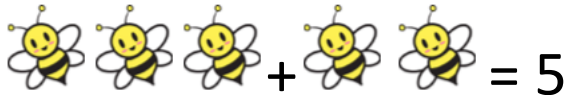


# Addition

## Stage 1

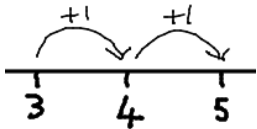
- Children understand the concept of addition as the combining of 2 or more groups.

- They count using objects starting at the largest number



- They use the + and = symbols correctly, understanding that:  $2 + 3 = 5$  and  $5 = 2 + 3$

- Extend to counting up in ones on a number line:



- They begin to count using **dienes equipment** (ones and tens)

## Stage 4

- Children should now use column addition of 2, 3 and 4 digit number. This expanded method could be used to help pupils who are struggling with column method to visualise the addition.
- Place value counters can be used to model this

$$700 + 80 + 9$$

$$\underline{600 + 40 + 2}$$

$$\underline{1300 + 120 + 11} = 1431$$

Column recommended by the end of year 3

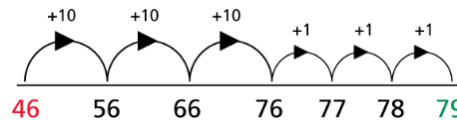
## Stage 2

- Children add 2 digit numbers by counting on in tens then ones on a number line:

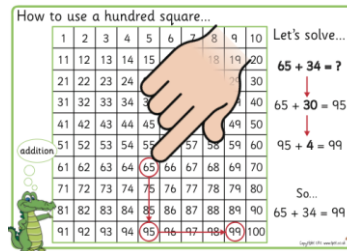
$$46 + 33$$

$$= 46 + 10 + 10 + 10 + 1 + 1 + 1$$

$$= 79$$



- Children use a **100 square** to begin to add two digit numbers by counting on in tens then ones



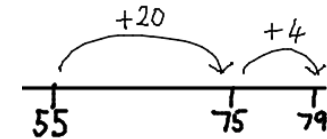
## Stage 3

- Children use an empty number line to extend partitioning adding the tens then the ones

$$55 + 24$$

$$= 55 + 20 + 4$$

$$= 79$$



Children must have a good understanding of place value and partitioning

Recommended by the end of year 2

## Stage 5

- This leads to the short written method of addition in columns using 'carrying'

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \end{array}$$

Recommended by the end of year 3

## Stage 6

- The same method is applied to addition of decimals

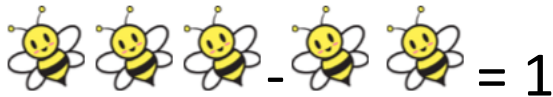
$$\begin{array}{r} 56.85 \\ + 36.85 \\ \hline 93.70 \end{array}$$

# Subtraction

## Stage 1

- Children understand the concept of subtraction as the taking a number away from another.

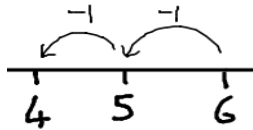
- They take away using objects



- They use the - and = symbols correctly, understanding that:

$$6 - 2 = 4 \quad \text{and} \quad 4 = 6 - 2$$

- Extend to counting backwards in ones on a number line:



- They visualise differences using **multilink**

## Stage 4

- Children should now learn vertical subtraction with decomposition
- Dienes equipment can be used to model the method of exchanging

$$\begin{array}{r} \overset{8}{9} \overset{12}{3} \overset{1}{2} \\ - 457 \\ \hline 475 \end{array}$$

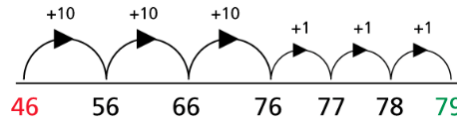
start here

Recommended by the end of year 4

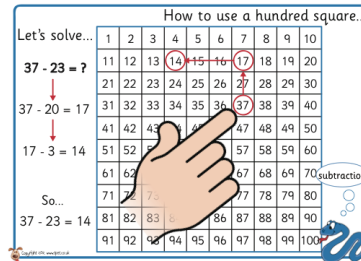
## Stage 2

- Children begin to find 'the difference'

$$79 - 46 = 33$$



- Children use a **100 square** to subtract a two digit number by counting back in tens then ones



## Stage 3

- Continue to encourage use of number line to find the difference by counting from smaller number to the larger one
- Progress to vertical subtraction without decomposition.
- Dienes equipment can be used to model this

$$\begin{array}{r} 156 \\ - 33 \\ \hline 123 \end{array}$$

start here

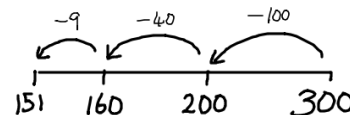
Recommended by the end of year 3

## Stage 5

- Subtracting from numbers containing zeroes such as 300 can be done by subtraction with decomposition but children may find using a number line more straight forward. See both methods below:

$$\begin{array}{r} \overset{2}{3} \overset{19}{0} \overset{1}{0} \\ - 149 \\ \hline 151 \end{array}$$

start here




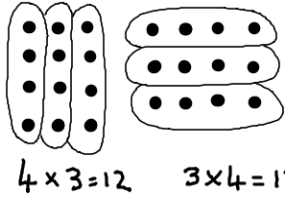
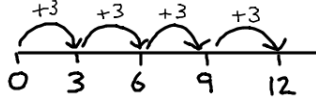
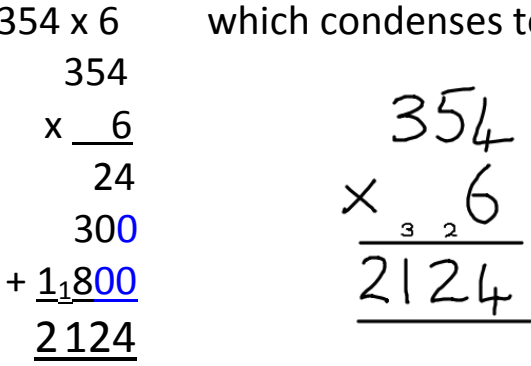
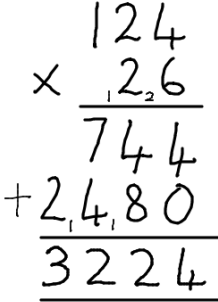
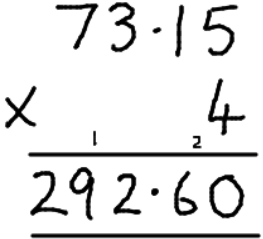
## Stage 6

- The same method is applied to subtraction of decimals

$$\begin{array}{r} \overset{5}{2} \overset{12}{6} \overset{1}{3} \cdot 5 \\ - 59.8 \\ \hline 203.7 \end{array}$$

start here

# Multiplication

<p style="text-align: center;">Stage 1</p> <ul style="list-style-type: none"> <li>Children begin to understand the concept of multiplication as grouping and 'lots of' and recognise the X symbol</li> </ul>  <ul style="list-style-type: none"> <li>They group objects and begin to understand 3 lots of 2      <math>3 \times 2 = 6</math></li> <li>They use X and = symbols and understand that  <math>3 \times 2 = 6</math>      <math>6 = 3 \times 2</math>  <math>2 \times 3 = 6</math>      <math>6 = 2 \times 3</math></li> </ul>	<p style="text-align: center;">Stage 2</p> <ul style="list-style-type: none"> <li>Children describe multiplication as an array and understand that it can be worked out in any order:</li> </ul>   <ul style="list-style-type: none"> <li>They use repeated addition on a number line</li> </ul> <p style="text-align: center;">Recommended by the end of year 2</p>	<p style="text-align: center;">Stage 3</p> <ul style="list-style-type: none"> <li>Children partition a number in order to multiply each part by a single digit:</li> </ul> $54 \times 6$ $4 \times 6 = 24$ $50 \times 6 = 300$ $+ \quad 24$ $\quad \underline{300}$ $\quad \quad \underline{324}$ <p style="text-align: center;">Children must be mastering their knowledge and use of 2x 3x 4x 5x 8x 10x table facts</p> <p style="text-align: center;">Recommended by the end of year 3</p>
<p style="text-align: center;">Stage 4</p> <ul style="list-style-type: none"> <li>Children should know all tables to 12x12</li> <li>Children use a formal written method of short multiplication</li> </ul> <p><math>354 \times 6</math>      which condenses to:</p>  <p style="text-align: center;">Recommended by the end of year 4</p>	<p style="text-align: center;">Stage 5</p> <ul style="list-style-type: none"> <li>Children progress to using formal long multiplication to multiply by a 2 digit number</li> </ul> <p><math>124 \times 26</math></p>  <p style="text-align: center;">Recommended by the end of year 5</p>	<p style="text-align: center;">Stage 6</p> <ul style="list-style-type: none"> <li>Children practice and master written methods continuing to decimals:</li> </ul> 

# Division

## Stage 1

- Children begin to understand the concept of division as sharing and grouping and recognise the  $\div$  symbol



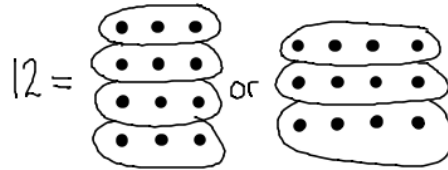
- They group objects and begin to understand

$$6 \text{ shared equally by } 3 = 2 \quad 6 \div 3 = 2$$

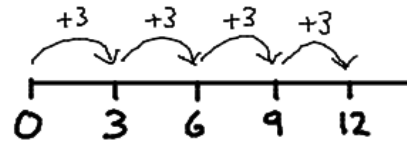
- They use the  $\div$  and  $=$  symbols

## Stage 2

- Children use arrays to group or divide numbers



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

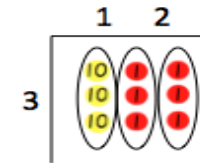


- They use repeated addition on a number line to reach the number

Recommended by the end of year 2

## Stage 3

- Children use short division to divide numbers
- Place Value counters can be used to model this method initially



$$\begin{array}{r} 12 \\ 3 \overline{) 36} \\ \underline{36} \\ 0 \end{array}$$

Recommended by the end of year 3

## Stage 4

- Children use a formal written method of short division to divide 3 digit numbers by 1 digit

$$672 \div 4$$

$$\begin{array}{r} 168 \\ 4 \overline{) 672} \end{array}$$

- They then move on to finding remainders

Recommended by the end of year 4

## Stage 5

- Children practice and master written methods continuing to decimals:

$$365 \div 4$$

$$\begin{array}{r} 91.25 \\ 4 \overline{) 365.00} \end{array}$$