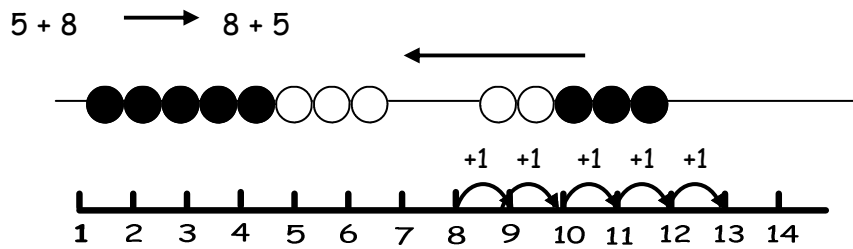


Stage	Progression for Addition		
1	<p>PRE-UNDERSTANDING/PRACTICAL EXPERIENCES</p> <ul style="list-style-type: none"> Use developing mathematical ideas and methods to solve practical problems involving counting and comparing in a real or role play context. <p>DEVELOPING UNDERSTANDING</p> <ul style="list-style-type: none"> Understand addition as combining sets to make a total, initially counting all items in the set then moving on to counting on from the larger number. Develop and support understanding through images such as: <div data-bbox="651 611 1107 904" data-label="Diagram"> </div> <ul style="list-style-type: none"> Interpret situations as addition calculations and explain reasoning. For example, answer questions using objects such as: <ul style="list-style-type: none"> <i>Lisa has 5 pens and Tim has 2 pens. How many pens do they have altogether?</i> 		
2	<p>DEVELOPING MENTAL CALCULATION</p> <p>Derive and recall addition facts - See appendices for yearly expectations and possible models and images to aid this learning.</p> <p>NB: Children should develop and use a 'toolbox' of mental calculation strategies from which they can choose the most efficient strategy to solve a calculation depending on the numbers involved in it.</p> <p>SPECIAL CASE STRATEGIES (to be taught alongside general strategies)</p> <ul style="list-style-type: none"> Compensation (adding nearest multiple of 10, 100 etc and adjusting) <div data-bbox="443 1608 1107 1883" data-label="Diagram"> </div> <ul style="list-style-type: none"> Near doubles (adding numbers relatively close to each other in value) <div data-bbox="443 1973 1107 2078" data-label="Equation-Block"> <table style="width: 100%; border: none;"> <tr> <td style="text-align: left; vertical-align: top;"> $12+13 = 12+ (12+1)$ $= 24+1$ $=25$ </td> <td style="text-align: left; vertical-align: top;"> $1.5 + 1.6$ <p>Double 1.5 plus 0.1</p> </td> </tr> </table> </div>	$12+13 = 12+ (12+1)$ $= 24+1$ $=25$	$1.5 + 1.6$ <p>Double 1.5 plus 0.1</p>
$12+13 = 12+ (12+1)$ $= 24+1$ $=25$	$1.5 + 1.6$ <p>Double 1.5 plus 0.1</p>		

- **Re-ordering** (use knowledge that addition can be done in any order) e.g. simplify the calculation by putting largest number first.....



..look for pairs of numbers that total 10 etc

$$8 + 3 + 5 + 2 = 10 + 8 = 18$$

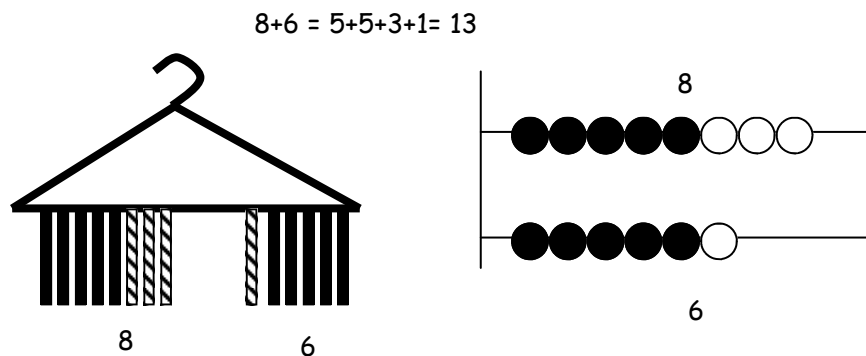
GENERAL STRATEGY

Partitioning:

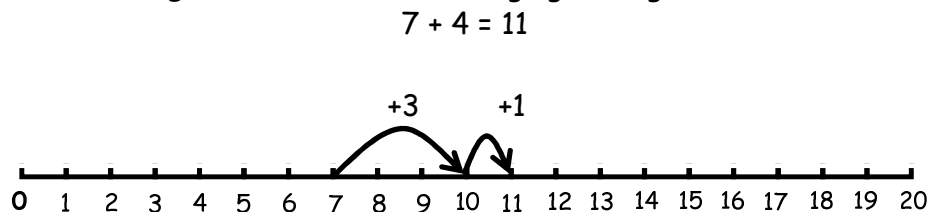
Use counting and developing recall of number facts to add a pair of numbers mentally by...

- **Partitioning** numbers into '5 and a bit'

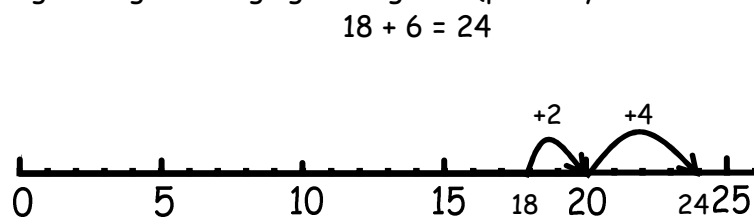
2



- **Partitioning** numbers to enable bridging through 10.....



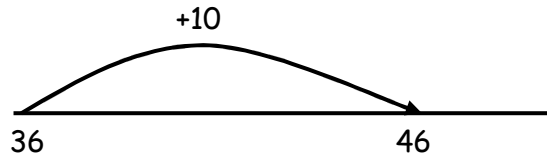
- ...progressing to bridging through 20 (partially marked number line)



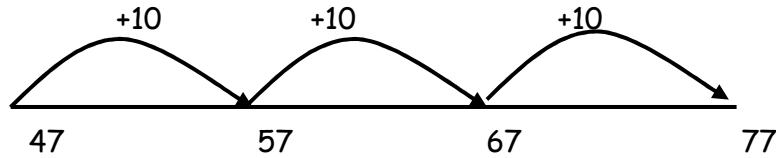
Addition of a 2-digit multiple of 10 to any 2-digit number (remember to make links with oral counting)

2

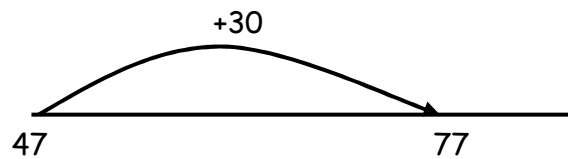
$$36 + 10 = 46$$



$$47 + 30 = 77$$

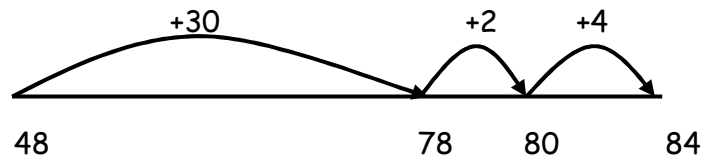


$$47 + 30 = 77$$

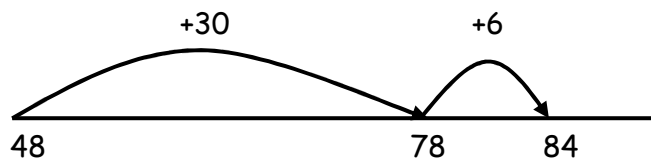


- **Partitioning** two digit numbers into their component parts

$$48 + 36 = 84$$



Leading to...



Children should be encouraged to jot according to their mental capability and eventually may be able to carry out the strategies demonstrated above without drawing a line e.g.

$$\begin{aligned} 48 + 36 &= 48 + 30 + 6 \\ &= 78 + 6 \\ &= 84 \end{aligned}$$

or

$$\begin{aligned} 48 + 36 &= 78 + 6 \\ &= 84 \end{aligned}$$

or

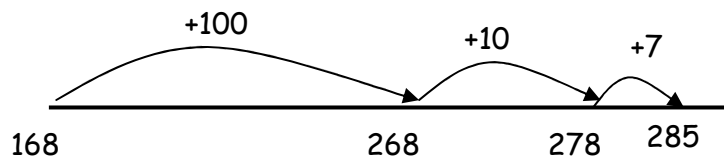
$$\begin{aligned} 40 + 30 &= 70 \\ 8 + 6 &= 14 \\ &= 84 \end{aligned}$$

WRITTEN METHODS:

Children should be encouraged to select an appropriate calculation method, be it mental or written, depending on the numbers involved in the calculation. To develop this skill children should be taught to ask themselves 'Can I do this mentally?' Therefore, it is important that children's mental methods of calculation are practised and secured alongside their learning and development towards a compact written method.

USING THE NUMBER LINE AS A WRITTEN METHOD FOR LARGER NUMBERS

$$168 + 117 = 285$$



- 3 EXPANDED WRITTEN METHOD:
This leads children to the more compact written method developing an understanding of its structure and efficiency. Two and three digit addition:
Write the numbers in columns

$$\begin{array}{r} 162 \\ + 35 \\ \hline 7 \\ 90 \\ \hline 100 \\ 197 \end{array}$$

Numbers are still added up mentally

$$\begin{array}{r} 168 \\ + 117 \\ \hline 15 \\ 70 \\ \hline 200 \\ 285 \end{array}$$

The amount of time that should be spent teaching and practising this expanded method will depend on how secure the children are in their recall of number facts and with partitioning.

COMPACT METHOD:

NB: For some children the number line or partitioning will still be the most efficient and reliable calculation method.

The Compact Method reduces the amount of recording required in the Expanded Method. Only the children who can calculate independently and accurately with the Expanded Method should be introduced to the Compact Method.

(When the Compact Method is introduced, use the language of adding the units, adding the tens and adding the hundreds)

- No 'carrying/ exchanges'

4

$$\begin{array}{r} 142 \\ + 23 \\ \hline 165 \end{array} \quad \text{and} \quad \begin{array}{r} 415 \\ + 224 \\ \hline 639 \end{array}$$

- One 'carry/exchange' - extra digit in the answer - the method could be introduced with 2-digit numbers however, the intention is that it is used to calculate numbers involving 3 or more digits

$$\begin{array}{r} 82 \\ + 27 \\ \hline 109 \\ 1 \end{array}$$

- One 'carry/exchange' - ones to tens

$$\begin{array}{r} 159 \\ + 34 \\ \hline 193 \\ \hline 1 \end{array}$$

- One 'carry/exchange' -tens to hundreds

$$\begin{array}{r} 541 \\ + 293 \\ \hline 834 \\ \hline 1 \end{array}$$

- Two 'carries/exchanges' - 'ones to tens' and 'tens to hundreds'

$$\begin{array}{r} 376 \\ + 485 \\ \hline 861 \\ \hline 11 \end{array}$$

- Use method to begin to add 2 or more 3 digit sums of money or measures, with or without adjustments, and the same number of decimal places.

4

$$\begin{array}{r} \pounds 4.21 \\ \pounds 3.87 \\ \hline \pounds 8.08 \\ \hline 1 \end{array}$$

NB:For children displaying a lack of understanding of recording at Stage 4, return to the expanded method of recording at Stage 3.

- Extend method to numbers with at least four digits.

$$\begin{array}{r} 1587 \\ + 475 \\ \hline 2062 \\ \hline 111 \end{array} \qquad \begin{array}{r} 3587 \\ + 1675 \\ \hline 5262 \\ \hline 111 \end{array}$$

- Use the compact method extending to numbers with any number of digits.
- Use the compact method to add two or more decimal fractions with up to 4 digits and either 1 or 2 decimal places.
- Continue to use number line for time

