All Saints C of E Primary School

Continuing the
Calculations Journey

Pure mathematicians just love to try unsolved problems - they love a challenge.

Andrew Wiles

Calculations

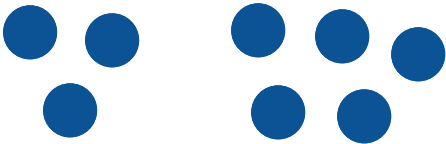# Addition

OBJECTS

- Count on from 0 up to 10 / 20.
- Count up from any number to 10 / 20.
- Recognise numerals to 10 / 20.
- 1:1 counting of objects reliably to 10 / 20.
- Order numbers to 10 and then 20.
- Know to put the largest number first when counting on.
- Know the vocabulary related to addition: add, altogether, total, more.

3   +   5   = 8
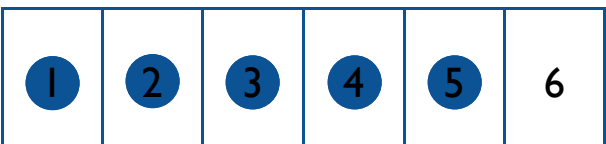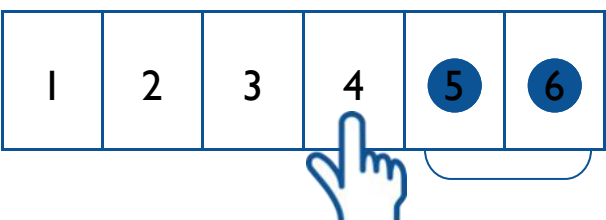
6   +   2   = 8

NUMBER TRACK

- Count on from 0 up to 10 / 20.
- Count up from any number to 10 / 20.
- Recognise numerals to 10 / 20.
- 1:1 counting of objects reliably to 10 / 20.
- Order numbers to 10 and then 20.
- Know 1 more than a given number to 10 / 20.
- Know the vocabulary related to addition: add, altogether, total, more.

| 1 | 2 | 3 | 4 | 5 | 6 |

3   +   2 = 5

| 1 | 2 | 3 | 4 | 5 | 6 |

4   +2 = 6

DIFFICULTY	RESOURCE

- Use counters for both numbers and then counting all of the objects to find the total.
    - 2 1-digit numbers that do not bridge 10.
    - 2 1-digit numbers that bridge 10. (R)
- Use counters for the second number and count on from the first number.
    - 2 1-digit numbers that bridge 10.
    - 2 1-digit numbers with totals to 20.

- Counters
- Cubes
- Pegs on a hanger
- Bead strings / bars
- Other objects

- Place counters on the number track for both groups.
    - 2 1-digit numbers that do not bridge 10.
    - 2 1-digit numbers that bridge 10.
- Use counters only for the second number that is being added on.
    - 2 1-digit numbers with totals to 20.

- Number tracks
- Counters
- Cubes
- Pegs on a hanger
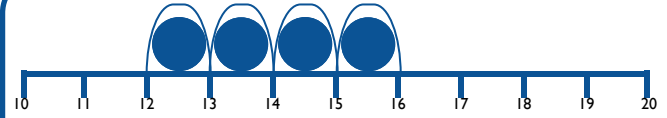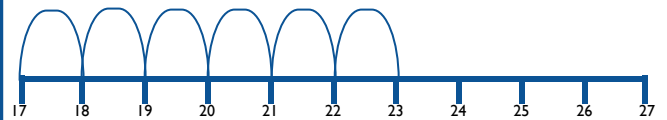- Bead strings / bars
- Other objects
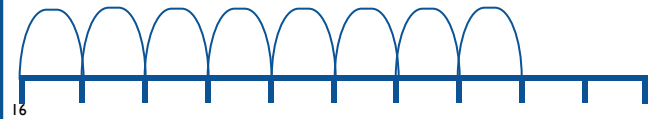
Addition

NUMBER LINE

- Count on from 0 up to 30.
- Count up from any number to 30.
- Recognise numerals to 30.
- Order numbers to 30.
- Know the vocabulary related to addition: add, altogether, total, more.

$$12 + 4 = 16$$

$$17 + 6 = 23$$

$$16 + 8 = 24$$

PARTITIONING

Place Value

- Recognise numerals to 100.
- Know what each digit represents in 2-digit numbers.
- Order numbers to 100.
- Partition 2-digit numbers into tens and ones.

Counting

- Count on in 1s and 10s from any number to 100.
- Know 1 and 10 more than a given number to 100.

- Know that addition can be done in any order

- Know the vocabulary related to addition: add, sum, altogether, total, more.
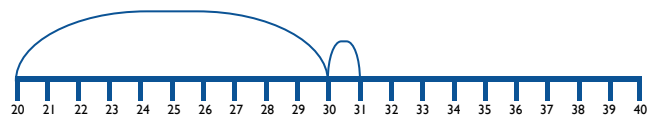
$$20 + 11 = 31$$
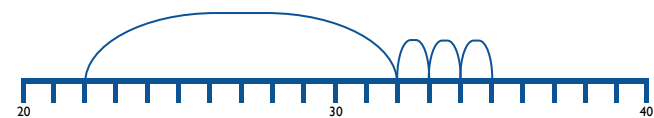
$$22 + 13 = 35$$

$$37 + 25 = 62$$

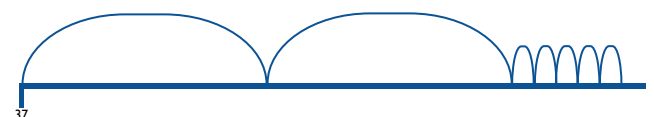| DIFFICULTY	RESOURCE

- Use counters / cubes on the number line for the smaller number and draw over them to count on.
  - Teen numbers add 1-digit numbers.
  - Any 2-digit number <30 add a 1-digit number.
- Draw jumps on top of the number line to add the smaller number.
  - Teen numbers add 1-digit numbers that bridge multiples of 10.
  - Any 2-digit number <30 add a 1-digit number. **Y1**
- Include missing number problems.

- Counters
- Cubes
- Numicon
- Dienes blocks
- Straws
- Number Lines
  - With all numbers
  - Blank
  - In head / fingers

- 2-digit number (multiple of 10) + 1-digit number. E.g. 40 + 6 = .
- 2-digit number + 1-digit number (involves bridging multiples of 10). E.g. 27 + 8 = .
- 2-digit number (multiple of 10) + 2-digit number. E.g. 60 + 34 = .
- 2-digit number + 2-digit number (involves bridging multiples of 10). E.g. 48 + 37 = . **Y2**
- Include missing number problems.
- Include adjusting for near multiples.

- Dienes Blocks
- Straws
- Number Lines
  - With all numbers to 100
  - With multiples of 10 recorded
  - Blank
  - In head / fingers

Addition

EXPANDED COLUMN

Place Value

- Recognise numerals to 1000.
- Know what each digit represents in 3-digit numbers including 0 as a place holder.
- Order numbers to 1000.
- Partition 3-digit numbers into hundreds, tens and ones.

Counting

- Count on in 1s, 10s and 100s from any number to 1000.
- Know 1, 10 and 100 more than a given number to 1000.
- Know number pairs for all numbers to 20.
- Know doubles for numbers to 10 (e.g. (9 + 9 = 18).
- Know the vocabulary related to addition: add, sum, altogether, total, more.

$234 + 122 = 356$

```
  H T U
  2 3 4
+ 1 2 2
_____
      6   ←— Sum of the ones / units
    5 0   ←— Sum of the tens
  3 0 0   ←— Sum of the hundreds
_____
  3 5 6
```

COLUMN

- See above

Place Value

- Recognise numerals to 10000.
- Know what each digit represents in 5-digit numbers and those involving decimals to 2 d.p. including 0 as a place holder.
- Order numbers to 10000.

$3574 + 2466 = 6040$

```
  Th H T U
   3 5 7 4
+  2 4 6 6
   ₁ ₁ ₁
_____
   6 0 4 0
```

$172.5 + 46.06 = 218.56$

```
   1 7 2 . 5
+    4 6 . 0 6
   ₁
_____
   2 1 8 . 5 6
```

DIFFICULTY	RESOURCE

DIFFICULTY

- 2-digit number + 1-digit number (not bridging multiples of 10).
  E.g. 34 + 5 = .

- 2-digit number + 1-digit number (bridging multiples of 10).
  E.g. 46 + 9 = .

- 2-digit number + 2-digit number (bridging multiples of 10 and then 100). E,g, 65 + 57 = .

- 3-digit number + 2-digit number (bridging multiples of 10 and 100) E.g. 187 + 34 = .

- 3-digit number + 3-digit number (bridging multiples of 10, 100 and **(Y3)** 1000). E.g. 745 + 386 = .

- Ensure that numbers using 0 as a place holder are included at each stage.

- Include missing number and adjusting methods for mental calculations.

RESOURCE

- Dienes blocks
- Straws
- Number Lines
  - Blank for mental addition.

DIFFICULTY

- 4-digit number + 4-digit number (bridging multiples of 10, 100 and **(Y4)** 1000). E.g. 8745 + 4386 = .

- Calculations involving decimals to 2 **(Y5)** decimal places.

- Ensure that numbers using 0 as a place holder are included at each **(Y6)** stage.

- Include missing number and adjusting methods for mental calculations.

RESOURCE

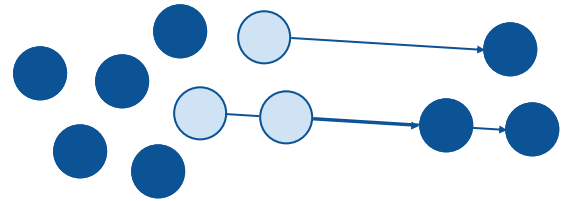- Dienes blocks
- Straws
- Number Lines
  - Blank for mental addition.

Subtraction

OBJECTS

- Count back from 10 / 20 to 0.
- Count back to zero from any number to 10 / 20.
- Recognise numerals to 10 / 20.
- 1:1 counting of objects reliably to 10 / 20.
- Order numbers to 10 and then 20.
- Know the vocabulary related to subtraction: take away, How many left?, How many now?, less.

8 - 3 = 5

8 - 2 = 6

NUMBER TRACK

- Count back from 10 / 20 to 0.
- Count back to zero from any number to 10 / 20.
- Recognise numerals to 10 / 20.
- 1:1 counting of objects reliably to 10 / 20.
- Order numbers to 10 and then 20.
- Know 1 less than a given number to 10 / 20.
- Know the vocabulary related to subtraction: take away, How many left?, How many now?, less.

| 1 | 2 | 3 | 4 | 5 | 6 |

5 - 3 = 2

| 1 | 2 | 3 | 4 | 5 | 6 |

6 - 4 = 2
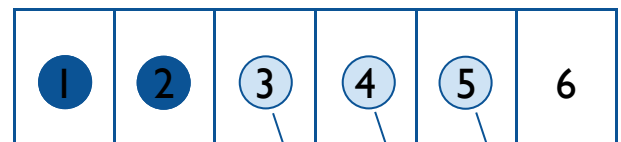
- Use counters or objects and then take away the second number, counting how many are left.

- Use counters or objects and count back to take away the correct number .

- Using shapes that are drawn and crossing them out as you count back.

  - Numbers to 10 subtracting 1-digit numbers.

  - Numbers to 20 subtracting 1 -digit numbers. (R)

- Counters
- Cubes
- Pegs on a hanger
- Bead strings / bars
- Other objects

- Place counters on the number track for the total and then remove the counters for the second number.

  - Totals to 10 subtracting 1-digit numbers.

  - Totals to 20 subtracting 1-digit numbers.

- Count back from the larger number

  - Totals to 10 subtracting 1-digit numbers.

  - Totals to 20 subtracting 1-digit numbers.

- Number tracks
- Counters
- Cubes
- Pegs on a hanger
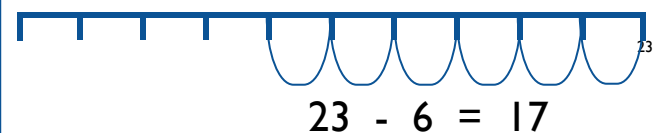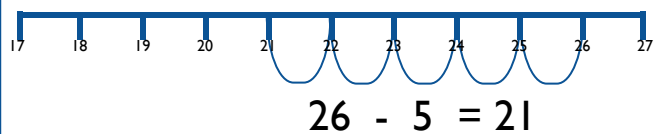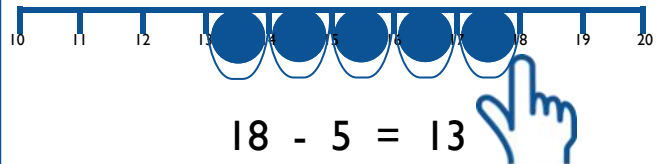- Bead strings / bars
- Other objects

Subtraction

NUMBER LINE

- Count back from 30 to any smaller number.
- Recognise numerals to 30.
- Order numbers to 30.
- Know the vocabulary related to subtraction: take away, How many left?, How many now?, less.

18 - 5 = 13

26 - 5 = 21

23 - 6 = 17

PARTITIONING

Place Value

- Recognise numerals to 100.
- Know what each digit represents in 2-digit numbers.
- Order numbers to 100.
- Partition 2-digit numbers into tens and ones.

Counting

- Count back in 1s and 10s from any number to 100.
- Know 1 and 10 less than a given number to 100.
- Know that subtraction cannot be done in any order
- Know the vocabulary related to subtraction: take away, How many left?, How many now?, less.

40 - 12 = 28

37 - 15 = 22

53 - 24 = 29

What is left

Taken away

38 - 26 = 12
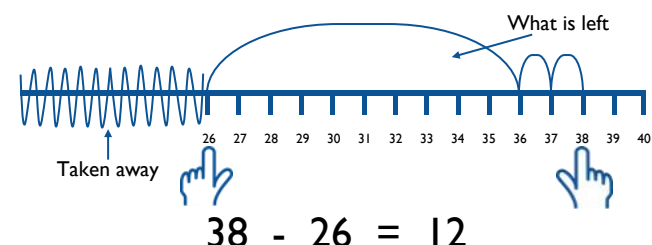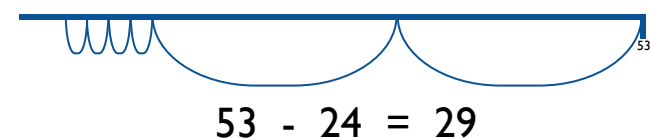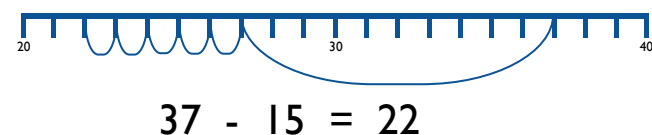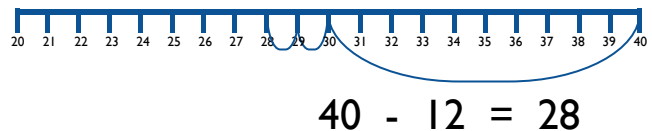
DIFFICULTY	RESOURCE

- Use counters / cubes on the number line for the smaller number and draw over them to count back.
  - Teen numbers subtract 1-digit numbers.
  - Any 2-digit number <30 subtract a 1-digit number.
- Draw jumps below the number line to subtract the smaller number.
  - Teen numbers subtract 1-digit numbers that bridge multiples of 10.
  - Any 2-digit number <30 subtract a 1-digit number. **(Y1)**
- Include missing number problems.

- Counters
- Cubes
- Numicon
- Dienes blocks
- Straws
- Number Lines
  - With all numbers
  - Blank
  - In head / fingers

- 2-digit number (multiple of 10) - 1-digit number. E.g. 40 - 6 = .
- 2-digit number - 1-digit number (involves bridging multiples of 10). E.g. 27 - 8 = .
- 2-digit number (multiple of 10) - 2-digit number. E.g. 60 - 34 = .
- 2-digit number - 2-digit number (involves bridging multiples of 10). **(Y2)** E.g. 68 - 37 = .
- Include missing number problems.
- Include adjusting for near multiples.
- Include finding the difference by counting on from the smaller to number to the larger one.

- Dienes Blocks
- Straws
- Number Lines
  - With all numbers to 100
  - With multiples of 10 recorded
  - Blank
  - In head / fingers

Subtraction

EXPANDED COLUMN

Place Value

- Recognise numerals to 1000.
- Know what each digit represents in 3-digit numbers including 0 as a place holder.
- Order numbers to 1000.
- Partition 3-digit numbers into hundreds, tens and ones.

Counting

- Count back in 1s, 10s and 100s from any number to 1000.
- Know 1, 10 and 100 less than a given number to 1000.
- Know number pairs for all numbers to 20.
- Know halves for numbers to 20 (e.g. (16 - 8 = 8).
- Know the vocabulary related to subtraction: take away, How many left?, How many now?, less.

378 - 264 = 114

```
    H T U
    3 7 8
  - 2 6 4
  ─────────
        4   ←── How many ones / units left
      1 0   ←── How many tens left
    1 0 0   ←── How many hundreds left
  ─────────
    1 1 4
```

562 - 345 = 217

```
    H T U
    5 ⁵6̷ ¹2
  - 3 4 5
  ─────────
        7   ←── How many ones / units left
      1 0   ←── How many tens left
    2 0 0   ←── How many hundreds left
  ─────────
    2 1 7
```

COLUMN

- See above

Place Value

- Recognise numerals to 10000.
- Know what each digit represents in 5-digit numbers and those involving decimals to 2 d.p. including 0 as a place holder.
- Order numbers to 10000.

3574 - 2466 = 1108

```
    Th H T U
    3 5 ⁶7̷ ¹4
  -  2 4 6 6
  ───────────
     1 1 0 8
```

4002.58 - 467.06 = 3535.52

```
    ³4̷ ¹0̷ ⁹0̷ ⁹1̷ 2 . 5 8
  -      4 6 7 . 0 6
  ──────────────────────
         3 5 3 5 . 5 2
```

DIFFICULTY	RESOURCE

- Calculations with no borrowing
  - 2-digit number - 2-digit number. E.g. 39 - 25 = .
  - Progressing to 3-digit numbers. E.g. 498 - 246 = .
- Calculations involving borrowing
  - 2-digit number - 2-digit number (borrowing from the tens). E,g, 65 - 27 = .
  - 3-digit number - 2-digit number (borrowing from the tens and hundreds). E,g, 234 - 58 = .
  - 3-digit numbers borrowing from any column. **Y3**
- Include missing number and adjusting methods for mental calculations.

- Dienes blocks
- Straws
- Number Lines
  - Blank for mental addition.

- See above for difficulty progression before moving on to the following:
  - 5-digit number - 4-digit number. E.g. 28745 - 4386 = . **Y4**
  - Calculations involving decimals to 2 decimal places. **Y5**
- Ensure that numbers using 0 as a place holder are included in the borrowing stage. E.g. 2008 - 1809 = . **Y6**
- Include missing number and adjusting methods for mental calculations.

- Dienes blocks
- Straws
- Number Lines
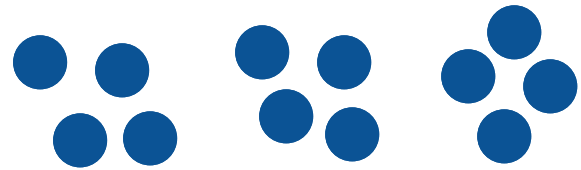 - Blank for mental addition.

Multiplication

OBJECTS

- Count on from 0 up to 10 / 20.
- Count up from any number to 10 / 20.
- Recognise numerals to 10 / 20.
- 1:1 counting of objects reliably to 10 / 20.
- Group objects accurately.
- Count in groups of 1, 2 and 5.
- Order numbers to 10 and then 20.
- Know the vocabulary related to multiplication: times, multiply, groups of, lots of.

$$4 \times 3 = 12$$
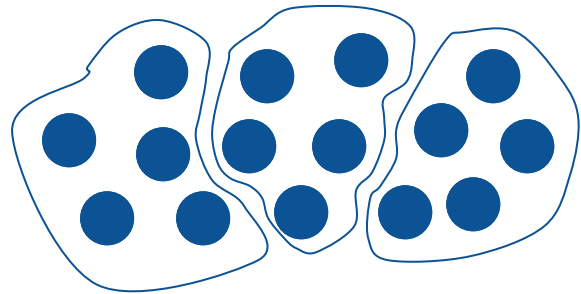
$$5 \times 3 = 15$$

ARRAYS

- Count up from any number to 30.
- Recognise numerals to 30.
- 1:1 counting of objects reliably to 30.
- Group objects accurately.
- Count in groups of 1, 2, 3, 5 and 10.
- Order numbers to 30.
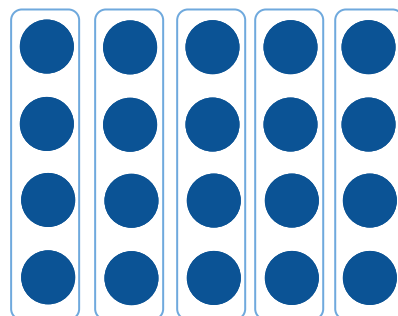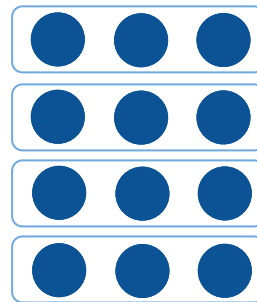- Know the vocabulary related to multiplication: times, multiply, groups of, lots of.
- Understand the commutative nature of multiplication.

$$3 \times 4 = 12$$

$$4 \times 5 = 20$$

DIFFICULTY	RESOURCE

DIFFICULTY

- Group counters into equal groups carefully considering language. E.g. 3 x 4 = 12 is three multiplied by four equals twelve or three, four times equals twelve. It is not three lots of four equals twelve. **(R)**

- Use an amount of counters / shapes and draw around them to make the groups.

    - 2 1-digit numbers that bridge 10.

    - 2 1-digit numbers with totals to 20.

- Include missing number problems.

RESOURCE

- Counters
- Cubes
- Pegs on a hanger
- Bead strings / bars
- Other objects

DIFFICULTY

- Rearrange counters in rough groups into rows and columns. Group the counters in rows to link with the next step of using a number line.

    - 2 1-digit numbers with totals to 20.

- Construct arrays from a given number sentence. **(Y1)**

    - 2 1-digit numbers with totals to 30.

- Include missing number problems.

RESOURCE

- Arrays used in a 'real world' context.
- Peg boards
- Counters
- Cubes
- Numicon
- Other objects

Multiplication

NUMBER LINE

Place Value

- Know what each digit represents in 2-digit numbers.
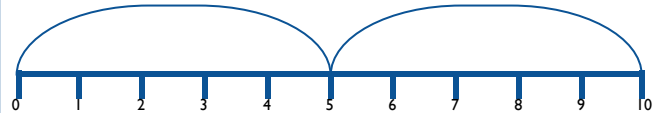- Recognise and order numbers to 100.

Counting

- Count up from any number to 100.
- Count in groups of 1, 2, 3, 4, 5 and 10 accurately.
- Know multiplication facts for 2, 3, 4, 5 and 10 times tables.
- Know the vocabulary related to multiplication: times, multiply, groups of, lots of, jumps of.

$2 \times 4 = 8$

$5 \times 2 = 10$
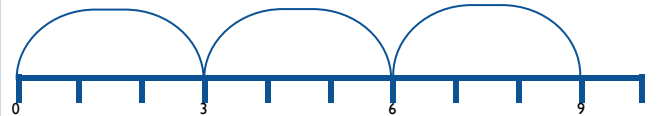
$3 \times 3 = 9$
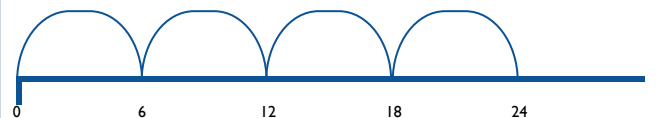
$6 \times 4 = 24$

DIFFICULTY

- Move the rows from the array onto the number line and draw a jump over each group.
  - 2 1-digit numbers with a total to 20.
- Draw jumps on top of the number line for each group starting from 0.
  - 2 1-digit numbers using the 1, 2, 3, 4, 5 and 10 times tables. **(Y2)**
  - 2 1-digit numbers using the 6 and 8 times tables.
  - 2 1-digit numbers using the 7 times tables.
- Include missing number problems.

RESOURCE

- Counters
- Cubes
- Numicon
- Number Lines
  - With all numbers to 100
  - With multiples of 10 recorded
  - Blank
  - In head / fingers

Multiplication

PARTITIONING

Place Value

- Know what each digit represents in 3-digit numbers.
- Recognise and order numbers to 1000.
- Move digits to the left relative to the decimal point when multiplying by multiples of 10 and 100,

- Know multiplication facts for all the times tables.
- Use column addition and / or mental strategies for totalling.
- Know the vocabulary related to multiplication: times, multiply, groups of, lots of, jumps of, product, factors.

$14 \times 5 = 70$

X	10	4
5	50	20

$? \times 12 = ?$

X	?	?
10	200	
2		8

$26 \times 4 = 104$

$20 \times 4 \quad = \ 80$

$6 \times 4 \quad = \ 24$

$\overline{104}$

$16 \times 15 = 240$

$16 \times 10 \quad = \ 160$

$16 \times 5 \quad = \ 80$

$\overline{240}$

DIFFICULTY

Grid

- 2-digit x 1-digit (up to 15 x 5).
- 2-digit x 1-digit (up to 30 x 5).
- 2-digit x 2-digit (up to 15 x 15). (Y3)
- 2-digit x 2-digit (up to 30 x 15).
- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10 and 100.
- Include missing number problems.

- 2-digit x 1-digit (up to 15 x 5).
- 2-digit x 1-digit (up to 30 x 5).
- 2-digit x 2-digit (up to 15 x 15).
- 2-digit x 2-digit (up to 30 x 15). (Y4)
- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10 and 100.
- Include missing number problems.

RESOURCE

- Dienes Blocks
- Place value cards

Multiplication

SHORT MULTIPLICATION

Place Value

- Know what each digit represents in 3-digit numbers.
- Recognise and order numbers to 1000.
- Move digits to the left relative to the decimal point when multiplying by multiples of 10 and 100,
- Know multiplication facts for all the times tables.
- Know how to use column addition.
- Know the vocabulary related to multiplication: times, multiply, groups of, lots of, jumps of, product, factors.

$$25 \times 8 = 200$$

```
    H T U
      2 5
  ×    8
       4
    2 0 0
```

$$5317 \times 8 = 42536$$

```
  ToTh Th H T U
       5 3 1 7
  ×        8
        2 1 5
     4 2 5 3 6
```

LONG MULTIPLICATION

Place Value

- Know what each digit represents in 6-digit numbers.
- Recognise and order numbers to 100000.
- Move digits to the left relative to the decimal point when multiplying by multiples of 10, 100 and 1000,
- Know multiplication facts for all the times tables.
- Know how to use column addition.
- Know the vocabulary related to multiplication: times, multiply, groups of, lots of, jumps of, product, factors.

$$315 \times 23 = 7245$$

```
  Th H T U          Th H T U
     3 1 5             3 1 5
  ×    2 3          ×    2 3
       1 5             9 4 5
       3 0           6 3 0 0
     9 0 0           7 2 4 5
   6 3 0 0
   7 2 4 5
```

DIFFICULTY	RESOURCE

- 2-digit x 1-digit (up to 15 x 5).
- 2-digit x 1-digit (up to 50 x 9).
- 2-digit x 1-digit (up to 99 x 9).
- Up to 4-digit x 1-digit using all sizes of digits. **(Y4)**
- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10 and 100.

- Dienes blocks
- Place value cards

DIFFICULTY	RESOURCE

- 2-digit x 2-digit (up to 15 x 15).
- 2-digit x 2-digit (up to 50 x 50).
- 2-digit x 2-digit (up to 99 x 99). **(Y5)**
- 3-digit x 2-digit (up to 999 x 99).
- Up to 4-digit x 2-digit using all sizes of digits. **(Y6)**
- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10, 100 and 1000.
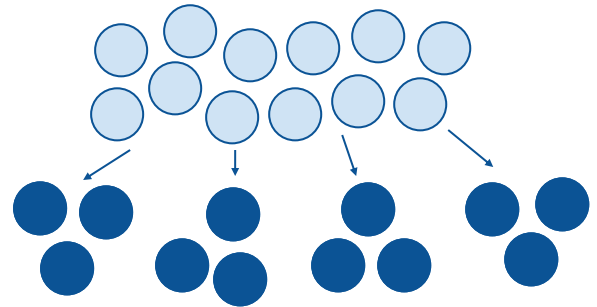
- Dienes blocks
- Place value cards

Division

OBJECTS

- Count on from 0 up to 10 / 20.

- Count up from any number to 10 / 20.

- Recognise numerals to 10 / 20.

- 1:1 counting of objects reliably to 10 / 20.

- Group objects accurately.

- Count in groups of 1, 2 and 5.

- Order numbers to 10 and then 20.

- Know the vocabulary related to division: divide, share, groups of, lots of.
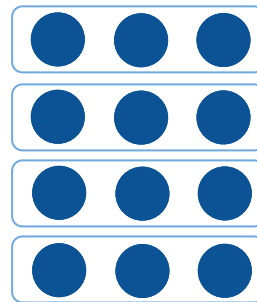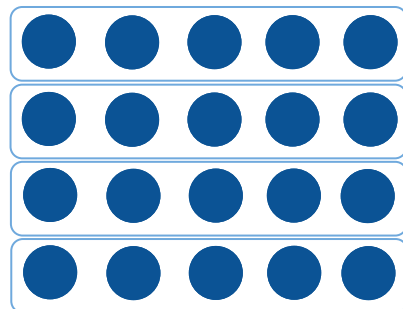
$$12 \div 3 = 4$$

$$10 \div 2 = 5$$

ARRAYS

- Count up from any number to 30.

- Recognise numerals to 30.

- 1:1 counting of objects reliably to 30.

- Group objects accurately.

- Count in groups of 1, 2, 3, 5 and 10.

- Order numbers to 30.

- Know the vocabulary related to division: divide, share, groups of, lots of.

$$12 \div 3 = 4$$

$$20 \div 5 = 4$$

DIFFICULTY

- Group counters into equal groups carefully considering language. E.g. 12 ÷ 3 = 4 is twelve divide into groups of three equals four or twelve divided into threes equals four. **(R)**

- Arrange the counters in a row and circle the groups.

    - 1-digit number divided by another 1-digit number.

    - 2-digit number divided by a 1-digit number. **(Y1)**

- Include sharing problems.

- Include missing number problems.

RESOURCE

- Counters

- Cubes

- Pegs on a hanger

- Bead strings / bars

- Other objects

DIFFICULTY

- Arrange a given total of counters into equal rows. Rows being an important link with moving to the number line.

    - 2-digit numbers to 30 divided by a 1-digit number.

- Include missing number problems.

RESOURCE

- Arrays used in a 'real world' context.

- Peg boards

- Counters
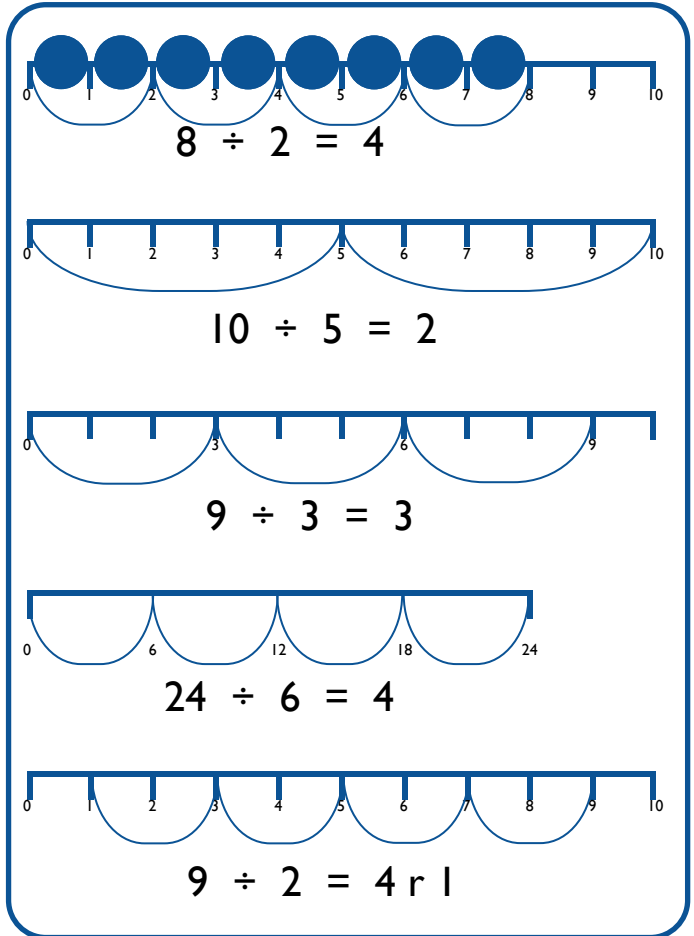
- Cubes

- Numicon

- Other objects

Division

NUMBER LINE

Place Value

- Know what each digit represents in 2-digit numbers.
- Recognise and order numbers to 100.

Counting

- Count back from any number to 100.
- Count backwards in groups of 1, 2, 3, 4, 5 and 10 accurately.
- Know division facts for 2, 3, 4, 5 and 10 times tables.

- Know the vocabulary related to division: divide, share, groups of, lots of.

$8 \div 2 = 4$

$10 \div 5 = 2$

$9 \div 3 = 3$

$24 \div 6 = 4$
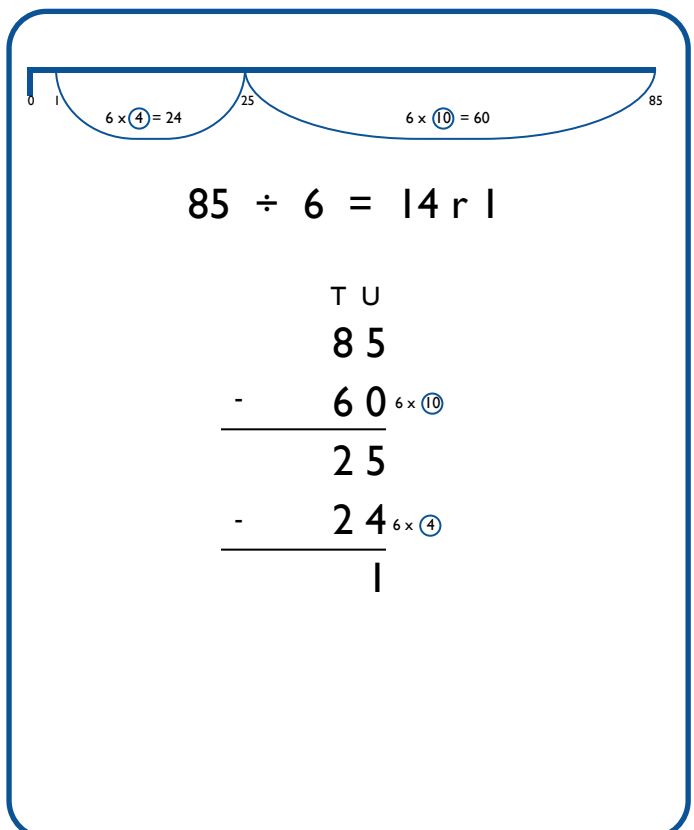
$9 \div 2 = 4 \text{ r } 1$

CHUNKING

Place Value

- Know what each digit represents in 3-digit numbers.
- Recognise and order numbers to 1000.

Counting

- Count back in different sized groups from any number to 100.

- Know multiplication and division facts for all the times tables.

- Know how to use column subtraction.

- Know the vocabulary related to division: divide, share, groups of, lots of.

$6 \times 4 = 24$ $6 \times 10 = 60$

$85 \div 6 = 14 \text{ r } 1$

```
    T U
    8 5
-   6 0   6 × 10
  ───────
    2 5
-   2 4   6 × 4
  ───────
      1
```

DIFFICULTY

- Move the rows from the array onto the number line and draw a jump under each group.
    - 2-digit number divided by a 1-digit number (up to 30 ÷ 5 =).
- Draw jumps under the number line from the start number until reaching zero.
    - 2-digit number divided by a 1-digit number (up to 99 ÷ 5 =). **(Y2)**
    - 2-digit number divided by a 1-digit number (up to 99 ÷ 9 =).
- Introduce finding remainders. Stop drawing jumps under the line when the amount left is too small to make another group,

RESOURCE

- Counters
- Cubes
- Numicon
- Number Lines
    - With all numbers to 100
    - With multiples of 10 recorded
    - Blank
    - In head / fingers

DIFFICULTY

- Link repeated subtraction method above to subtracting chunks of multiples related to times tables knowledge.
- 2-digit ÷ 1-digit (up to 30 ÷ 5).
- 2-digit ÷ 1-digit (up to 99 ÷ 9). **(Y3)**
- 3-digit ÷ 2-digit (up to 150 ÷ 12). **(Y4)**
- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10, 100 and 1000.
- Efficiency and accuracy to be the main focus of teaching. Using as big a chunk as possible without spending a lot of time working out or being inaccurate.

RESOURCE

- Number Lines
    - With multiples of 10 recorded
    - Blank
    - In head / fingers

Division

SHORT DIVISION

Place Value

- Know what each digit represents in 3-digit numbers.
- Recognise and order numbers to 1000.
- Move digits to the left / right relative to the decimal point when multiplying / dividing by multiples of 10, 100 and 1000.

- Know multiplication and division facts for all the times tables.
- Know links between fractions and decimals.
- Know the vocabulary related to division: divide, share, groups of, lots of, divisor, dividend, quotient.

$$98 \div 7 = 14$$

$$
\begin{array}{c|cc}
 & 1 & 4 \\
\hline
7 & 9 & {}^2 8 \\
\end{array}
$$

$$432 \div 5 = 86 \text{ r } 2$$

$$
\begin{array}{c|ccc}
 & 0 & 8 & 6 \quad \text{r } 2 \\
\hline
5 & 4 & {}^4 3 & {}^3 2 \\
\end{array}
$$

$$496 \div 11 = 45 \tfrac{1}{11}$$

$$
\begin{array}{c|ccc}
 & 0 & 4 & 5 \quad \text{r } 1 \\
\hline
11 & 4 & {}^4 9 & {}^5 6 \\
\end{array}
$$

DIFFICULTY

- 2-digit ÷ 1-digit (up to 99 ÷ 5).

- 3-digit ÷ 1-digit (up to 999 ÷ 5).

- Up to 3-digit ÷ 2-digit (up to 999 ÷ 12). **Y5**

- When considering the difficulty of the problem think about the size of the divisor and the size of the digits in the amount to be divided. For additional challenge make some of the digits smaller in value than the divisor.

RESOURCE

- Dienes blocks

- Place value cards

Division

LONG DIVISION

Place Value

- Know what each digit represents in 5-digit numbers.
- Recognise and order numbers to 10000.
- Move digits to the left / right relative to the decimal point when multiplying / dividing by multiples of 10, 100 and 1000,

- Know multiplication and division facts for all the times tables.

- Know how to use column subtraction.

- Know links between fractions and decimals.

- Know the vocabulary related to division: divide, share, groups of, lots of, divisor, dividend, quotient.

$432 \div 15 = 28 \text{ r } 12$

Or

$432 \div 15 = 28 \, \frac{\cancel{12}}{\cancel{15}} \, \frac{4}{5}$

```
        2  8
15 |  4  3  2
      3  0  0   15 × ⑳
      1  3  2
      1  2  0   15 × ⑧
         1  2
```

$432 \div 15 = 28.8$

```
        0  2  8 . 8
15 |  4  3  2 . 0
15 ×②  3  0
         1  3  2    43 - 30
15 ×⑧    1  2  0
            1  2  0   132 - 120
15 ×⑧       1  2  0
```

DIFFICULTY

- 3-digit ÷ 2-digit (up to 999 ÷ 99).

- Up to 4-digit ÷ 2-digit using all sizes of digits. (Y6)

- When considering the difficulty of the problem think about the size of the divisor and the size of the digits in the amount to be divided. For additional challenge make some of the digits smaller in value than the divisor.

- Ensure that children are moving the digits to the left relative to the decimal point when multiplying by 10, 100 and 1000.

RESOURCE
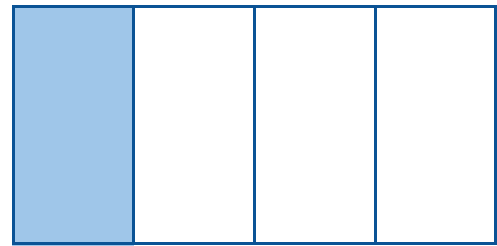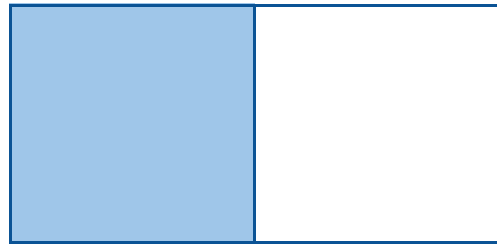
- Dienes blocks

- Place value cards

Fractions

SHAPES

- Recognise and name 2D shapes.
- Count to 10 reliably.
- Know the vocabulary related to division: divide, share, groups of, lots of.

OBJECTS

- Count up from any number to 30.
- Recognise numerals to 30.
- Order numbers to 30.
- 1:1 counting of objects reliably to 30.
- Share objects accurately.
- Count in groups of 1, 2, 3, 5 and 10.
- Recognise, name and draw unit fractions of a half and quarter.
- Know the vocabulary related to division: divide, share, groups of, lots of.

$$\frac{1}{2} \text{ of } 8 = 4$$

$$\frac{1}{4} \text{ of } 16 = 4$$

$$\frac{1}{3} \text{ of } 18 = 6$$
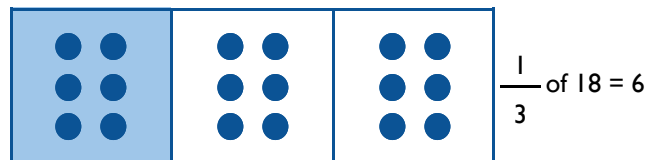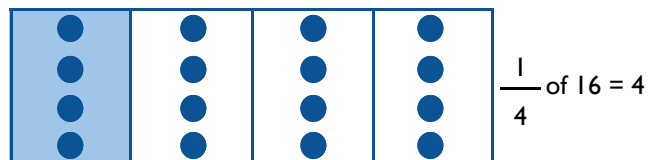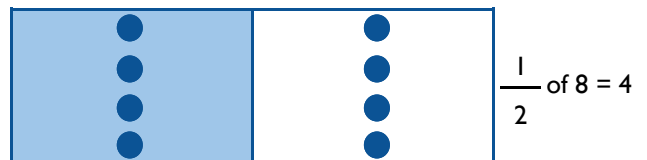
- Use a bar shape to introduce halves and then quarters (unit fractions).

- Check understanding by using a variety of shapes.

- 2D shapes

- Ensure children can recognise and name a wider range of unit fractions within shapes (E.g. thirds and fifths).

- Share an amount of objects on top of pictures of unit fractions (numerator equals 1). **(Y1)**

- Share an amount of objects on top of non-unit fractions (numerator is greater than 1 but not larger than the denominator). **(Y2)**

- Use the language of denominator and numerator.

- Counters

- Cubes

- Other objects

- 2D shapes

Fractions

BAR

- Count up from any number to 50.
- Recognise numerals to 50.
- Order numbers to 50.
- 1:1 counting of objects reliably to 50.
- Share objects accurately.
- Count in groups of 1, 2, 3, 4, 5 and 10.
- Recognise, name and draw unit fractions with single digit denominators.
- Know the vocabulary related to division: divide, share, groups of, lots of.

$\frac{3}{5}$ of 10 = 6

$\frac{4}{6}$ of 24 = 16

$\frac{8}{9}$ of 27 = 24
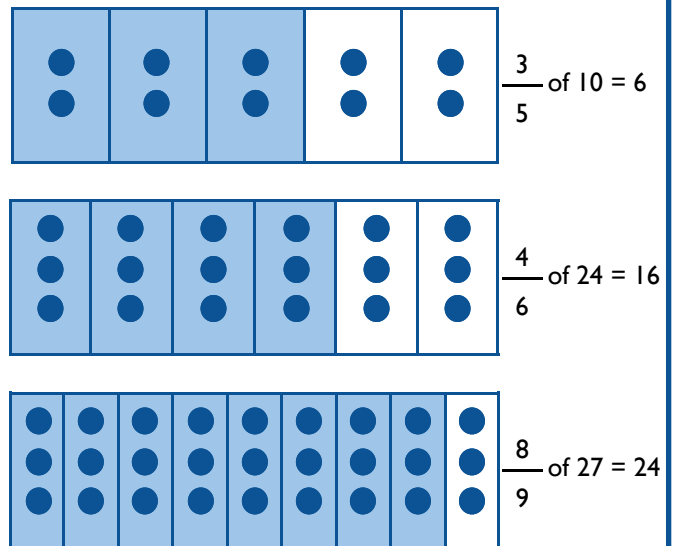
BAR - EQUIVALENCE

- Recognise, name and draw unit and non-unit fractions with single digit denominators.
- Know the vocabulary related to division: divide, share, groups of, lots of.
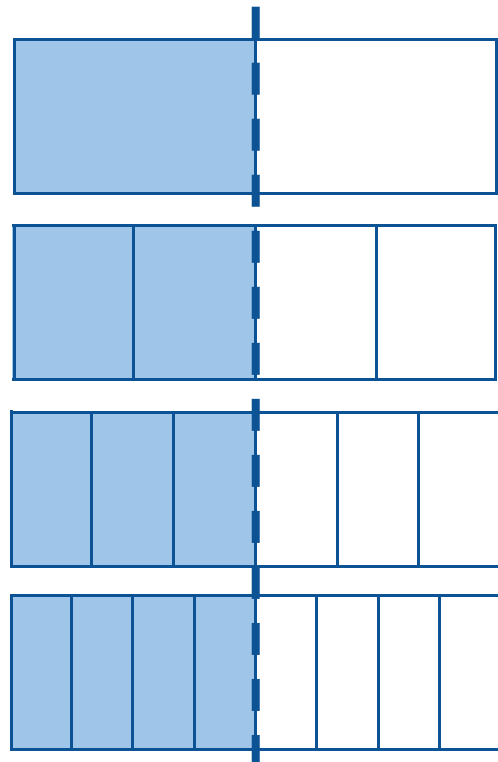
DIFFICULTY	RESOURCE

- Ensure children can recognise and name a wider range of unit fractions within shapes (E.g. fifths, sixths, tenths etc).

- Share an amount of objects on top of non-unit fractions (numerator is greater than 1 but not larger than the denominator). **(Y3)**

- Include examples where the numerator and denominator are equal and is therefore one whole.

- Move to the children drawing their own bars.

- Use the language of denominator and numerator.

- Counters
- Cubes
- Other objects
- 2D shapes

- Children to match equivalent fractions given to them (matching to **(Y2)** one half).

- Finding fractions that match to other unit fractions (E.g. to one third).

- Drawing non-unit fractions that are equivalent to another unit or non-unit fraction (e.g. two quarters is equivalent to four eighths). **(Y4)**

- Use the language of denominator and numerator.

- 2D shapes
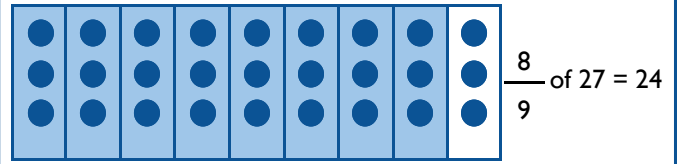- Premade unit and non-unit fraction bars.
- Fraction wall

Fractions

BAR - CALCULATIONS

- Count up from any number to 100.

- Recognise numerals to 100.

- Order numbers to 100.

- Share objects accurately.

- Count in groups of 1, 2, 3, 4, 5 and 10.

- Know multiplication and division facts for the 2, 3, 4, 5 and 10 times tables.

- Know and use the terms denominator and numerator.

- Know the vocabulary related to division: divide, share, groups of, lots of.

$\frac{8}{9}$ of 27 = 24

$27 \div 9 = 3$ Divide by the denominator.

$3 \times 8 = 24$ Multiply by the numerator.

BAR - ORDERING

- Recognise, name and draw unit and non-unit fractions with single digit denominators.

- Find the fractions of quantities for non-unit fractions.

- Know multiplication and division facts from all the times tables.

- Know what the <, > and = signs mean.

- Know the vocabulary related to division: divide, share, groups of, lots of.
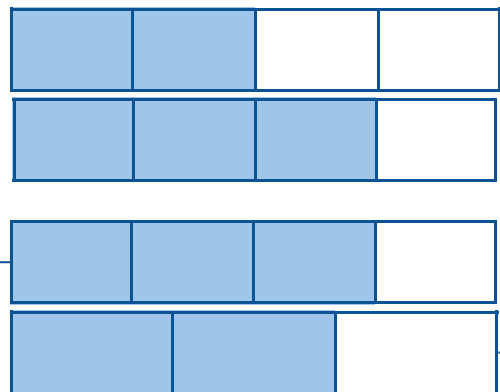
Testing with a common multiple of both denominators.

$12 \div 4 = 3$ $12 \div 3 = 4$

$9 > 8 \quad \therefore \quad {}^{3}/_{4} > {}^{2}/_{3}$

DIFFICULTY	RESOURCE

- Move from the bar visual method to using calculations to solve fractions of larger numbers to 100.
    - Numbers and fractions that link to the 2, 5 and 10 times tables.
    - Numbers and fractions that link to the 3, 4, 6 and 8 times tables.
    - Numbers and fractions that link to the 7 and 9 times tables. **(Y4)**

- Counters
- Cubes
- Other objects
- 2D shapes
- Premade unit and non-unit fraction bars.

- Compare visually non-unit fractions with the same denominator.
- Compare visually non-unit fractions with different denominators. **(Y5)**
- Compare fractions by finding the fraction of a common amount (an amount in which both denominators are factors).
- Convert fractions by using a common denominator (see converting later). **(Y6)**
- Learn the link between fractions, decimals and percentages.

- Objects
- Premade non-unit fraction bars.
- Fraction wall

Fractions
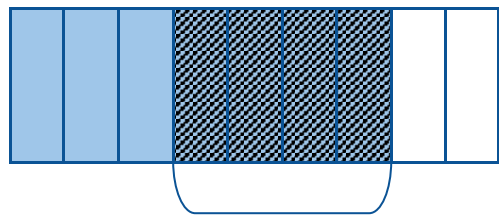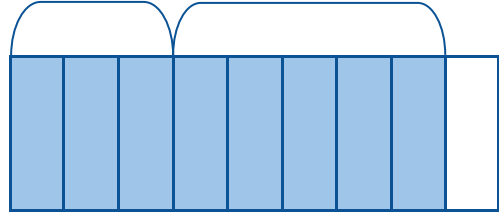
BAR - ADD / SUBTRACT

- Recognise and name non-unit fractions.
- Count forwards and backwards reliably to 20.
- Add and subtract small amounts mentally.
- Know the vocabulary related to division, addition and subtraction.

$$\frac{3}{9} \quad + \quad \frac{5}{9} \quad = \quad \frac{8}{9}$$

$$\frac{7}{9} \quad - \quad \frac{4}{9} \quad = \quad \frac{3}{9}$$

BAR - IMPROPER / MIXED

- Recognise, name and draw non-unit fractions.
- Count forwards and backwards reliably to 20.
- Add and subtract small amounts mentally.
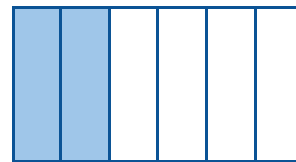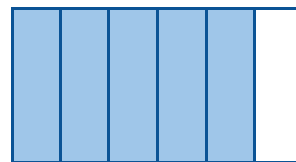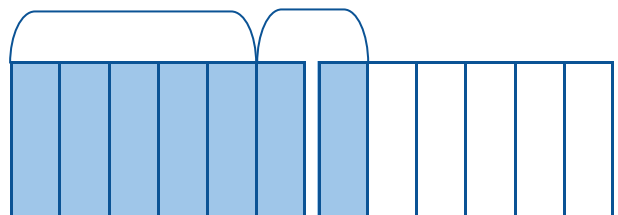- Know the vocabulary related to division, addition and subtraction.

$$+$$

$$\frac{5}{6} \quad + \quad \frac{2}{6} \quad = \quad \frac{7}{6} \quad \text{or} \quad 1\frac{1}{6}$$

- Add and subtract unit and non-unit fractions (proper fractions only). **Y4**

- Use calculation methods without visuals. Only add and subtract the numerator.

- Learn the link between fractions, decimals and percentages.

- Fraction wall

- Fraction bars

- Use visual support to add and subtract improper / mixed number fractions.

- Convert improper and mixed number fractions (up to 1 and a fraction).

- Add and subtract without visuals only altering the numerator. **Y5**

- Include problems involving mixed number fractions up to 2, 3 and 4 and a fraction.

- Learn the link between fractions, decimals and percentages.
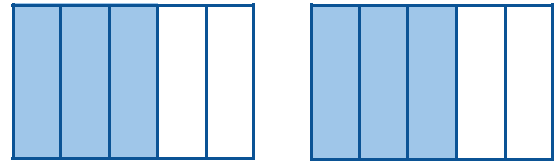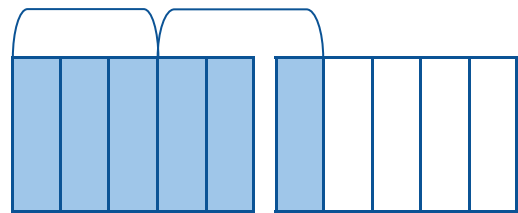

- Fraction wall

- Fraction bars

Fractions

BAR - MULTIPLY

- Recognise, name and draw non-unit fractions.
- Count reliably in groups using times table knowledge.
- Know multiplication facts from the times tables.
- Know the vocabulary related to multiplication and addition.

$$\frac{3}{5} \times 2 = \frac{6}{5} \text{ or } 1\frac{1}{5}$$
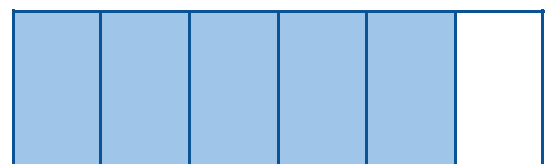
$$\frac{3}{5} \qquad \frac{3}{5}$$

$$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$

BAR - DIVIDE

- Recognise, name and draw non-unit fractions.
- Count reliably in groups using times table knowledge.
- Know multiplication facts from the times tables.
- Know how to divide shapes equally.
- Know the vocabulary related to multiplication and division.

$$\frac{5}{6} \div 3 = \frac{15}{18}$$

| DIFFICULTY | RESOURCE |

- Use visual methods for combining bars.
- Calculate knowing that the numerator is multiplied by the multiplier.

(Y5)

- Use improper and mixed number answers.
- Multiply denominators without visuals for fractions with a numerator of 1.

(Y6)

- Learn the link between fractions, decimals and percentages.

- Fraction wall
- Fraction bars

- Use visual methods for dividing bars.
- Calculate knowing that the numerator and denominator are multiplied by the divisor.
- Only use proper fractions.

(Y6)

- Learn the link between fractions, decimals and percentages.

- Fraction wall
- Fraction bars

Fractions

BAR - CONVERTING

- Recognise, name and draw non-unit fractions.
- Count reliably in groups using times table knowledge.
- Know multiplication facts from the times tables.
- Know how to divide shapes equally.
- Know the vocabulary related to addition, subtraction, multiplication and division.

$$\frac{2}{3} + \frac{1}{6} = \frac{5}{6}$$

$$\frac{4}{6} \qquad \frac{1}{6}$$

$$\frac{3}{5} + \frac{2}{4} =$$

$$\times 4 \qquad \times 5$$

$$\frac{12}{20} + \frac{10}{20} = \frac{22}{20} \text{ or } 1\frac{2}{20}$$

$$= \frac{11}{10} \text{ or } 1\frac{1}{10}$$

DIFFICULTY

- Use visual methods with only one of the denominators being converted to the other.

- Calculate by changing one denominator to the other using multiplication.

- Calculate by converting both denominators using multiplication to find a common denominator.

- Simplify answers.

- Learn the link between fractions, decimals and percentages.

RESOURCE

- Fraction wall
- Fraction bars