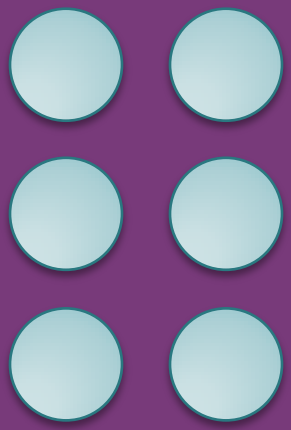
HEATHERSIDE JUNIOR SCHOOL

PROGRESSION AND REASONING IN MULTIPLICATION AND DIVISION

In Years 1 and 2

Children use counting, arrays, multiplication squares and repeated addition to solve multiplication problems, and write them using the x and = signs. They also learn to recall particular multiplication facts.

For example: 3 x 2 =



2 lots of 3 = 6

2 x 3 = 6

3 lots of 2 = 6

3 x 2 = 6

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

2 + 2 + 2 = 6

It is essential that children have a fluent recall of multiplication facts and their related division facts:

By the end of Year 2 children are expected to recall facts for the:

2, 5 and 10 x tables

By the end of Year 3 children are expected to recall facts for the:

3, 4 and 8 x tables

By the end of Year 4 children are expected to recall facts for:

all tables up to 12 x 12

From June 2020, children in Year 4 will take a national on-line multiplication tables check, consisting of 25 questions. They will have 6 seconds to answer each question.

Multiplication Facts

Children regularly practise their multiplication facts in class.

Facts

3 x 4 = 12

Related Facts

4 x 3 = 12

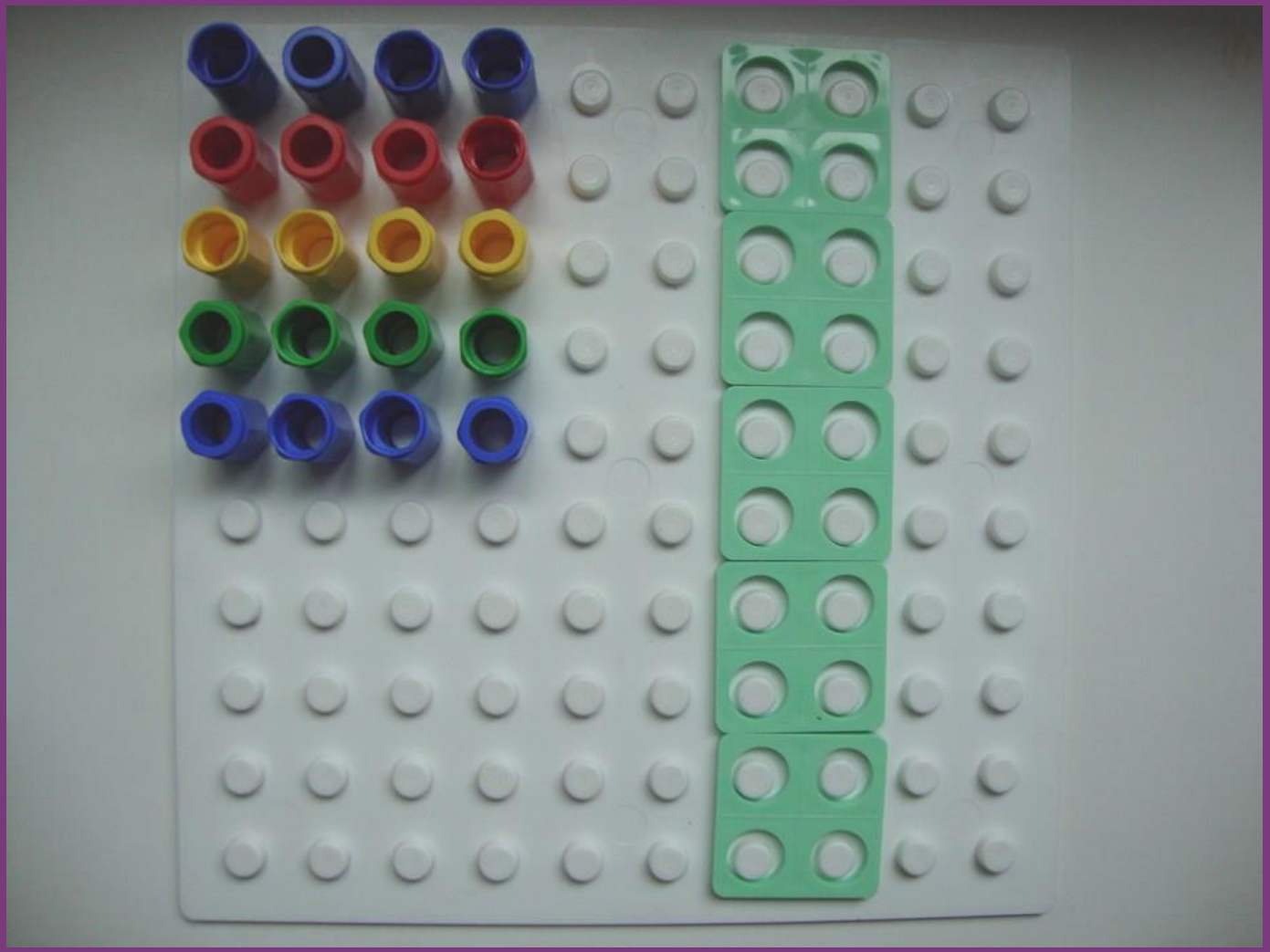
Inverse

12 ÷ 3 = 4

120 ÷ 3 = 40

Including our…

Concrete apparatus and arrays



Year Three: The Grid Method

X	20	3
8	160	24

23 x 8 = 184

160 + 24 = 184

This is extended to a 3-digit x 1-digit number, **using the grid method.**

- The numbers are partitioned and placed in a grid.
- The individual answers are added together in order to calculate the final answer.

Expanded Column Method for TU x U

For example:

56 x 5 =

Used alongside:

- concrete apparatus
- visual models
- informal jottings

$$
\begin{array}{rl}
 & 56 \\
\times & \underline{5} \\
 & 30 \quad (5\times 6) \\
 & 250 \quad (5\times 50) \\
 & \underline{280}
\end{array}
$$

COMPACT COLUMN METHOD

For example: 23 x 3 =

By the end of Year 4, children should be able to use the compact method for TU x U and HTU x U

In Year 5, children should be able to use the compact method for ThHTU x U

$$\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \end{array}$$

This is then extended to carrying across columns and to using 3-digit numbers.

$$\begin{array}{r} 138 \\ \times\ 7 \\ \hline 966 \\ 2\ 5 \end{array}$$

EXPANDED COLUMN METHOD

For example:

56 x 27 =

In Year 5, children should also use the expanded column for multiplying up to four-digit numbers by a one or two-digit number.

$$
\begin{array}{rll}
 & 56 & \\
\times & 27 & \\
\hline
 & 42 & (7\times6) \\
 & 350 & (7\times50) \\
 & 120 & (20\times6) \\
+ & 1{,}000 & (20\times50) \\
\hline
 & 1{,}512 & \\
 & 1 &
\end{array}
$$

By the end of Year 5, children will then use compact long multiplication, using a zero as the place value holder.

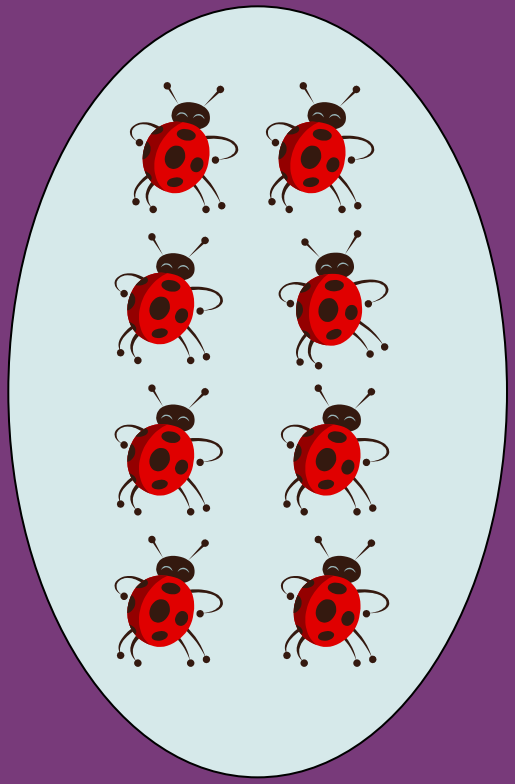
Th	H	T	U	
	1,	1	2	4
X			2	6
	6,	7	4	4
		1	2	
2	2,	4	8	0
2	9,	2	2	4
	1	1		

Children will again be taught to multiply the units first.

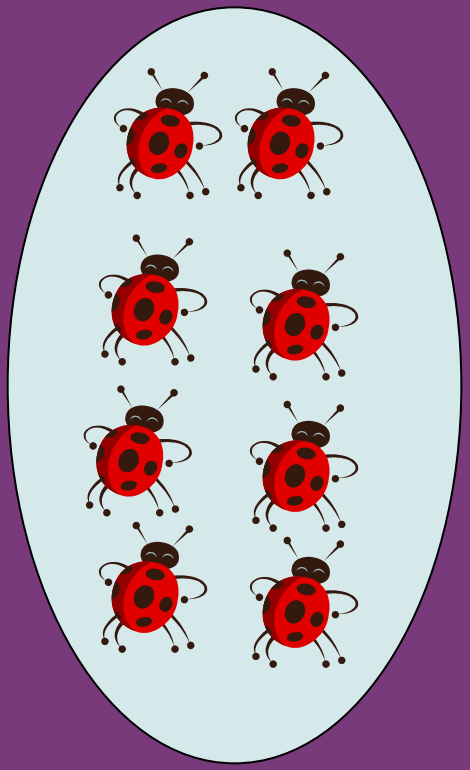
The individual products are then added together to complete the calculation.

DIVISION IN YEARS 1 AND 2

Children will use the known facts for the **2, 5 and 10 times tables** to calculate simple **sharing and grouping** problems supported by concrete apparatus and jottings.



16 ÷ 2 = 8



How many groups of 8 can you make? 16 ÷ 8 = 2

YEAR 3 INTO YEAR 4

Children will use known facts to divide a 2-digit number by a 1-digit number

$25 \div 5 = 5$

…and derive related facts.

$60 \div 3 = 20$

can be derived from $6 \div 3 = 2$

Children will also use known facts to identify missing numbers.

$8 \div \boxed{4} = 2$

Year Four

Children will divide a 1-digit or a 2-digit number by 10 and 100.

(supported by place value indicators)

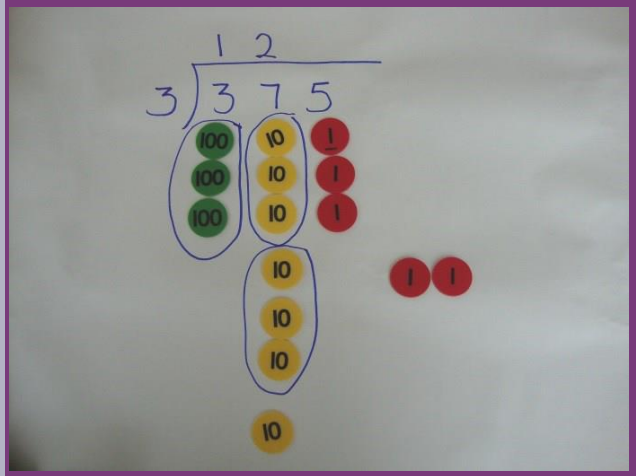
26 ÷ 10 = 2.6

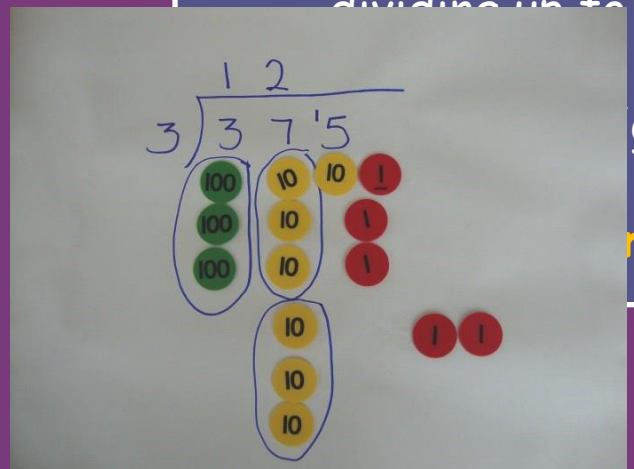
This is then extended to dividing by 1000 in Year 5.

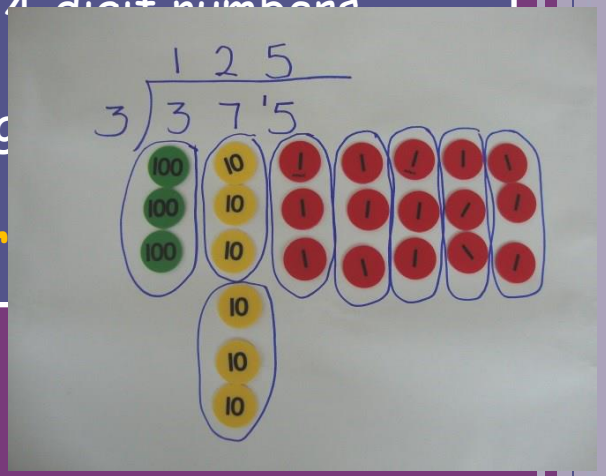
In year 5, children should have a secure knowledge of their division facts in order to use short division – bus stop method - to divide numbers that divide equally with no remainder.

$$\begin{array}{r} 1\ 2\ 5 \\ 3\overline{)\ 3\ 7\ {}^{1}5} \end{array}$$

In Year 5, children will also use this short division method for dividing up to 4 digit numbers







LONG DIVISION: REPEATED SUBTRACTION

558 ÷ 24 =

```
      23r 6
   ┌──────
24 │  558
 - │  480      (20 x 24)
   ──────
      78
 - │   72      ( 3 x 24)
   ──────
       6
```

In Year 6, children will use repeated subtraction for dividing up to 4-digit numbers by a 2-digit number, extending to remainders expressed in different forms

e.g. fractions.

How many 24s have been subtracted?

558 ÷ 24 = 23 $\frac{1}{4}$ or 23.25

Glossary

Inverse – the opposite, related operation: addition/subtraction; multiplication/division

Partition – splitting a number up eg 123 = 100 + 20 +3

Place value – the value of each digit in a number eg hundreds, tens and units (ones)

Recombine – putting a number back together eg 100 + 20 +3 = 123

Switchers – related multiplication calculations eg 3 x 4 and 4 x 3

Fact families – related multiplication and division facts eg 4 x 5 = 20; 5 x 4 = 20; 20 ÷ 4 = 5; 20 ÷ 5 = 4

Expanded method – a calculation method showing each step in a calculation

Compact method – a calculation method where the steps are combined and not explicitly shown