

# Wales Primary School Calculation Policy



## Multiplication and Division

### Teaching Timestables (following Claire Christie teaching tables)

FS2 and Y1 – counting in multiples and through songs and rhyme  
 Y2 – x10, x2, x5 begin booklets A - C in Spring term (moving onto X3 in Summer term)  
 Y3 - x4, x8, x3, x6 booklets D-G  
 Y4 - x9, x7, x11, x12 booklets H – K  
 Y5 and Y6 recap all & derived facts for decimals etc (set out in progression of skills)

Timestables to be taught in a daily 10 minute session

Current timestables to be displayed on a numberline in the classroom and built up throughout the teaching program

Timestables Rockstars to be used at home

### Key skills for multiplication

**(FS2) Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.**

Doubling is repeated addition  
 Understand odd means one left

### Representations / models

*Doubles, halves, counting in 2's, repeated addition, bead strings*

**(Y1/2) Solve one-step problems with multiplication**

Count on and back in ones, twos and tens  
 Count on and back in 5's (Y2)  
 Know facts and division facts for x2, 5 and 10 by end of Y2 (moving onto 3's)  
 Doubles and halves

**Method – practical & learning facts (Y2 to record with written symbol)**

One bag holds 5 apples.  
 How many apples do 4 bags hold?

20

$5 + 5 + 5 + 5 = 20$   
 $4 \times 5 = 20$   
 $5 \times 4 = 20$

*Bar model Number shapes Counters Ten frames Bead strings Number lines, Numicon*

**(Y3/4) Multiply 2-digit by 1-digit numbers**

Derived facts e.g.  $3 \times 2 = 6$ ,  $3 \times 20 = 60$   
 How to make a number 10 times bigger  
 Add numbers mentally  
 X tables facts

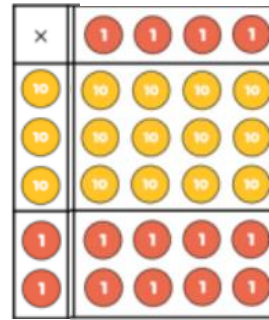
**Method – grid method**



$24 \times 3 (60+12)$

|    |     |
|----|-----|
| x  | 4   |
| 30 | 120 |
| 2  | 8   |

$32 \times 4 (120 + 8)$



$32 \times 4 (120 + 8)$

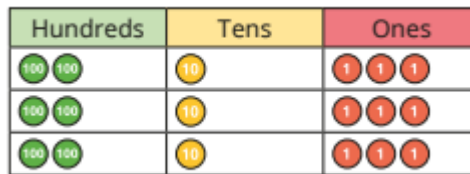
*Place value counters Base 10 Grid method*

**(Y4) Multiply 3-digit by 1-digit numbers**

How to make a number 100 times bigger  
 X tables facts

**Method – grid method**

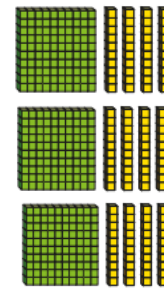
$213 \times 3 =$



|   |      |    |    |
|---|------|----|----|
| x | 600  | 20 | 6  |
| 3 | 1800 | 60 | 18 |

$626 \times 3 = 1800 + 78$

*Place value counters Base 10 Grid method*

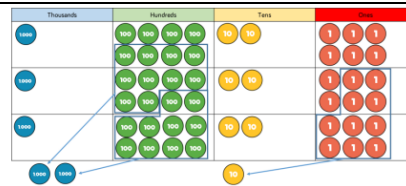


$140 \times 3 = 300 + 120$

**(Y5) Multiply 4-digit by 1-digit numbers**

Timestables facts  
 Powers of 10  
 Place value  
 Addition facts

**Method – grid method to formal written method**



$1,826 \times 3 = 5,478$

|   |    |   |   |   |
|---|----|---|---|---|
|   | Th | H | T | O |
|   | 1  | 8 | 2 | 6 |
| x |    |   |   | 3 |
|   | 5  | 4 | 7 | 8 |
|   | 2  |   | 1 |   |

|   |      |      |    |    |
|---|------|------|----|----|
| x | 1000 | 800  | 20 | 6  |
| 3 | 3000 | 2400 | 60 | 18 |

$1.826 \times 3 = 5478$   
 $3000+2400 = 5400$   
 $60+18 = 78$

*Place value counters formal written method*

### (Y5) Multiply 2-digit by 2-digit numbers

Timestables facts  
Powers of 10  
Place value  
Addition facts

$22 \times 31 = 682$

|    |     |    |
|----|-----|----|
| x  | 20  | 2  |
| 30 | 600 | 60 |
| 1  | 20  | 2  |

|   | H | T | O |
|---|---|---|---|
|   |   | 2 | 2 |
| x |   | 3 | 1 |
|   |   | 2 | 2 |
|   | 6 | 6 | 0 |
|   | 6 | 8 | 2 |

$23 \times 32 = 506$

Method – grid method to formal written method

Place value counters Base 10 formal written method Grid method

### (Y5) Multiply 2-digit by 3-digit numbers

Timestables facts  
Powers of 10  
Place value  
Addition facts

| Th | H  | T | O |
|----|----|---|---|
|    | 2  | 3 | 4 |
| x  |    | 3 | 2 |
|    | 4  | 6 | 8 |
| 17 | 10 | 2 | 0 |
| 7  | 4  | 8 | 8 |

Method – grid method to formal written method

$234 \times 32 = 7,488$

|    |       |     |     |
|----|-------|-----|-----|
| x  | 200   | 30  | 4   |
| 30 | 6,000 | 900 | 120 |
| 2  | 400   | 60  | 8   |

Place value counters Short written method Grid method

### (Y5/6) Multiply 2-digit by 4-digit numbers

Timestables facts  
Powers of 10  
Place value  
Addition facts

| TTh | Th | H | T | O |
|-----|----|---|---|---|
|     | 2  | 7 | 3 | 9 |
| x   |    |   | 2 | 8 |
| 2   | 1  | 9 | 1 | 2 |
| 2   | 5  | 3 | 7 |   |
| 5   | 4  | 7 | 8 | 0 |
| 1   |    | 1 |   |   |
| 7   | 6  | 6 | 9 | 2 |

Method – grid method to formal written method

$2,739 \times 28 = 76,692$

Formal written method

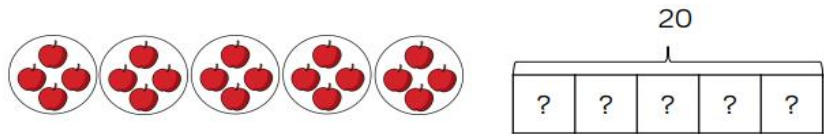
**Key skills for division**

**Representations / models**

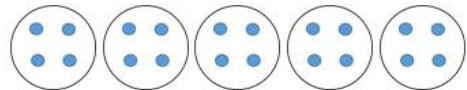
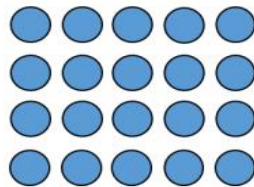
(FS2) (see above under multiplication)

**(Y1 / 2) Solve one-step problems with division (sharing)**

Sharing must be equal  
Link between multiplication and division  
Fact families



There are 20 apples altogether.  
They are shared equally between 5 bags.  
How many apples are in each bag?

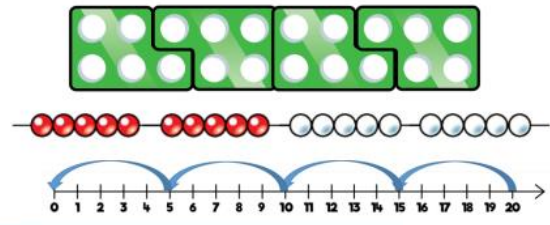
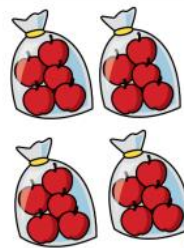


$20 \div 5 = 4$

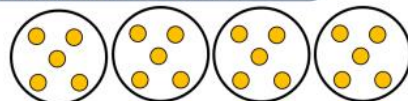
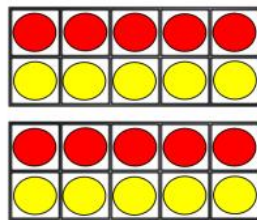
Bar model Real life objects Arrays Counters

**(Y1/2) Solve one-step problems with division (grouping)**

Each group must be equal  
Link between multiplication and division  
Fact families  
Repeated subtraction



There are 20 apples altogether.  
They are put in bags of 5.  
How many bags are there?



$20 \div 5 = 4$

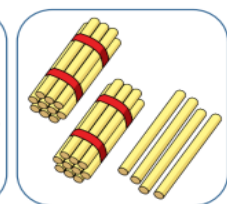
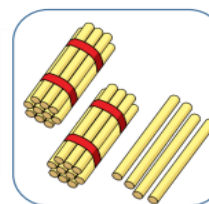
**Method – using multiplication facts / bar models**

Real life objects Number shapes Bead strings Ten frames Number lines Arrays Counters, Numicon

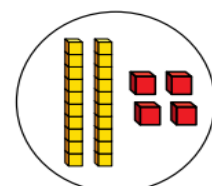
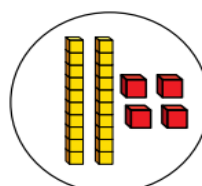
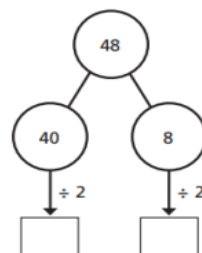
**(Y3) Divide 2-digits by 1- digit (no exchange sharing)**

Doubles and halves  
Divide by 4 half and half again  
Link between multiplication and division  
Partitioning  
Partition by multiples  
Timestables facts

| Tens |    | Ones |   |   |   |
|------|----|------|---|---|---|
| 10   | 10 | 1    | 1 | 1 | 1 |
| 10   | 10 | 1    | 1 | 1 | 1 |



$48 \div 2 = 24$



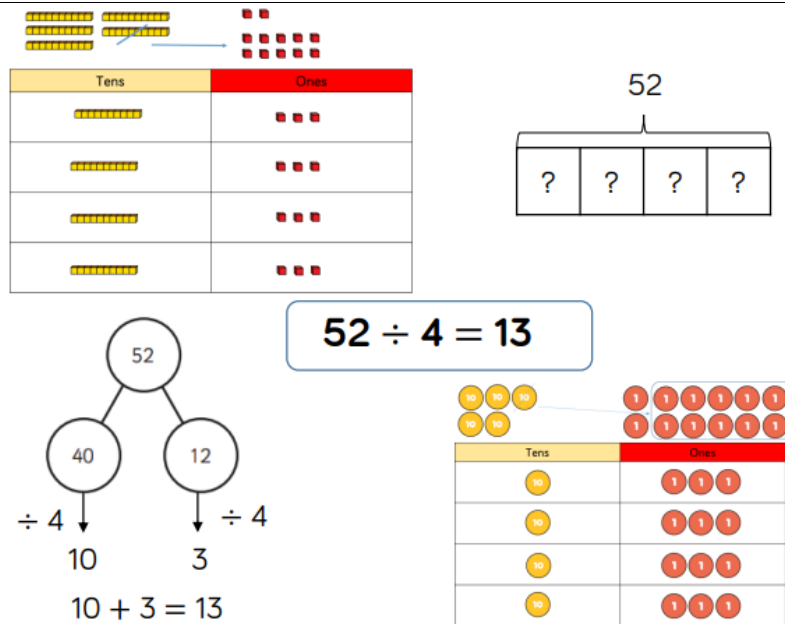
**Method – part-whole model**

Straws Base 10 Bar model Place value counters Part-whole model



**(Y3/4) Divide 2-digits by 1- digit (sharing with exchange)**

Doubles and halves  
Divide by 4 half and half again  
Link between multiplication and division  
Partitioning  
Partition by multiples  
Timestables facts

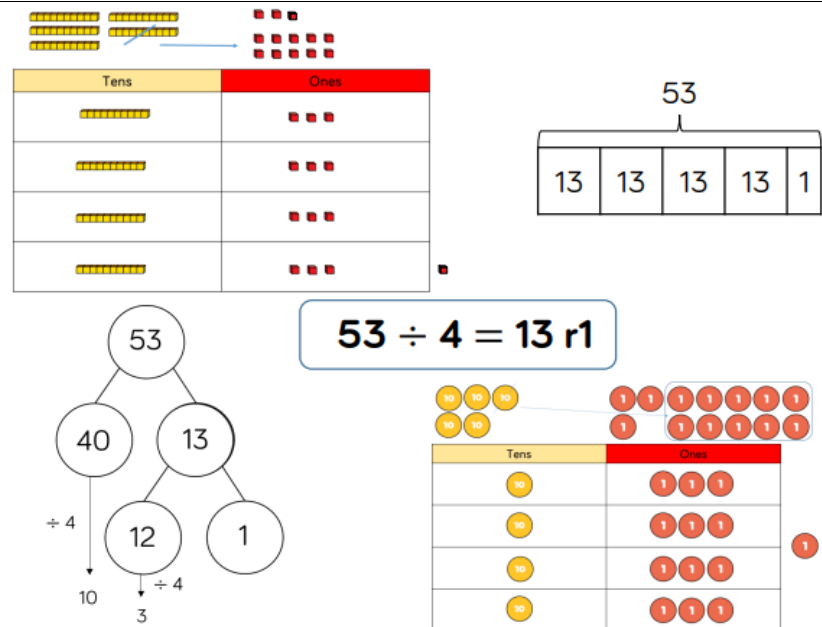


**Method – part-whole model**

*Straws Base 10 Bar model Place value counters Part-whole model*

**(Y3/4) Divide 2-digits by 1- digit (sharing with remainders)**

Understanding of remainders  
Doubles and halves  
Link between multiplication and division  
Partitioning  
Partition by multiples  
Timestables facts

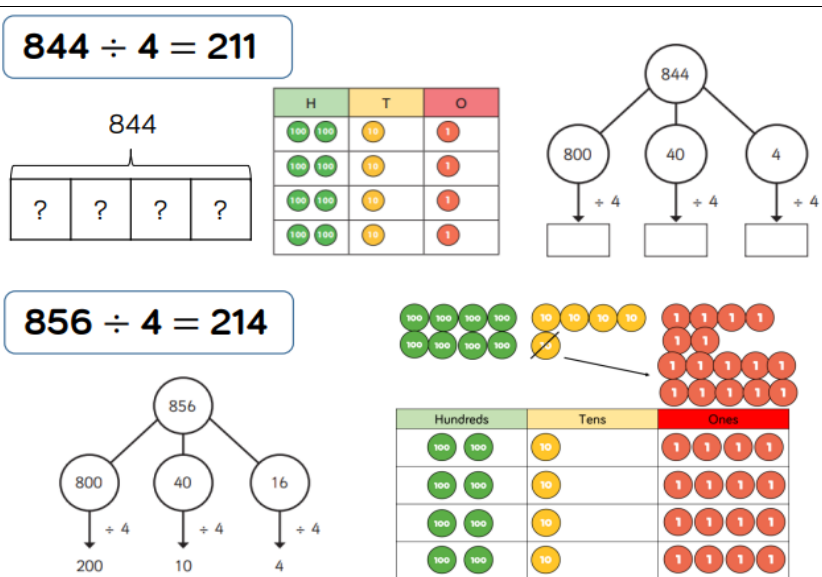


**Method – part-whole model**

*Straws Base 10 Bar model Place value counters Part-whole model*

**(Y4) Divide 3-digits by 1- digit (sharing with exchange)**

Link between multiplication and division  
Partitioning  
Partition by multiples  
Timestables facts & derived facts

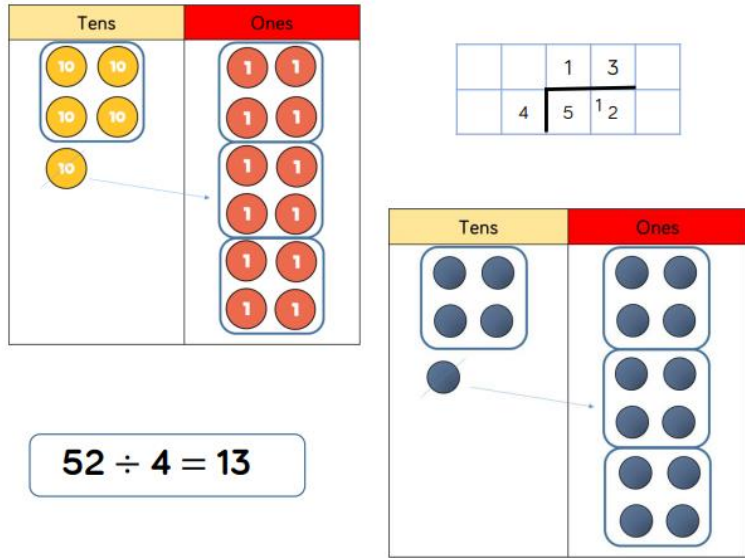


**Method – part-whole model**

*Base 10 Bar model Place value counters Part-whole model*

**(Y4/5) Divide 2-digits by 1- digit (grouping)**

Timestables subtraction



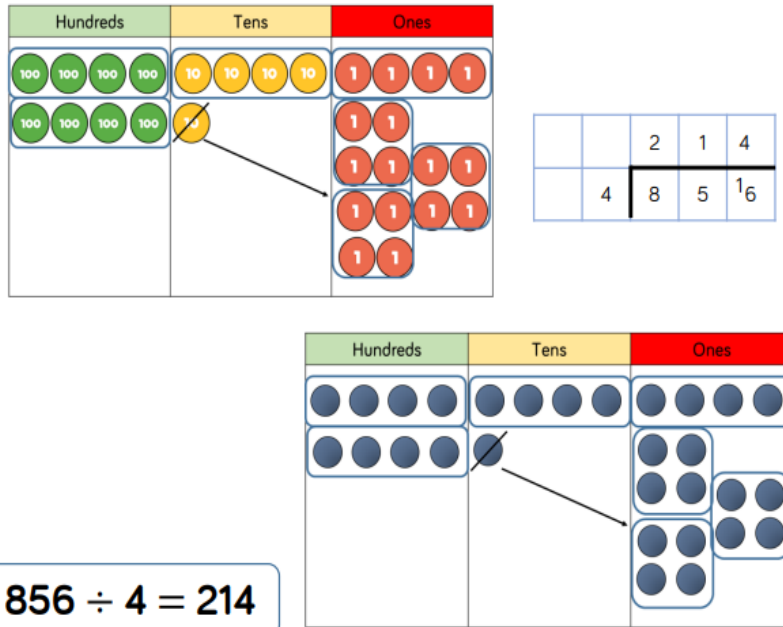
$52 \div 4 = 13$

**Method – part-whole model (bus stop Y5)**

*Place value counters Counters Place value grid (Written short division (bus stop) – Y5 only)*

**(Y4/5) Divide 3-digits by 1- digit (grouping)**

Timestables subtraction



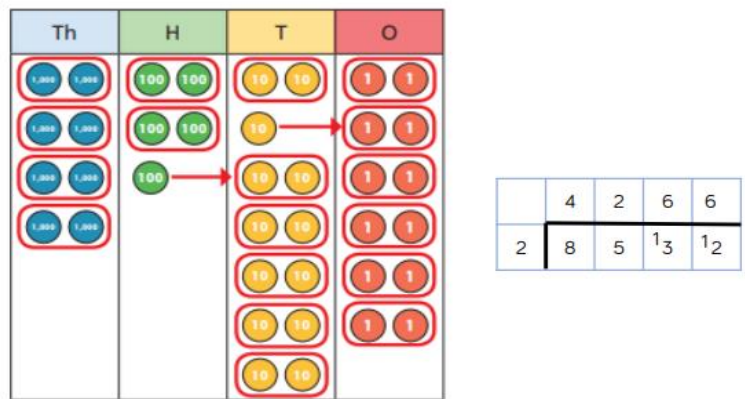
$856 \div 4 = 214$

**Method – part-whole model (bus stop Y5)**

*Place value counters Counters Place value grid (Written short division – Y5 only)*

**(Y5) Divide 4-digits by 1- digit (grouping)**

Timestables subtraction



$8,532 \div 2 = 4,266$

**Method – part-whole model & bus stop**

*Place value counters Counters Place value grid Written short division*

**(Y6) Divide multi-digits by 2-digits (short division)**

Timestables subtraction

**Method – bus stop**

|  |    |   |                |                |
|--|----|---|----------------|----------------|
|  |    | 0 | 3              | 6              |
|  | 12 | 4 | 4 <sub>3</sub> | 7 <sub>2</sub> |

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

|  |    |   |                |                 |                 |
|--|----|---|----------------|-----------------|-----------------|
|  |    | 0 | 4              | 8               | 9               |
|  | 15 | 7 | 7 <sub>3</sub> | 13 <sub>3</sub> | 13 <sub>5</sub> |

|    |    |    |    |    |    |     |     |     |     |
|----|----|----|----|----|----|-----|-----|-----|-----|
| 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |
|----|----|----|----|----|----|-----|-----|-----|-----|

*Written long division List of multiples*

**(Y6) Divide multi-digits by 2-digits (long division)**

Timestables subtraction

**Method – bus stop**

|   |   |   |   |   |
|---|---|---|---|---|
|   |   | 0 | 3 | 6 |
| 1 | 2 | 4 | 3 | 2 |
|   |   | - | 3 | 6 |
|   |   |   | 7 | 2 |
|   |   |   | - | 7 |
|   |   |   |   | 0 |

- (x30)  $12 \times 1 = 12$
- $12 \times 2 = 24$
- $12 \times 3 = 36$
- $12 \times 4 = 48$
- $12 \times 5 = 60$
- $12 \times 6 = 72$
- (x6)  $12 \times 7 = 84$
- $12 \times 8 = 96$
- $12 \times 9 = 108$
- $12 \times 10 = 120$

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

|    |  |   |   |   |   |
|----|--|---|---|---|---|
|    |  | 0 | 4 | 8 | 9 |
| 15 |  | 7 | 3 | 3 | 5 |
|    |  | - | 6 | 0 | 0 |
|    |  |   | 1 | 3 | 5 |
|    |  |   | - | 1 | 2 |
|    |  |   |   | 1 | 3 |
|    |  |   |   | - | 1 |
|    |  |   |   |   | 0 |

- $1 \times 15 = 15$
- $2 \times 15 = 30$
- $3 \times 15 = 45$
- $4 \times 15 = 60$
- $5 \times 15 = 75$
- $10 \times 15 = 150$

$$372 \div 15 = 24 \text{ r}12$$

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
|   |   | 2 | 4 | r | 1 | 2 |
| 1 | 5 | 3 | 7 | 2 |   |   |
|   |   | - | 3 | 0 | 0 |   |
|   |   |   | 7 | 2 |   |   |
|   |   |   | - | 6 | 0 |   |
|   |   |   |   | 1 | 2 |   |

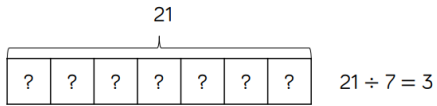
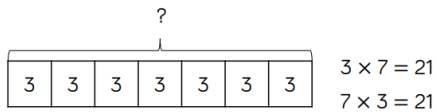
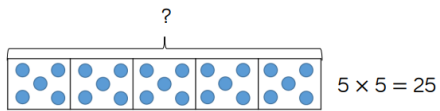
- $1 \times 15 = 15$
- $2 \times 15 = 30$
- $3 \times 15 = 45$
- $4 \times 15 = 60$
- $5 \times 15 = 75$
- $10 \times 15 = 150$

|   |   |   |   |               |
|---|---|---|---|---------------|
|   |   | 2 | 4 | $\frac{4}{5}$ |
| 1 | 5 | 3 | 7 | 2             |
|   |   | - | 3 | 0             |
|   |   |   | 7 | 2             |
|   |   |   | - | 6             |
|   |   |   |   | 1             |

$$372 \div 15 = 24 \frac{4}{5}$$

*Written long division List of multiples*

## Bar Model



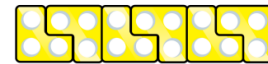
Boys 

|   |   |   |   |   |
|---|---|---|---|---|
| 3 | 3 | 3 | 3 | 3 |
|---|---|---|---|---|

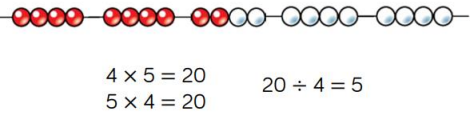
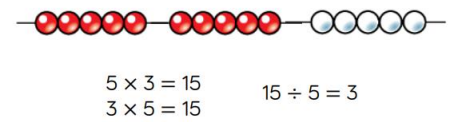
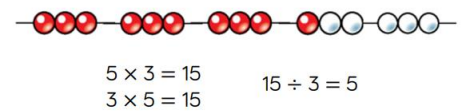
Girls 

|   |
|---|
| 3 |
|---|

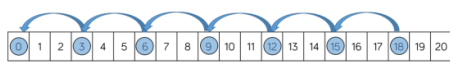
## Number Shapes



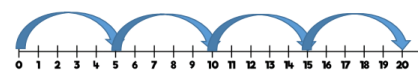
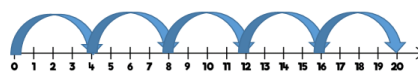
## Bead Strings



## Number Tracks



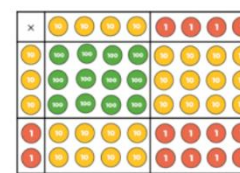
## Number Lines (labelled)



## Place Value Counters (multiplication)

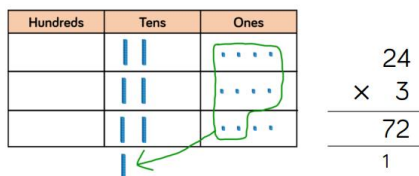


$$\begin{array}{r} 34 \\ \times 5 \\ \hline 170 \\ 12 \phantom{0} \\ \hline \end{array}$$

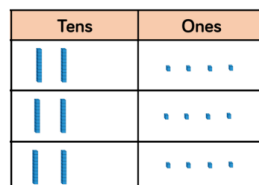
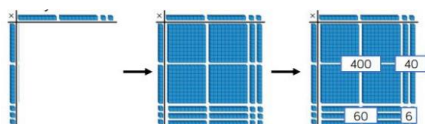


$$\begin{array}{r} 44 \\ \times 32 \\ \hline 88 \\ 880 \\ \hline 1408 \\ 1 \phantom{000} \\ \hline \end{array}$$

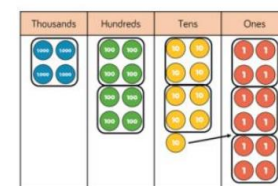
## Base 10/Dienes (multiplication)



$$\begin{array}{l} 96 \div 4 = 24 \\ 80 \div 4 = 20 \\ 16 \div 4 = 4 \end{array}$$



$$\begin{array}{l} 72 \div 3 = 24 \\ 60 \div 3 = 20 \\ 12 \div 3 = 4 \end{array}$$



$$\begin{array}{r} 1223 \\ 4 \overline{) 4892} \end{array}$$