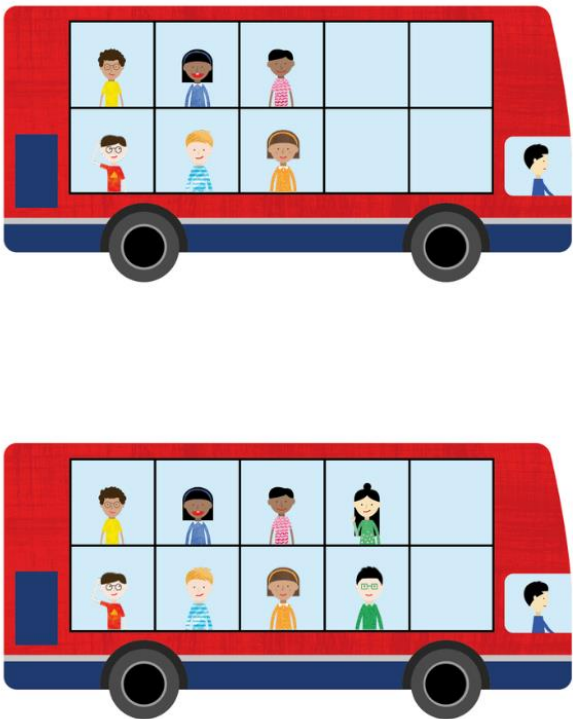


Calculation Progression – Multiplication



Year Group	Expectation	Method	Mathematical Language
R	Explore and represent patterns within numbers up to 10.	Making doubles 	Altogether, double
Year 1	Make equal groups. Add equal groups to find the total number of objects. Group things equally. Solve word problems about multiplication.	Making equal groups  There are 5 flowers in each group. There are 4 equal groups. Making equal rows  1 row of 5 = 5 2 rows of 5 = 10 3 rows of 5 = 3 rows of 5 3 fives = 15 There are 15 children altogether. There are 3 rows. 	Multiplication, equal, rows, array

		Making doubles double 1 = 2 ones double 1 = 2 double 2 = 2 twos double 2 = 4 double 4 = 2 fours double 4 = 8 Double means twice the amount. Jacob uses 8 blocks next.	
Year 2	Do my 2, 5 and 10 times table. Write multiplication equations. Write multiplication equations. Write a family of multiplication and division facts. Solve word problems using the 2, 5 and 10 times tables. Solve word problems involving multiplication.	Equal Groups 3 + 3 + 3 + 3 + 3 = 15 There are 15 oranges in total. 5 threes = 15 5 groups of 3 = 15 $5 \times 3 = 15$ 5 times 3 equals 15 We read $5 \times 3 = 15$ as 5 times 3 equals 15. $\times$ means to multiply. Multiply by 2, 5 and 10 2 4 6 8 10 12 14 16 18 20 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2	Commutative, repeated addition
Year 3	Multiply by the 3, 4 and 8 times table. Solve word problems involving the 3, 4 and 8 times tables.	Multiply by 3, 4 and 8 There are 3 muffins on each tray. 1 group of 3 $1 \times 3 = 3$ 2 groups of 3 $2 \times 3 = 6$ 3 groups of 3 $3 \times 3 = 9$ 4 groups of 3 $4 \times 3 = 12$ 5 groups of 3 $5 \times 3 = 15$ Emma made 15 muffins in total.	Groups of, equal groups, repeated addition, equation

Year 4

Multiply by 6, 7, 9, 11 and 12. Solve word problems involving multiplication. Multiply without regrouping. Multiply with regrouping.

Multiplying by 6, 7, 9, 11 and 12



$$2 \times 9 = 18$$

2×9 is
2 groups of 9.



$$\begin{aligned} 2 \times 9 &= 18 \\ 3 \times 9 &= 18 + 9 \\ &= 27 \end{aligned}$$

3×9 is one
more group of 9
than 2×9 .



Commutativity



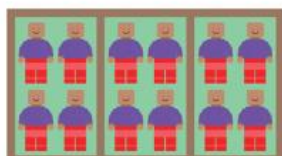
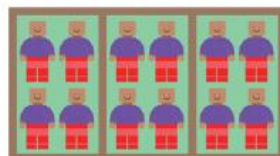
$$8 \times 3 = \square$$



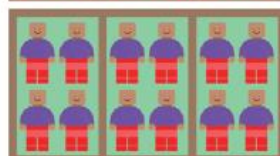
$$3 \times 8 = \square$$

Multiplying three one digit numbers

$$3 \times 4 \times 2 = \square$$



$$3 \times 4 = 12$$



$$\begin{aligned} 3 \times 4 \times 2 &= 12 \times 2 \\ &= 24 \end{aligned}$$

Multiply 2-digit number by a 1-digit number

Step 1 Multiply 2 ones by 4.

$$\begin{array}{r} 1 \ 2 \\ \times \ 4 \\ \hline 8 \end{array} \quad \rightarrow \quad 2 \times 4 = 8$$

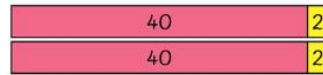
Step 2 Multiply 1 ten by 4.

$$\begin{array}{r} 1 \ 2 \\ \times \ 4 \\ \hline 8 \\ + \ 4 \ 0 \\ \hline 4 \ 8 \end{array} \quad \rightarrow \quad 10 \times 4 = 40$$



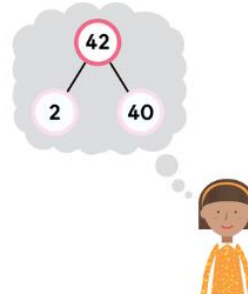
Regrouping, product, commutative, commutativity, multiple of 10, multiple of 100

$$42 \times 2 = \square$$



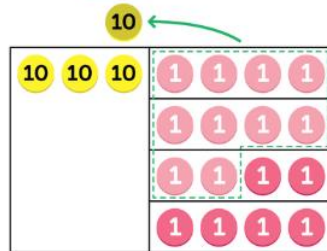
$$\begin{array}{r} 42 \\ \times 2 \\ \hline 4 \quad 2 \\ + 8 \quad 0 \\ \hline \end{array}$$

$4 \rightarrow 2 \times 2 = 4$
 $+ 8 \quad 0 \rightarrow 2 \times 40 = 80$
 $\square \quad \square \rightarrow 2 \times 42 = \square$



Multiplying a 2-digit number by a 1-digit number with renaming

$$4 \times 34 = \square$$



Start by multiplying the ones by 4.

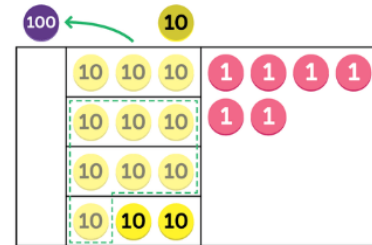


$$\begin{array}{r} 1 \quad 3 \quad 4 \\ \times \quad 4 \\ \hline 6 \end{array}$$

$$4 \text{ ones} \times 4 = 16 \text{ ones}$$

Rename the ones.

$$16 \text{ ones} = 1 \text{ ten} + 6 \text{ ones}$$



Then, multiply the tens by 4.



$$\begin{array}{r} 1 \quad 3 \quad 4 \\ \times \quad 4 \\ \hline 1 \quad 3 \quad 6 \end{array}$$

$$3 \text{ tens} \times 4 = 12 \text{ tens}$$

Add the tens.

$$12 \text{ tens} + 1 \text{ ten} = 13 \text{ tens}$$

Rename the tens.

$$13 \text{ tens} = 1 \text{ hundred} + 3 \text{ tens}$$

$$4 \times 34 = 136$$

Year 5

Find multiples and common multiples. Find factors and common factors. Identify prime and composite numbers. Recognise square numbers and cube numbers, and use the notation for squares (e.g. 42) and cubes (e.g. 23). Multiply numbers up to 4 digits by a 1-digit number. Multiply numbers up to 3 digits by a 2-digit number. Multiply mentally. Multiply numbers by 10, 100 and 1000.

Multiples



1 row of 8 stamps.
 $1 \times 8 = 8$



2 rows of 8 stamps.
 $2 \times 8 = 16$



3 rows of 8 stamps.
 $3 \times 8 = 24$



4 rows of 8 stamps.
 $4 \times 8 = 32$



5 rows of 8 stamps.
 $5 \times 8 = 40$

A multiple is a number you get when you multiply one number by another number.

8, 16, 24, 32 and 40 are multiples of 8.

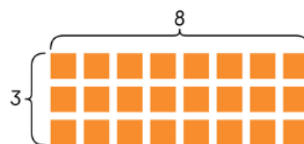
The product of 5 and 8 is 40.

40 is a multiple of 5.
40 is also a multiple of 8.

Sam has 40 stamps altogether.

Factors

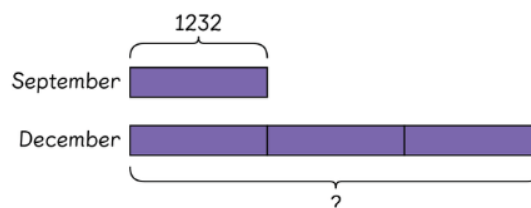
Factors are the numbers we multiply together to make another number. 2 and 12 are factors of 24 because $2 \times 12 = 24$.



3 rows of 8 tiles
 $3 \times 8 = 24$

3 and 8 are factors of 24.

Multiplying a 4-digit number by a 1-digit number



$$1232 \times 3 =$$

1 2 3 2	
x 3	
—	
6	→ $2 \times 3 = 6$
9 0	→ $3 \times 30 = 90$
6 0 0	→ $3 \times 200 = 600$
+ 3 0 0 0	→ $3 \times 1000 = 3000$
—	
3 6 9 6	$3 \times 1232 = 3696$

Multiplying a 2-digit number by a 2-digit number

$16 \times 12 = \text{[]}$



$16 \times 1 \text{ ten} = 16 \text{ tens}$

$16 \times 2 \text{ ones} = 32 \text{ ones}$

$16 \times 10 = 160$

$16 \times 2 = 32$

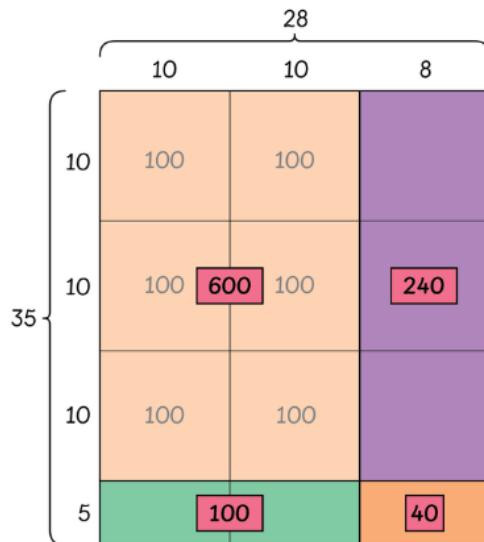
$16 \times 12 = 192$

$16 \text{ tens} = 160$
 $32 \text{ ones} = 32$



Grid Method

$35 \times 28 = \text{[]}$



$30 \times 20 = 600$

$30 \times 8 = 240$

$30 \times 28 = 840$

$5 \times 20 = 100$

$5 \times 8 = 40$

$5 \times 28 = 140$

$840 + 140 = 980$

$35 \times 28 = 980$

Column Method

$231 \times 13 = \text{[]}$

231	
×	13
693	→ $231 \times 3 = 693$
+ 2310	→ $231 \times 10 = 2310$
3003	

Year 6	Multiply numbers up to 4 digits by a 2-digit whole number. Identify common factors, common multiples and prime numbers. Solve problems involving multiplication. Solve problems involving the calculation and conversion of units of measure.	Column Method 4-digit by 2-digit $£1229 \times 28 =$ $ \begin{array}{r} \begin{array}{ccccccc} & & 1 & & 2 & & 1 \\ & & 1 & 2 & 2 & 9 & \\ \times & & & & 2 & 8 & \\ \hline & 9 & 8 & 3 & 2 & & \\ + & 2 & 4 & 5 & 8 & 0 & \\ \hline 3 & 4 & 4 & 1 & 2 & & \end{array} \end{array} $ $\rightarrow 1229 \times 8 = 9832$ $\rightarrow 1229 \times 20 = 24580$ $\rightarrow 1229 \times 28 = 34412$	estimate approximately equal to reasonable guess 4-digit number greatest possible product smallest possible product
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