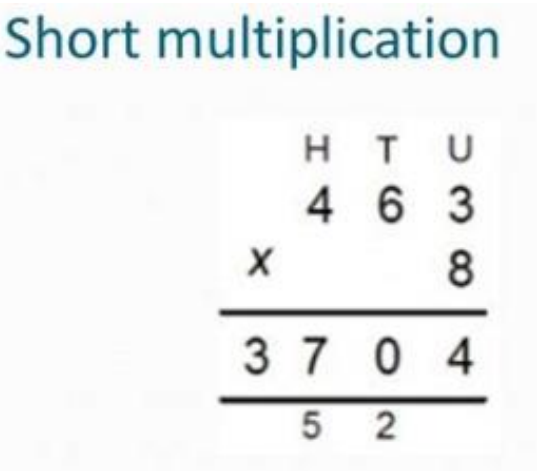
Bar modelling and number lines can support learners when solving problems with multiplication alongside formal written methods.











Start with long multiplication, reminding the children about lining up their numbers clearly in columns.
If it helps, children can write out what they are solving next to their answer.

This moves to the more compact method.

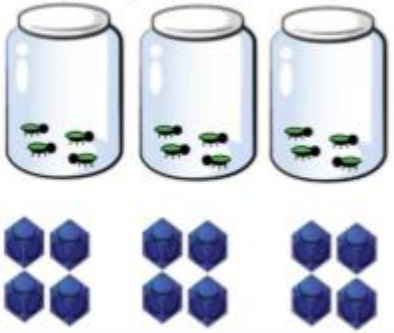
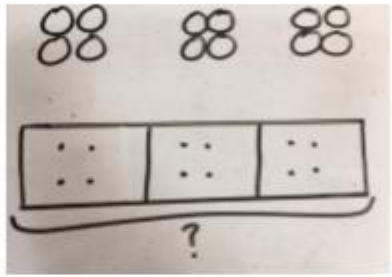
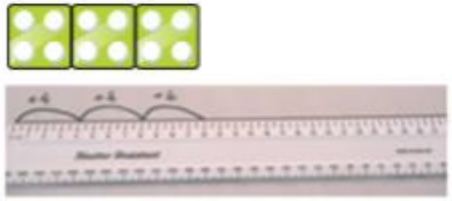
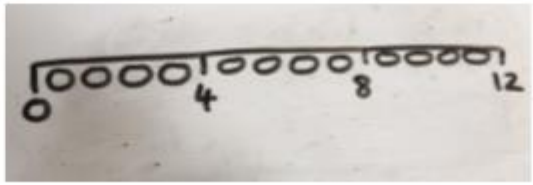
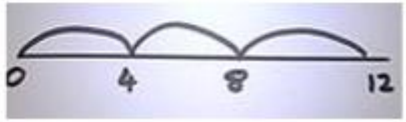
56 x34 = 1904

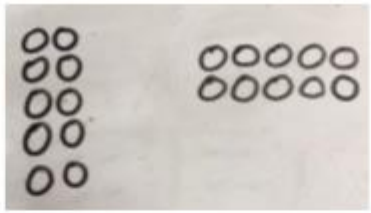
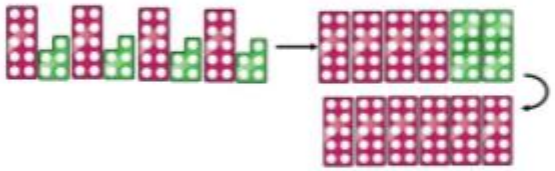
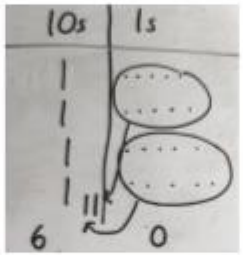
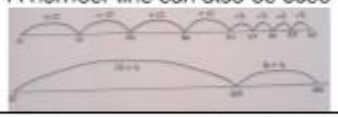
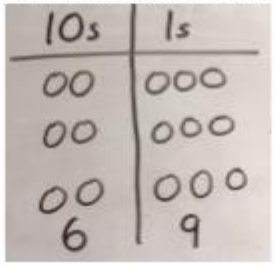
56
X34
224 (4 x 56)
1680 (30 x 56)
1904

56 x 7.2 = 403·2

56
X 7·2
11·2
392·0
403·2

ADDITIONAL SUPPORT FOR MULTIPLICATION

Concrete	Pictorial	Abstract
Repeated grouping/repeated addition 3 × 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group. 	Children to represent the practical resources in a picture and use a bar model. 	3 × 4 = 12 4 + 4 + 4 = 12
Number lines to show repeated groups- 3 × 4  Cuisenaire rods can be used too.	Represent this pictorially alongside a number line e.g.: 	Abstract number line showing three jumps of four. 3 × 4 = 12 

Use arrays to illustrate commutativity counters and other objects can also be used. $2 \times 5 = 5 \times 2$ 	Children to represent the arrays pictorially. 	Children to be able to use an array to write a range of calculations e.g. $10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$
Partition to multiply using Numicon, base 10 or Cuisenaire rods. 4×15 	Children to represent the concrete manipulatives pictorially. 	Children to be encouraged to show the steps they have taken. 4 x 15 10 5 10 x 4 = 40 5 x 4 = 20 40 + 20 = 60 A number line can also be used 
Formal column method with place value counters (base 10 can also be used.) 3×23 	Children to represent the counters pictorially. 	Children to record what it is they are doing to show understanding. 3×23 20 3 $3 \times 20 = 60$ $3 \times 3 = 9$ $60 + 9 = 69$ 23 × 3 69

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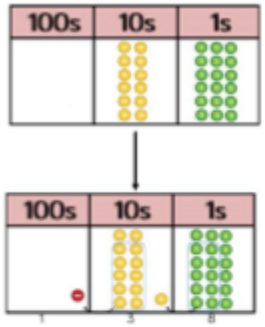
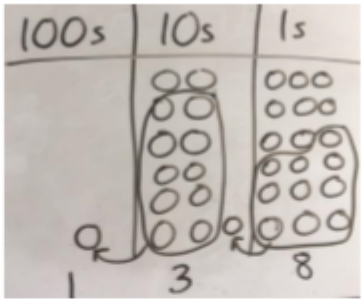
Formal column method with place value counters.
6 x 23



Children to represent the counters/base 10, pictorially e.g. the image below.



Formal written method

$$6 \times 23 =$$

$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$$

When children start to multiply 3d × 3d and 4d × 2d etc., they should be confident with the abstract:

To get 744 children have solved 6 × 124.
To get 2480 they have solved 20 × 124.

$$\begin{array}{r} 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 7\ 4\ 4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ \hline 1\ 1 \end{array}$$

Answer: 3224

Conceptual variation; different ways to ask children to solve 6 × 23

Mai had to swim 23 lengths, 6 times a week.
How many lengths did she swim in one week?

With the counters, prove that 6 x 23 = 138

Find the product of 6 and 23

6 × 23 =

☐ = 6 × 23

$$\begin{array}{r} 6 \\ \times\ 23 \\ \hline \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times\ 6 \\ \hline \\ \hline \end{array}$$

What is the calculation?
What is the product?