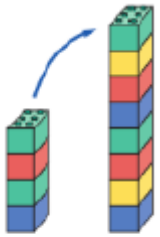
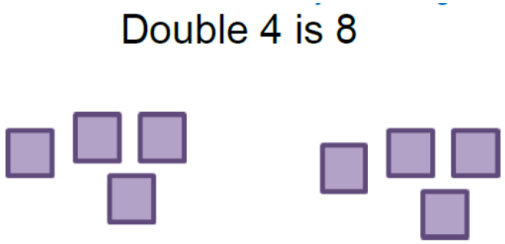
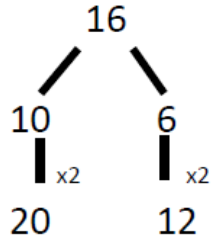
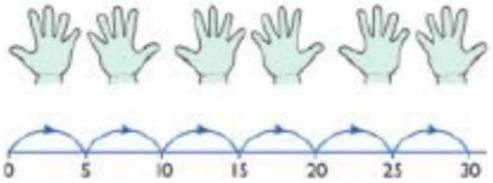
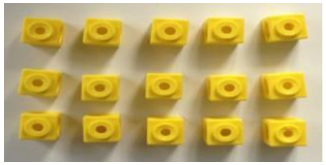
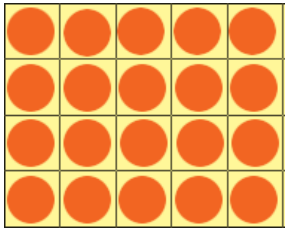
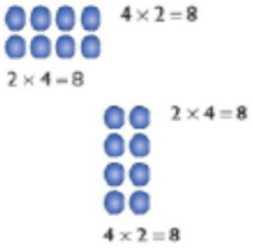
Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
Year 1 Doubling Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Use practical activities to show how to double a number.  double 4 is 8 $4 \times 2 = 8$	Draw pictures to show how to double a number. 	 Partition a number and then double each part before recombining it back together.
Counting in multiples/steps	  Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	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

Year 2

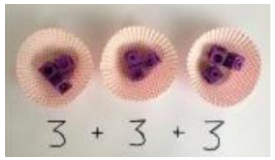
Repeated addition

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.

Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

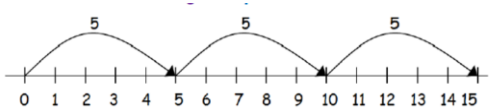
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.



Use different objects to add equal groups.

There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?

2 add 2 add 2 equals 6



5 + 5 + 5 = 15

Write addition sentences to describe objects and pictures.

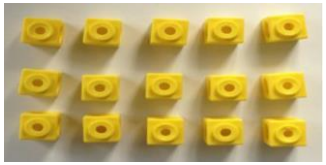
2 + 2 + 2 + 2 + 2 = 10

Arrays- showing commutative multiplication

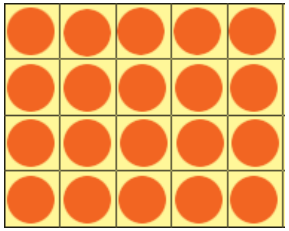
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

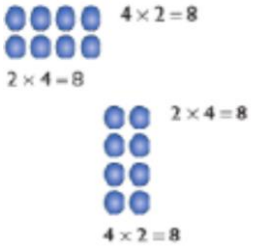
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Create arrays using counters/ cubes to show multiplication sentences.



Draw arrays in different rotations to find **commutative** multiplication sentences.





Link arrays to area of rectangles.

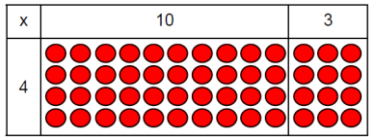
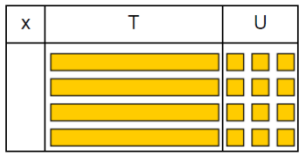
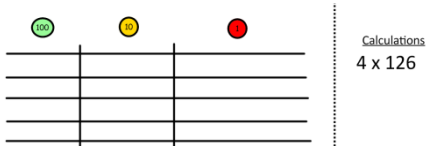
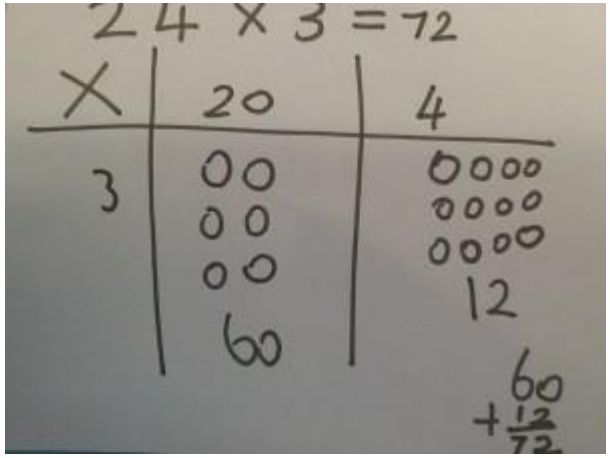
Use an array to write multiplication sentences and reinforce repeated addition.

5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

3 x 5 = 15

Year 3 Grid Method Children should always consider whether partitioning is the best strategy –if it is possible to use strategies such as doubling (some may use doubling twice for ×4), they need to choose the most efficient strategy. Children may wish to make jottings, including a full grid as exemplified here – but grid method is not a formal method and its only purpose is to record mental calculations. This supports the development of the necessary mental calculating skills but does not hinder the introduction of formal written methods in Year 4. Concrete manipulatives are essential to develop understanding. Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.	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.	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
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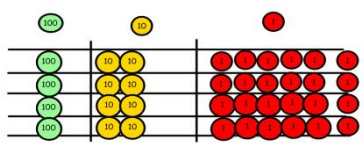
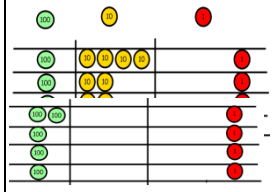
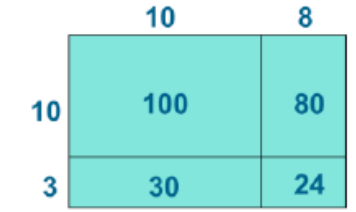
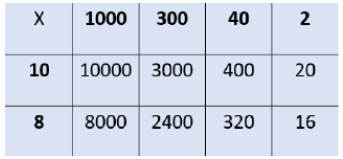
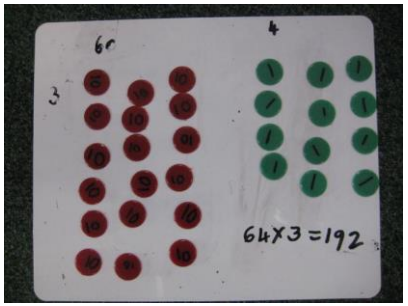
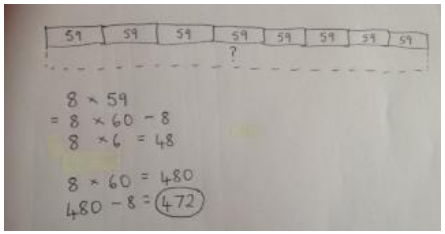
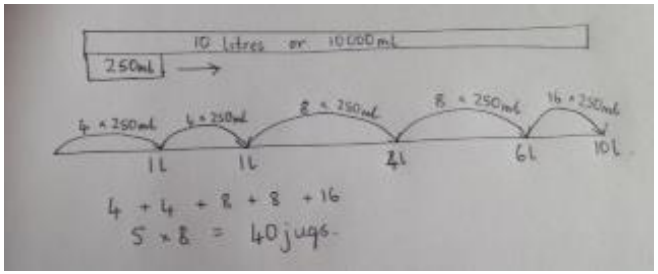
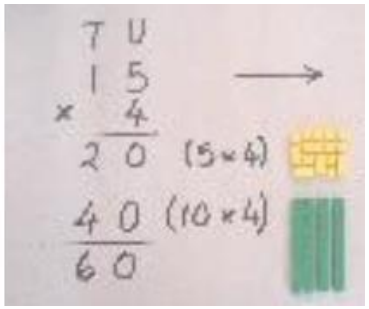
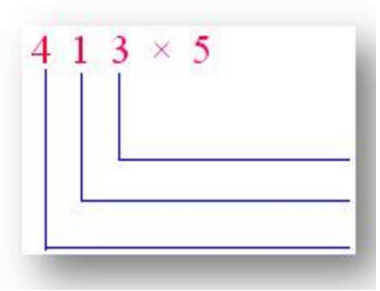
7	210	35	 **210 + 35 = 245** Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	 Calculations 4 x 126 Add up each column, starting with the ones making any exchanges needed.  Then you have your answer.		 10 8 10 100 80 3 30 24 
Year 4 Column multiplication Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. Recall multiplication and division facts for multiplication tables up to 12 × 12. Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.	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. Use concrete apparatus to develop understanding of multiplication of 2 digits by 1 digit using the expanded method	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.  	T U 1 5 x 4 2 0 (5 x 4) 4 0 (10 x 4) 6 0 Moving onto 3 digits by 1 digit

X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

Recognise and use factor pairs and commutativity in mental calculations. Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.			3 × 5 = 15 10 × 5 = 50 400 × 5 = + 2000 = 2065

Year 5

Column multiplication

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
Multiply and divide numbers mentally drawing upon known facts.
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.
Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
Solve problems involving multiplication and division,

Start with long multiplication, reminding the children about lining up their numbers clearly in columns.

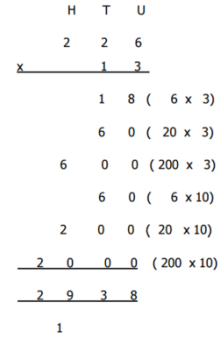
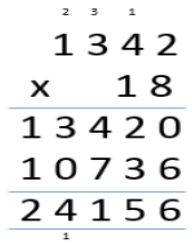
If it helps, children can write out what they are solving next to their answer.

```
  32
x 24
---
   8   (4 x 2)
 120   (4 x 30)
  40   (20 x 2)
 600   (20 x 30)
---
 768
```

Move away from noting down when ready

Move chd onto short method of multiplying TU X U

H	T	U
2	1	5
		4
8	6	0

including scaling by simple fractions and problems involving simple rates. **Year 6** Column multiplication Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long and short multiplication.			Children should be confident with using expanded notation to multiply  Develop short method of multiplying with up to 4 digits by 1 or 2 digits including use of decimals  Show children the importance of lining up numbers including the decimal point. Talk about disregarding the decimal point and replacing it by however many decimal

			places if this is easier for children.